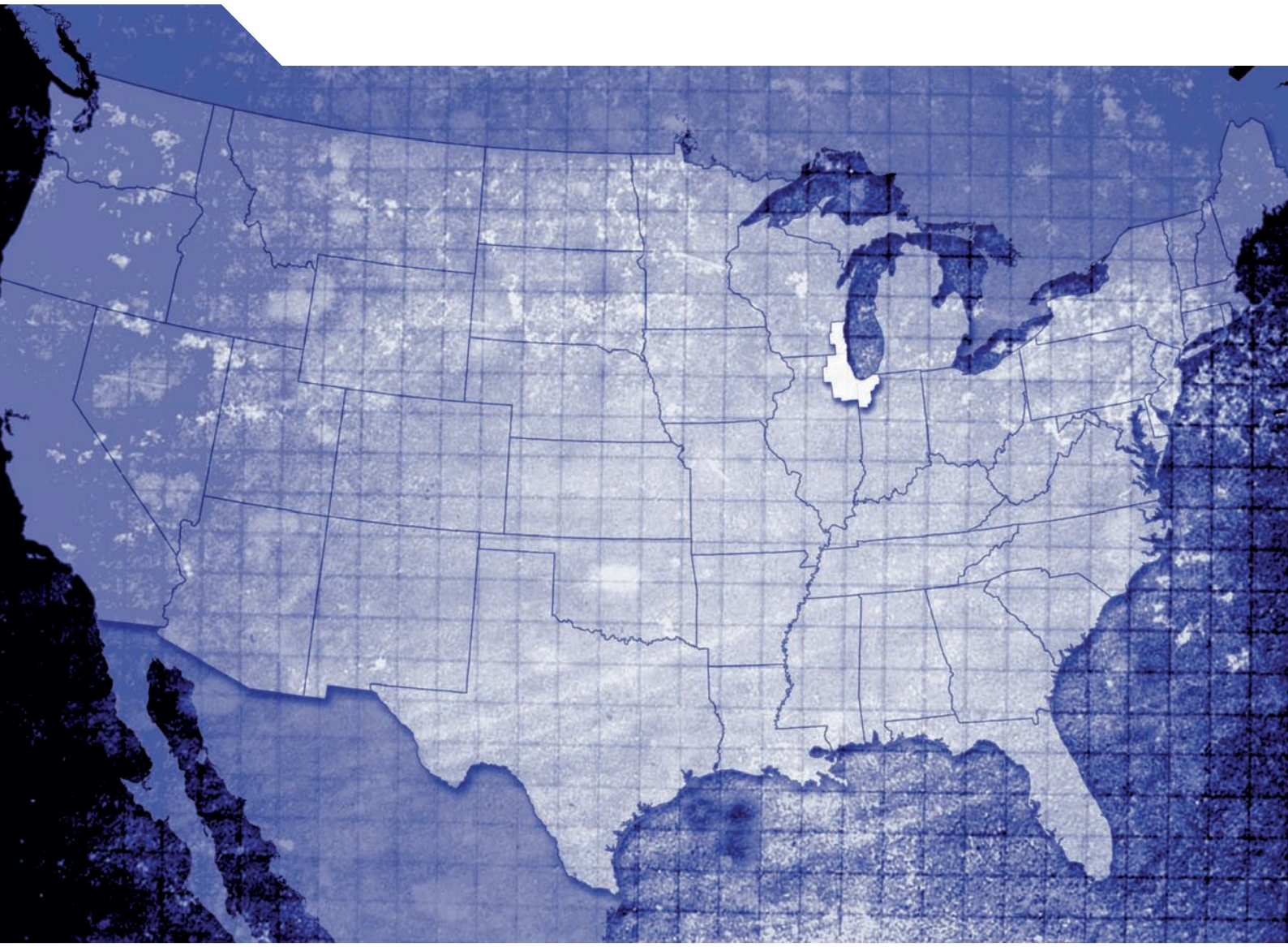
OECD Territorial Reviews

The Chicago Tri-State Metropolitan Area, United States



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OECD Territorial Reviews: The Chicago Tri-State Metropolitan Area, United States 2012

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Foreword

Across the Organisation for Economic Co-operation and Development (OECD), globalisation is increasingly testing the capacity of regional economies to adapt and exploit their competitive edge, while also offering new opportunities for regional development. This is leading public authorities to rethink their strategies. Moreover, as a result of decentralisation, central governments no longer have the sole responsibility for development policies. Effective relations between different levels of government are now required in order to improve the delivery of public services.

The need to pursue regional competitiveness and governance is particularly acute in metropolitan regions. Although they produce the bulk of national wealth, metropolitan economies are often held back not only by unemployment and distressed areas but because opportunities for growth are not fully exploited. Effective metropolitan governance is called for if a functional region as a whole is to reach its full potential.

In 1999, the OECD, responding to a need to study and spread innovative territorial development strategies and governance in a more systematic way, created the Territorial Development Policy Committee (TDPC) and its Working Party on Urban Areas (WPUA), as a unique forum for international exchange and debate. Among the activities the committee has developed are a series of case studies on metropolitan regions that follow a standard methodology and common conceptual framework. This allows countries to share their experiences, and is intended to produce a synthesis that will formulate and diffuse horizontal policy recommendations.

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This Review was co-ordinated and drafted by Lamia Kamal-Chaoui, Head, Urban Development Programme, Adam Knelman Ostry, Senior Counsellor, and Alexis Robert, Policy Analyst. The Review also draws on key contributions from Karen Maguire (Innovation), Olaf Merk (Transportation and Logistics), Javier Sanchez-Reaza and Jose-Luis Alvarez-Galvan (Economic Analysis). Targeted research results were provided by Giulia Ajmone Marsan and David Gierten. Extensive substantive comments were provided by William Tompson and Emily Farchy (Workforce Development). Michael G. Donovan contributed to the initial co-ordination of the Review. Jeanette Duboys prepared the Review for publication.

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- **The Netherlands:** Mr. Jan Evert Visser, Senior Policy Advisor, Ministry of Economic Affairs, Agriculture & Innovation, Department of Regional Affairs and Spatial Economics, the Netherlands
- **Sweden:** Mr. Ola Göranssen, Deputy Director, Climate Division, Ministry of the Environment, Sweden

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Acronyms and abbreviations

ALMP	Active Labour Market Programmes
APS	Advanced Producer Services
BOMA	Building Owners and Managers Association
C&D	Construction and Demolition
C^2ST	Chicago Council on Science and Technology
CCAP	City of Chicago's Climate Action Plan
CCX	Chicago Climate Exchange
CEC	Chicagoland Entrepreneurship Center
CMAP	Chicago Metropolitan Agency for Planning
CNA	Certified Nursing Assistant
CPS	Chicago Public Schools
CREATE	Chicago Region Environmental and Transportation Efficiency
CSO	Combined Sewer Overflow
CTE	Career and Technical Educational
CWIC	Chicago Workforce Investment Council
EDC	Metro Denver Economic Development Corporation
ENMAX	Calgary local energy distributor
ESCOs	Energy service companies
ETA	Employment and Training Administration
GCM	Gary-Chicago-Milwaukee corridor
GLRC	Great Lakes Regional Collaboration
HEI	Higher Education Institute
HVAC	Heating/Ventilation/Air Conditioning
iBIO	Illinois Biotechnology Industry Association
ICCB	Illinois Community College Board
IEDC	Indiana Economic Development Corporation
IHSCA	Institute of Health Science Careers Academy
IIT	Illinois Institute of Technology

IL	Illinois
IN	Indiana
INTERREG	EU programme to foster interregional co-operation
ISTC	Illinois Science and Technology Coalition
ITA	Illinois Technology Association
KIN	Kellogg Innovation Network
KISA	Knowledge Intensive Service Activities
LPN	Licensed Practical Nurses
MPO	Metropolitan Planning Organization
MSA	Chicago-Naperville Joliet Metropolitan Statistical Area
MSA	Metropolitan Statistical Area
MVA	Øresund Medicon Valley Academy
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago
NGOs	Non-Governmental Organisations
NIRPC	Northwestern Indiana Regional Planning Commission
NITEC	Northern Illinois Technology Enterprise Center
OMP	O'Hare Modernization Program
P-20	Council to improve the alignment of education systems, from preschool through graduate schools
PACE	Property-Assessed Clean Energy
PATH	Northern New Jersey's commuter rail service
PAYT	"Pay-as-you-throw"
PISA	Program for International Student Assessment
POWT	Private Onsite Wastewater Treatment Systems
PPP	Public-Private Partnerships
RIAN	Regional Innovation Acceleration Network
RNFIL	recognition of non formal and informal learning
RPS	Renewable Portfolio Standards
RTA	Regional Transport Authority
SBIR	Small Business Innovation Research
SBTT	Small Business Technology Transfer
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SMEs	Small and Medium-sized Enterprises
STEM	Science, Technology, Engineering, and Mathematics

STI	Science, Technology and Innovation
STTR	Small Business Technology Transfer
TARP	Tunnel and Reservoir Plan
TFP	Total Factor Productivity
TL2	Territorial Level 2
TRIEC	Toronto Region Immigrant Employment Council
USDOL	United States Department of Labor
VC	Venture Capital
WAN	Wisconsin Angel Network
WBC	World Business Chicago
WBMC	Workforce Boards of Metropolitan Chicago
WI	Wisconsin
WIA	Workforce Investment Act
WIB	Workforce Investment Boards
WIN	Wisconsin Innovation Network
WIRED	Workforce Innovation and Regional Economic Development
YA	Youth Apprenticeship

Assessment and recommendations

The ChicagoTri-State Metropolitan Region straddles three US states.

The Chicago Tri-State Metro-Region – the 14-county Chicago-Naperville Joliet Metropolitan Statistical Area (MSA) – is home to approximately 9.5 million people, of whom over 90% live in Illinois, less than 2% in Wisconsin and the remainder in Indiana. It is the third most populous metropolitan area in the country, and the tenth largest among the OECD Metro-Regions. Only Los Angeles and New York have larger populations within the US, all three being outstripped by Mexico City, Seoul and, especially Tokyo with its 35 million inhabitants. The City of Chicago, located essentially in Cook County but extending into parts of DuPage County near O'Hare international airport, has a population of 2.7 million (28% of the total metro population) and a population density about ten times higher than the region's average. The fact that the region crosses state boundaries and encompasses a large number of municipal and other service-based administrative units poses particular challenges for its effective governance and development. Beyond the Chicago Tri-State Metro-Region, the 21-county Tri-State Region, sometimes referred to as the Gary-Chicago-Milwaukee corridor, is increasingly regarded by civic, business and political leaders as a common economic area, with nascent and growing commuting flows from the seven "external" counties into the Chicago Tri-State Metro-Region.

The region is rich, but does not rank at the top

An economic snapshot of the Chicago Tri-State Metro-Region shows that it constitutes one of the largest metropolitan economies in the OECD (ranking 8th among the 90 OECD metropolitan areas in terms of GDP). It contributed 3.4 % to US GDP in 2008 and represented 3.1% of the national population in 2010. Similarly, the Tri-State Region's GDP, at USD 523 billion in 2008, is third in the US behind Los Angeles and New York. In terms of *per capita* GDP, the Tri-State Region ranks lower than San Francisco, Boston and Houston, as well as Los Angeles and New York. But the Tri-State Region's *per capita* GDP is nevertheless higher than those of several European metropolitan areas that are usually thought of as being wealthy, such as London, Paris, Stockholm, Milan or Amsterdam.

The region is economically diversified

Key elements of success of the Tri-State Metro-Region are that its economy is both broadly based and responsive to changing demands. Its geographic position ensures that it will continue to be a major and growing transportation hub for both domestic and international traffic, passenger and freight (50% of all US rail freight passes through the Metro-Region). Its traditional manufacturing industries are declining in importance,

although specialisation in this area remains high compared to other US Metro-Regions and the national average (which still represents 11.4% of employment). The new sectors of nanotech, biotech, ICT and green engineering are becoming increasingly important, as evidenced by Chicago's high level of patent applications in these domains (it ranks 12th among the 90 Metro-Regions for total patent applications and fifth for nanotechnology). Such innovative activities are aided by both the high proportion of highly educated people in the population – approximately 34% of the population are 25 years old and over have at least a Bachelor's degree, a higher proportion than the national average of 28% (estimates for the period 2005-09) – and by the presence of world-class academic and research institutions. Innovation in the financial sector has also helped maintain Chicago's position as a world-class financial centre and as a leader in derivatives trading. Finally, both the public and the private sectors have worked together in the past to make Chicago an attractive location for corporate headquarters and an attractive place in which to live, with its parks, theatres, museums, music centres, world-famous architecture, and lakeside setting. The City of Chicago regularly ranks near the top in global city-attractiveness ratings.

But its growth has slowed …

The Tri-State Region's growth rate has been slipping; for most of this century, its GDP growth has lagged behind that of the US average. This slowdown has been even more marked in *per capita* terms. Between 2001 and 2007, real annual GDP growth averaged 1.6% lower than the OECD average for Metro-Regions (at 2.6%). The Tri-State Region ranked 50th out of 74 OECD Metro-Regions and 22nd out of 29 US Metro-Regions. When compared to OECD metro areas using *per capita* GDP growth rates, the Tri-State Region ranks 56th out of 84 OECD Metro-Regions. Several US metro-areas have managed to do better than average, and the Tri-State Region is falling further behind both Los Angeles and New York (Chicago ranks 16th out of the 29 US Metro-Regions in terms of GDP *per capita* growth). This comparative lack of dynamism can in part be explained by the familiar convergence process: it is easier for less advanced regions to grow faster than leading ones, because the former can borrow and imitate production and distribution methods that have been developed by the latter. Once a metropolitan area converges on the technological frontier, its continued growth depends increasingly on policy advances and innovation that push that frontier further out – a more difficult, costly and riskier process.

The region's working-age population is ageing, and unemployment remains high

The Tri-State Region's population is comparatively young, and it constitutes the tenth largest labour market in the OECD, but its working-age population is ageing, and employment has not fully recovered from the crisis. The ratio of working-age to total population actually rose earlier this century and since 2007 has stabilised at 68%, much the same as in other metropolitan areas. However, the proportion of prime working-age adults, those aged between 25 and 44, is falling gradually, which could raise challenges in the labour market over the long term. Such challenges could be exacerbated by the fact that older workers who have been laid off in the recession may find it difficult to return to work, especially if they have been unemployed for long periods. Another cause for concern is that both the size of the labour force and the employment rate fell during the first decade of this century, although this partly reflects the severity of the recession,

which hit certain industries and certain segments of the population disproportionately severely, raising unemployment and discouraging many from even looking for a job. Unemployment in the Tri-State Region has risen from its pre-crisis level of 4.9% in 2007 to 10% in 2009, while the employment rate plunged from its pre-crisis level of 72.3% to just over 67% in 2009, a drop closely mirroring that in the US as a whole. Even before the crisis, labour market performance was relatively weaker than that of the nation.

Labour productivity growth rates have also slowed.

A major reason for the Tri-State Region's disappointing growth performance lies in the productivity of its workforce. Chicago is an attractive place in which to do business; overall, state and local taxes are not higher than the US average, the industrial composition of the region is more favourable than the national average, and the cost of living is not high. However, decline in participation rates and the ageing of the working age population limit growth prospects. Weak labour productivity since the early 2000s is a particular issue to be addressed. Although high in absolute terms – some 15% higher than the US average – its *growth rate* has been weak. One factor may have been the continuing decline in employment in manufacturing, where labour productivity typically grows briskly because of mechanisation, which leads to fewer jobs. Employment rises in the service sector where productivity growth tends to be slower. But this cannot be the whole story: the shift to a service-sector economy is a phenomenon common to most other OECD Metropolitan Regions, yet the Tri-State Region's labour productivity growth, at less than 1% annually over 2001-08, ranks 17th out of 26 US Metro-Regions, and was only about two thirds of the average for all OECD Metro-Regions.

The region is underperforming in terms of its percentage share of national output

The under-performance of the Tri-State Region in terms of output and labour productivity growth and job creation since the beginning of the 2000s is a loss not only for the region itself but, given the region's size, for the US economy as whole. A more dynamic Chicago Tri-State Metro-Region could provide an important contribution to national growth. For instance, if the Tri-State Region had performed better over 2001-08, i.e. under a scenario whereby its contribution to aggregate US growth had been around 3.4%, the percentage of its share of the national economy, the aggregate USD GDP growth would have been around 0.4% higher, a modest but palpable effect, which shows the significance of what happens in the Tri-State Region for the US economy as a whole. In the same vein, if employment in Chicago had grown at the national rate over 1990-2010, the region would have gained nearly 600 000 more jobs than it has today.

The region's population is well-educated...

In the Tri-State Region, the working-age population is comparatively well educated, though perhaps not to the levels that would be expected given its good higher-education infrastructure. It ranks fourth among US metropolitan areas in educational achievement, with nearly one-third of the Tri-State Region's population holding a BA degree or higher, and a quarter holding some college or associate degree. Institutes of higher education abound in the region, with over 200 post-secondary education and training institutions, graduating 140 000 annually. Northwestern University and the University of Chicago are ranked in the top 30 of the world's universities for science, and in the top 12 for business,

economics and engineering. Chicago's Booth business school was recently ranked first in the world in the *Economist*'s survey of 115 schools. These institutions attract students from all over the world.

... but there is a serious skills mismatch...

Yet skills acquired via the region's education system are useful only if businesses in the metropolitan economy need them; if not, then there is a skills mismatch. And the data suggests that there is indeed a serious mismatch between skills demand and supply in the Tri-State Region. While aggregated data for the region suggests that the *average* worker in the region has the formal education required to do the *average* job, the data conceals serious issues in certain key parts of the region's skill spectrum. At the high end, there is a large pool of high-skilled, highly educated workers, in principle more than sufficient to fill the jobs available at that level. At the low end, there are large numbers of high school drop-outs (38.3% in the City of Chicago in 2011 which is among the highest in the US) and others with limited education opportunities. They far outweigh the number of jobs available for individuals with low skills, even though the Tri-State Region's manufacturing industry as a whole has not modernised to the same extent as its competitors elsewhere in the US. In the middle of the spectrum, where most jobs lie, there is a marked education gap. Even in the currently depressed labour market, there are not enough individuals qualifying for the jobs that demand some higher educational attainment beyond a high-school diploma.

...exacerbated by significant underemployment, especially among blacks and Hispanics...

The skills divide is linked to a racial divide. Data on employment, unemployment and labour-force participation in the Tri-State Region reveal diverging trends in work experience by age and race. Between 2005 and 2009, about 75% of young white adults (ages 22-24) were working, compared to fewer than 70% of Hispanics, and only 50% of blacks. For workers aged 16-18, the discrepancy grows: 10% of 16-18 year-old blacks were working in this period compared with over 30% of whites and 25% of Hispanics. As education does not fully account for these low workforce participation rates, it must be concluded that a large number of youths and young adults in the region are neither working nor studying, particularly those who are black. This phenomenon is deeply rooted and predates the crisis. Occupations also tend to vary by race: in the City of Chicago, whites are far more likely to be in management, finance, real estate, the arts, and professional and scientific services than are blacks or Hispanics. Conversely, blacks are far more likely than whites to be working in low-paid occupations in transportation and health care, while Hispanics dominate manufacturing. In the 2007-09 period, unemployment rates of blacks, at 22.4% were nearly four times higher than for whites. Hispanics had unemployment rates of around 10%.

...and made worse by spatial segregation

Social exclusion and spatial segregation both reflect and reinforce labour market issues. The concentration of significant populations with very low skills and little labour force attachment represents a drag on future growth as well as aggravates the shortages in medium-skilled occupations in the labour market. The Chicago Tri-State Metro-Region's labour market is characterised by a high degree of geographic segmentation that reduces

low-income residents' access to employment, since they are likely to find it hardest to bear the cost of commuting. Only 5% of residents in the Metro-Region live in high-poverty neighbourhoods (in which 35% or more of residents live in poverty), while 20% of poor residents live in high-poverty neighbourhoods. This suggests that poverty is relatively isolated and concentrated in specific neighbourhoods. The poverty rate has increased over 2000-10, with poverty in the City of Chicago increasing faster than in the Chicago Tri-State Metro-Region, implying an increasing concentration of poverty at the core.

The skills mismatch could worsen...

A mid-level education gap could be filled in part by individuals with superior skills taking up jobs that are below their skill level. This would be a waste of talent, and a waste of educational resources. A better alternative would be to invest in education and training of the lower skilled, to bring them up to the level required by employers. In the Tri-State Region, this mid-level skill shortage is likely to persist: the share of employment in the region's manufacturing sector, which used to be a major employer of low-skilled workers, has shrunk over time, and is now down to about 8%, as compared with 12% a decade ago, and half of what it was 40 years ago. Investment in high-tech machinery has raised the productivity of those still working in the more successful firms in manufacturing in the Tri-State Region, but this has also raised the level of basic skills required to operate the machinery effectively. While low-skilled jobs are still to be found in some legacy manufacturing sectors and in some services (for example in hospitality and healthcare delivery), data shows that most future employment creation will require at least a high school diploma.

Too many youth drop out of high school in the inner city, particularly Hispanic and black youth

Although the Tri-State Region as a whole can claim that it has a lower proportion than the national average of inhabitants with no high school diploma (7.3% compared with 8.5%), the drop-out rate in the City of Chicago, at 38.3%, is well above the national average of 8.1%, and well above those in many other major cities. Drop-out rates elsewhere in the Tri-State Region are considerably lower: Naperville, Indian Prairie and Oswego have rates of 3% or lower, with graduation rates of around 95%. The skills divide also reflects racial inequality. Within the City, the black drop-out rate is over 43 % and only half have post-secondary education, whereas the white drop-out rate is at about 30% and over 70% have post-secondary education. The Hispanic drop-out rate is at 34% and only 30% have post-secondary education. Other ethnic groups, especially Asian, have formal educational outcomes similar to those of whites in the City, and considerably superior to them in the remainder of the Metro-Region.

Many training programmes exist, but spending, much of which is federal, is low by OECD standards.

A wide range of programmes exists; they concentrate on furnishing youth and adults with education, job placement, support services, vocational training and career information. Residents of the City of Chicago alone have 83 separate programmes, of which 39 are administered by the City itself through 13 agencies working with their counterparts at the state and federal level. An additional 41 programmes are administered

by the state of Illinois and three by the US Department of Labour (USDOL). That said the US spends only a *quarter* of the OECD average on workforce development programmes for improving the efficiency of the labour market, to train or retrain workers, or for other employment incentives. The USDOL and the federal Department of Education provide much of the funding for worker training, channelling it through programmes administered under the 1998 Workforce Investment Act (WIA). Federal funds are allocated to the local Workforce Investment Boards (WIBs) across the Tri-State Region that contract with local training entities (academic and private) to provide services. USDOL financing has fallen during the past decade, and the current tight fiscal environment suggests that funding might fall further. The three state governments in the Tri-State Region have their own budget challenges and are in no position to make up any shortfall. This is all the more problematic as the tight fiscal climate is accompanied by a large increase in the numbers of workers requiring well-targeted employment programmes to help them return to work, or find a suitable first job. It is therefore important that those receiving training acquire the skills that match the needs of business in the Tri-State Region.

Programme management is unco-ordinated

The atomisation of programme management has created a situation in which the plethora of training institutions do not communicate well with each other to co-ordinate curriculum design and delivery and avoid overlap and duplication, despite sharing common goals. They do not communicate well with the governments that fund them, nor – most importantly – with the business community that needs the skills that these training institutions are supposedly supplying. As a result, in the Tri-State Region, a large, disjointed training bureaucracy interacts poorly, if at all, with potential employers. As a result of the functional region crossing state lines, key stakeholders also cope with conflicting state priorities for workforce development. Businesses thus benefit from little, if any, inter-state co-ordination in the design and delivery of workforce development programming that reflects true, region-wide economic development needs. Given the current tight fiscal environment, progress in programme management must be made by improving collaboration between key institutional actors across the Tri-State Region, including federal funders, state and municipal governments, educational institutions, training service providers, the workforce boards and the business groups. The purpose of increased collaboration is to articulate common region-wide goals and implement region-wide strategic plans to achieve them. Region-wide collaboration should also focus on the development of robust indicators so that stakeholders can measure performance and intervene if necessary to ensure progress in achieving these goals. This should lead to taxpayers' money no longer being wasted on training programmes that equip low-skilled youth with skills and qualifications that may not meet the actual needs of the region's employers. And while in-house training provided by firms tends to benefit employees who already have more than basic education, *public* resources need to be focussed on upgrading skills at the bottom end of the skills hierarchy by involving employers in the vocational training curriculum-design and delivery process so that the training service providers can learn which skills are most in demand in key sectors across the region.

...and made worse by petty, destructive intra-region competition to attract businesses

Several recent examples of inter-state squabbling over finite (and diminishing) public resources or over business decisions to locate in a particular part of the Tri-State Region

point to the need to "take a step back" to integrate the true functionality of the region into planning for workforce development and economic development more generally. Empirical evidence in the US and elsewhere demonstrates that trying to increase the number of firms in a limited geographical area by luring them away from nearby localities in the same functional region via tax incentives is self-defeating in the long run, because it invites retaliation, and some of the firms involved may move to greener pastures when the tax breaks terminate, or may have moved to the region anyway even without the tax breaks. It is preferable by far to attract firms by showing that a pool of talent and organisations exists in the region that can help a newcomer exploit it. In the Tri-State Region, this petty, predatory zero-sum intra-regional competitive approach to economic growth and job-creation remains all too common.

... Addressing a shortage of high-skilled workers can boost the region's innovation-driven growth potential

Whilst the Tri-State Region ranks high among OECD regions on many technology-based innovation indicators in terms of *volume*, it ranks only 23th among OECD Metro-Regions and 11th among the US ones in terms of patents per capita. The region does not rank significantly as a US knowledge hub. Since the Tri-State Region's economy is closer to the productivity frontier, it is thus not in a position to benefit from "catch-up" growth. The region will therefore have to rely on innovation to sustain growth over the long term. Given that the US is a technological leader in many industrial sectors active in the Tri-State Region (e.g. financial services, pharmaceuticals, nanotech, information and communication technologies, etc), it is clear that future growth will have to be based on *region-wide* innovation systems that harness the region's entire suite of strengths and assets, starting with its people. Yet, at the high-skill end, data for the Tri-State Region points to an apparent oversupply of the most highly qualified and skilled adults. At the same time, the region's businesses complain that they cannot attract or retain them. This apparent paradox may indicate a skill-mismatch in this area as well. Stakeholders in the Tri-State Region need to analyse this issue further in order to define the strategic approaches most able to match high-end skills supply to demand, particularly in innovation-driven emerging business clusters.

The Tri-State Region has world-class universities and research labs

The Tri-State Region has strong research assets that can contribute to the innovation process including two world-class universities (Northwestern and the University of Chicago), the federally-funded Argonne National laboratory and the Fermi national Accelerator Laboratory. The excellence of the work conducted in the Tri-State Region's research facilities shows up in their ability to attract a significant proportion of research funding from the federal government, as well as from the states. These institutions actively contribute to the economic innovation process via licensing, funding start-ups, and working directly with firms. This talent and experience is less well recognised internationally. The Illinois Science and Technology Coalition (ISTC), a venture development organisation, aims to redress this by fostering public-private R&D projects, advocate for funding for R&D initiatives, and collaborating with public and private partners to attract and retain research resources in the region. The Tri-State Region's stakeholders need to develop and implement tailored *international branding strategies* aimed at both attracting in-bound foreign direct investment and talent and at maximising foreign-market penetration by region-wide firms.

Yet its tertiary education skills are average.

Innovation requires skilled persons to innovate. It also requires skilled persons to recognise the commercial possibilities of an innovation, and implement the results in the marketplace. Although the share of workers with tertiary credentials in the Tri-State Region is above the national average, Illinois ranks 14th among US states in this regard. In several countries and regions, placement of highly skilled workers into SMEs is promoted by innovation brokers – private-sector or academic organisations set up for the purpose, sometimes publicly funded. Such mechanisms, such as the UK's Knowledge Transfer Partnership, that maps recent graduates against job vacancies in high-tech firms and in emerging, innovation-driven business clusters more generally, could help address the common complaint by employers in the Tri-State Region that they find it difficult to attract and retain such workers.

Inter-firm and business-academia collaboration could be enhanced...

University research laboratories sometimes produce blockbuster products that give rise to millions of dollars in revenues. But this is rare. Research more typically results in incremental improvements leading to genuine but minor new products or processes that can be commercially exploited. Universities in the Tri-State Region have technology transfer units, whose staff can advise researchers on the best ways to transform their discoveries into commercially interesting ideas – pointing to the need to forge closer links between local industry and academia. In turn, this could be facilitated by consolidating existing university technology-transfer offices to make them more effective, along the lines of "Springboard Atlantic" in eastern Canada or the Northern Illinois Technology Enterprise Center, based at the Northern Illinois University, which performs these functions on a smaller scale and which should therefore expand its networks.

...as could access to venture capital for start-ups and SMEs in emerging clusters.

Large firms account for most R&D spending and they can afford to maintain research centres. By contrast, in very small firms, research and other innovation-directed activity might be impossible to dissociate from other activities at the individual employee (or entrepreneur) level and hence do not qualify for tax breaks or subsidies. It is sobering that the founders of Netscape, Paypal and YouTube studied at the University of Illinois but went to California to found their initially very small companies, likely because the Tri-State Region is insufficiently attractive for banks, venture capitalists and angel financiers to invest in high-technology and innovation-driven start-ups. Evidence points to the fact that in the Tri-State Region, banks traditionally focus their business on large legacy-based firms with a long history of activity in the region. Evidence also points to the relatively low flows of venture capital into Illinois-based firms, compared with those on the west and east coasts, and to the fact that Illinois-based recipients are comparatively less successful in generating jobs and revenues from these investments.

The Tri-State Region's hub functions are a growth driver too

All economic activity in the Tri-State Region (as in any region) depends to a significant degree on the state of its transportation (and communications) infrastructure.

The Tri-State Region is a major player in the fields of air passenger and freight, trucking and railways, and the efficiency of its transport services, including warehousing and intermodal facilities, affects not only the regional economy, but the entire North American economy. Transportation and logistics generate considerable employment and value-added across the region, with a significant impact on a variety of economic sectors. Important indirect effects (backward and forward linkages) of transportation on other sectors of the economy, along with Chicago's position as main airline hub, have had an impact on headquarter functions and high value-added jobs in the region. Its strong position in railway transport has also translated into innovative activities, such as high patent shares in railways.

...Air transportation works better than ground transportation

O'Hare airport is the second largest in the US for passenger traffic, and fourth in the world, with nearly 70 million passengers transiting through each year. The Tri-State Region's airports perform important hub functions, and have North America's largest diversity of direct destinations after New York. The Tri-State Region's position in air cargo transport is less central in terms of volume, but still scores highly in terms of diversity of destinations. On the other hand, problems of surface congestion are longstanding in the Tri-State Region. One vehicle in six on the interstate highways is a truck – and trucks carry about one half of freight by weight and three quarters by value. They contribute to congestion on urban roads. In addition, and unusually within a major metropolitan region, the Tri-State railroad network has many level crossings with road barriers. Freight trains passing through the area are often of the Class 1 variety, with a large number of wagons which sometimes leads to gridlock. Truck congestion costs are estimated at well over USD 5 billion annually, or about 1% of the region's GDP, on a par with Los Angeles and New York, and far above those in other US metropolitan areas.

The public transit system is key to the Metro-Region's attractiveness but inadequate

The Chicago Tri-State Metro-Region's extensive urban and commuter rail system has helped it rank highly among world cities, but the system is underfunded and is no longer meeting the needs of the regional labour market. The Metro-Region is among the top 20 OECD Metro-Regions in terms of suburban growth, and ranked 51st out of 90 OECD Metro-Regions in terms of population density, below the OECD average and that of the Los Angeles and New York Metro-Regions. As a result, only 24% of the working population living within three quarters of a mile (1.2 km) of public transport can get to work using public transport within 90 minutes, and in suburban areas this figure drops to 14%.One consequence is road congestion, which imposes higher costs on commuters in the urban areas around the City of Chicago than in any other US Metro-Region. While expanding the public transit system could reduce congestion and ease labour mobility, and increase jobs in one of the fastest-growing green jobs sectors, the public transit system barely has enough funding to operate, let alone upgrade or expand. The Regional Transport Authority (RTA), which serves six counties and 88% of the population in the Chicago Tri-State Metro-Region, estimates the cost of maintaining, enhancing and expanding the system over 2007-37 at USD 57 billion.

A comprehensive funding plan is needed, including user charges

To reverse the decline of the Chicago Tri-State Metro-Region's public transportation system, there is a need for all 21-counties in the Chicago-area 21-county region to contribute actively to regional transportation planning and funding. Beyond making a case for federal and state public transit funding, a regionally co-ordinated effort could consider two local sources of transit funding: congestion charges and value-capture taxes. Congestion charges should be considered as an integral part of a transport funding package. London has addressed the problem of public transit funding in part through a combination of direct charging for taking an automobile into the city, and competitive contracting out of private bus services. Congestion charges on vehicle use have been considered in the Chicago Tri-State Metro-Region, but not yet actively pursued, although a preliminary study found support for the concept among a range of stakeholder groups. Additionally, although policy makers may be reluctant to raise taxes, it would be worth considering expanding the existing value-capture tax, which could draw from the increase in property values arising from public infrastructure development.

The biggest barrier is the absence of integrated Tri-State, multi-modal transportation planning...

To ensure that air, road and rail freight and passenger traffic, including public transport traffic, can move freely and interact efficiently requires planning and implementation at the Tri-State regional level, with a clear understanding of the desirable long-term evolution of each mode and how best to harmonise their development over time. This is lacking. As in other major US metropolitan areas – New York with its Port Authority being the exception – there is no single regulatory authority over freight and passenger movements across all modes over the entire Tri-State Region. This is not necessarily a bad thing *per se*, but in its absence, a variety of private and public stakeholders have proposed solutions over time, mostly partial and many unfunded (with no coherence between them). Intra-regional surface transportation plans have been implemented, primarily aimed at improving rail capacity by focussing on level-crossing choke points. Yet no reference is made to road-rail coherence region-wide or to enhancing air cargo movement. Little thought has been given to the long-term evolution of the entire transportation system – surface, air and maritime – region-wide. And while each state is required to develop and implement a multi-modal transportation plan within its borders, nothing compels states to co-operate in the interests of functional regions that cross state lines. As a result, there has been no meaningful inter-state integrated transportation planning in the Tri-State Region. If only because interstate commerce falls under the constitutional purview of the US government, an active federal engagement could induce the three states to co-operate more systematically to address region-wide transportation interests in an integrated fashion.

...reflecting non-engagement by State and federal authorities

Evidence from across the OECD suggests that when national governments engage with sub-national and regional authorities to pursue policy objectives that reflect the interests of functional regions, they do so in recognition of the importance these functional regions represent their country's national and international economic performance. They usually engage by using such tools as policy conditionality or financial incentives to encourage co-operation among public authorities on all sides of

administrative boundaries that criss-cross a functional region. In the case of the Tri-State Region, the most important players needing to collaborate on an on-going basis to articulate and implement region-wide, multi-modal integrated transportation plans are at the State level. In the absence of state-driven co-operation , the federal government could encourage the three states to work together to sustain the dynamism of the logistics hub and the efficiency of the Tri-State Region's transportation networks by designing a multi-modal, long-term, region-wide planning and regulatory-harmonisation framework. Such encouragement could take the form of an inter-state Compact-type arrangement, i.e. a legally-binding arrangement between state authorities, sometimes sanctioned by Congress through legislation, which focuses on ensuring inter-state co-operation to achieve common policy outcomes. Encouragement could also take the form of policy conditionality tied to federal transport funding, or of straight fiscal inducements aimed at encouraging dialogue between the various stakeholders in the private and public sectors to design and implement true region-wide, integrated intermodal transportation planning along with collecting relevant region-wide data and performance indicators.

The Chicago-area 21-county region has become specialised in a number of green sectors, particularly building and water

Innovation-driven economic growth in the Tri-State Region is reflected in the success certain emerging green-tech business clusters have been achieving. The Chicago-area 21-county region stands out for the number of its green business sectors, particularly those related to buildings and water technologies. The Chicago Tri-State Metro-Region ranks among the top five Metro-Regions in the US for specialisations in professional energy services, and also has strong specialisations in Air and Water Purification Technologies, Lighting, and Green Architecture and Construction Services. The Milwaukee Metro-Region is home to the top water-related cluster in the US and the Milwaukee Water Council, which strengthens the water technologies supply chain and research for over 150 firms and institutions. Sectors with strong opportunities for future growth include green buildings, wind energy, smart grid, vehicle electrification, and water purification and treatment.

Jobs are strongest in the buildings sector, and growth is modest but steady

Green jobs are growing in the Chicago Tri-State Metro-Region, with building-related activities boasting the largest share. The sectors of professional energy services, green architecture and construction services, HVAC and building control systems, energy-saving building materials, green building materials, and lighting together make up 31% of green jobs in the Chicago Tri-State Metro-Region, or roughly 11 300 jobs. These are followed by energy-related activities (9.3%), including nuclear energy, biofuels/biomass, wind, battery technologies, smart grid, solar photovoltaic, renewable energy services, solar thermal, geothermal and fuel cells. Going forward, building retrofits are estimated to be responsible for the highest number of new jobs over 2009-20. Energy distribution and supply jobs are next most important in terms of projected job creation, in activities related to smart grid and distributed renewable energy.

Energy-saving building retrofits are a key potential source of jobs and greenhouse gas emissions reductions, but funding is needed.

The built environment in the Chicago Tri-State Metro-Region presents both an important environmental challenge and green growth opportunity and should be a top priority for a green growth strategy. Building energy consumption accounts for well over half (63%) of the metro region's greenhouse gas emissions and presents an opportunity for an estimated 4 000 new jobs for energy-efficiency retrofitting. As building owners can be deterred by high up-front costs, local institutions such as the Chicago Center for Neighborhood Technology fill the gap by leverages government funds and providing technical advice. Energy service companies (ESCOs) provide another solution, as they can finance the retrofitting out of the subsequent energy savings. However, their use in residential building retrofits in the Chicago Tri-State Metro-Region is still limited. Another way to reduce the barrier to entry would be municipal low-interest loans repayable through property taxes, but this would require a change in US federal legislation.

Wind energy is promising but not yet price competitive

Chicago has long been known as the "windy city", and it is no coincidence that there is interest in generating more electricity from wind power. Currently, this source of renewable energy accounts for a miniscule 1% or so of the total, but stringent new pollution regulations on coal-fired plants (40% of the total) may force some of them out of business, and drive up the demand for renewable sources. At present, 13 wind energy firms have their headquarters in the Tri-State Region, and the Chicago-area 21-county region counts over 60 wind companies, including members of the Wisconsin Wind Works in the Milwaukee Metro-Region. These firms cover a large part of the supply chain, including turbine and tower makers, manufacturers of gears, couplings, bearings and fasteners, as well legal, financial and engineering consulting and diagnostic software designers. With 540 jobs in 2010, the Chicago Tri-State Metro-Region ranked 6th among US metro regions for wind industry jobs, having experienced 39.3% annual average growth between 2003 and 2010. Nevertheless, the sector is not yet competitive with fossil-fuel energy sources, and its viability still depends on subsidies and regulations, such as mandated or voluntary renewable energy portfolio standards in Illinois, Indiana and Wisconsin.

"True-cost" pricing of water and waste encourages conservation and raises revenue, and highlights the need for a price on carbon

There is a crucial need to set prices that match environmental impact and resource availability. Low energy prices may be stifling renewable energy and energy efficiency innovation. A national price signal, such as in the form of a cap-and-trade programme or a carbon tax, could make renewable energy sources much more cost-competitive with fossil fuel sources, depending on the baseline price that was established. Similarly, water fees in the Metro-Region could send a more accurate price signal, with the goal of increase efficiency and revenues. Currently, several hundred thousand customers lack water meters, and even when fees are set for water use, they are at levels higher than actual average usage, which discourages conservation. "Pay-as-you-throw" waste fees could raise revenue, increase recycling and reduce waste going to landfill in the region.

While this form of pricing successfully operates in hundreds of cities throughout the US and Europe, it has not been widely applied in the region. Waste and water fees that reflect the true costs of consumption and the limits on the resource's availability provide a further argument for a national pricing signal for carbon that reflects the negative externalities associated with greenhouse gas emissions.

Need to better identify and foster green tech clusters

The Chicago Tri-State Metro-Region and the Chicago-area 21-county region both have strong green research and development (R&D) assets that contribute to green innovation. These include the Argonne National Laboratory, whose spinoffs include cutting-edge solar and battery technologies, and Milwaukee Water Council, which has launched a venture fund to provide capital to water start-ups and begun work on business incubator. Despite these green research assets, R&D in the region has dropped and venture capital for energy-related start-ups remains low. In addition to the Milwaukee Water Council, two Illinois organisations provide models for attracting venture capital to the green sector. The Illinois Science and Technology Coalition (ISTC), focuses on areas where Illinois businesses and universities can both fill a market gap and stand out in the marketplace. The Illinois Clean Energy Trust, a non-profit clean energy business accelerator, conducts parallel connects researchers with entrepreneurs and financiers to help commercialize new energy-related business opportunities.

Better regional co-ordination is needed to identify both emerging clusters and financing opportunities

Regional institutions such as CMAP in northeastern Illinois, SEWRPC and the Milwaukee 7 in southeastern Wisconsin, and NIRPC in northwestern Indiana, have an important role to play in regional co-ordination to value and promote the green firms and investments in the Chicago-area 21-county region. In the short-term, this could take the form of a much-needed inventory of green financing resources and a strategy for pursuing funding opportunities on a 21-county region-wide basis. In the longer term, a regional institution may be needed to provide a convening role for key public and private-sector actors to make difficult decisions across state lines on priorities for infrastructure investment. As the labour market extends across the Metro-Region, regional information collection on green sector training needs would also be an important step to determining the scale of green training needed.

Effective institutional arrangements are required to address the Tri-State Region's challenges

Institutional arrangements in the Tri-State Region are not well adapted to address many of the challenges the area faces. At issue is its extreme fragmentation, exacerbated by the fact that the functional region crosses state lines. The Greater Toronto Area has 28 local and city government entities. Greater London has 34. The Paris Metro-Region, one of the most fragmented in the OECD, has nearly 1 400. The Chicago Tri-State Region has 1 700 distinct units, each with its own revenue and responsibilities, often overlapping geographically even at the lowest level. There is no inherent disadvantage in having small local government units: they are close to the communities they serve, and may be the best placed to deliver the services their clients want and are willing to pay for.

But proliferation on this scale sometimes leads to myopic decisions, whilst area-wide consensus and long-term strategic thinking become difficult, if not impossible, to achieve.

Existing institutions need to work together on a Tri-State regional approach

Stakeholders have already successfully undertaken some projects requiring extensive collaboration and co-ordination across multiple agencies and state jurisdictions. Regional leaders should therefore focus on building region-wide dialogue using *existing regional institutions* to address the region's challenges. They need not create *new* regional institutions. Indeed, efforts must be consistent with the overall regional plans already developed and should be flexible and responsive to the specifics of a given situation. The existing metropolitan planning authorities (MPOs), The Chicago Metropolitan Agency for Planning (CMAP), the Southeastern Wisconsin Planning Commission (SEWRPC) and the Northwestern Indiana Regional Planning Commission (NIRPC), already co-ordinate transportation and economic development, as well as land use, in their particular metropolitan jurisdictions. Although their legal mandates are geographically limited, there is no barrier to their discussing and collaborating with each other to ensure coherence at the regional level. Some steps have already been taken (NIRPC, 2011), and more should be encouraged.

Advance the Tri-State Region's functional interests

The Metropolitan Planning Organizations have suggested in their long-term planning exercises that planning should be integrated and multi-sector, focusing on economic development, community liveability, workforce development and region-wide mobility for people, goods and services. In this regard, where it makes sense, the spatial footprint of the integrated planning can in fact extend to the 21-county region, particularly with respect to transportation/logistics planning and economic development more broadly. So, the focus of integrated planning should consider the spatial scale along with the relevance of pursuing multi-sector policy objectives at that scale. In other words, region-wide planning if necessary but not necessarily region-wide planning, at the Tri-State or 21-county region of coverage. Integrated, region-wide targeted planning could focus on:

- *Economic Development*, including cluster building, business productivity and innovation capacity in legacy and emerging clusters, particularly in the green economy, international market projection and branding, and attracting foreign direct investment and technological advancements into the Tri-State Region;
- *Workforce Development*, including human capital formation, attraction and retention, matching skills supply with demand across the Tri-State Region at all levels of economic activity, enhancing labour productivity and innovation capacity across theTri-State Region;
- *Transportation and Logistics Development*, including integrated, intermodal, region-wide plans aimed enhancing the fluid, seamless mobility of people, goods and services into, through and out of theTri-State Region.

...in innovation-driven economic development

The Metropolitan Planning Organizations (or the lead convener-stakeholders) across theTri-State Region could therefore consider "leading the charge" to build more effective inter-state planning to pursue theTri-State Region's economic development objectives. They could consider convening regular stakeholder meetings to enhance, monitor the implementation of, and monitor progress on, integrated regional economic development planning. Stakeholders in theTri-State Region's economic development include the chambers of commerce, the business associations and their related non-government organisations, state, county and local governments, in particular the State departments of Commerce and the City of Chicago (by far the largest municipal government in theTri-State Region), research institutions and federal research laboratories in the region.

...in an efficient and effective region-wide labour market

Key to sustaining innovation-driven economic performance across theTri-State Region is human capital. At issue are the challenges associated with matching skills supply to demand, coupled with ensuring that businesses in the main legacy manufacturing sectors innovate to a degree that their skills needs match those of their counterparts across the country. Additionally, training service providers are not sufficiently co-ordinating curricula and training services offerings to meet business needs in the emerging innovation-driven clusters. Basic skills for both children and youth and for adults in stressed neighbourhoods across the region are also not being met effectively. Addressing these issues effectively requires the development and implementation of integrated, targeted, region-wide approaches, while reducing overlap and duplication in the provision of basic and advanced education and training services across the region and pooling increasingly scarce public training resources effectively.

...and in integrated, Tri-State, intermodal transportation planning

To maximise the logistics hub's potential, key public and private stakeholders need to focus on developing, implementing and monitoring success in the implementation of integrated, intermodal, region-wide plans. Transportation investments will require greater vertical co-ordination at the state and federal level, with priority given to projects with the greatest region-wide return. Regional stakeholders, including elected officials, business leaders, and policy makers, should renew efforts to reform state grant funding allocations to ensure that theTri-State Region, a national economic engine, gets a commensurate share of transportation and other infrastructure funding. At the federal level, more efforts could be made to allocate scarce dollars to projects producing the greatest value, with a preference for multi-modal and multi-jurisdictional infrastructure projects (transit systems, bridges, roads, etc.). Examples of such policy conditionality abound across the OECD, including the suite of *Building Canada* federal infrastructure programming or the system of *Contrats de ville* in France.

By "catching the attention" of state and federal authorities

Leading by example is key to demonstrating the relevance of theTri-State Region as a region to state and federal authorities. In transportation especially, but in economic development more broadly, true region-wide collaboration across state lines by the

region's stakeholders leading to successful outcomes could draw state and federal attention to the need for high-level strategic planning that recognises theTri-State Region as a functional, integrated economic engine of the country's national and international economic performance. The potential impact on state and federal decision-makers of bottom-up leadership in theTri-State Region should not be under-estimated. Once the region's stakeholders demonstrate the economic relevance of theTri-State Region as a region, state and federal authorities will be in a better position to see that it is in their best interest to remove barriers to more systematic inter-state collaboration aimed at enhancing the region's capacity to contribute to America's national and international economic performance.

...building the evidence base through a university-based research network

There is a strong need for data and indicators to monitor performance and measure progress in the implementation of region-wide strategies and plans. More fundamentally, evidence-based policy design and implementation requires evidence: data to define challenges and metrics of performance to understand whether the strategies are achieving the objectives they were designed to achieve. In theTri-State Region, there is no shortage of individuals or institutions engaged in measuring performance in the policy areas under review. That said the capacity in the region to harness this information and present it in a way that "tells the region's story" coherently is lacking. Therefore, the region's key private-sector and not-for-profit stakeholders could consider funding a *university-based research centre* in theTri-State Region to network with existing researchers and universities to collect relevant research results, data and indicators on theTri-State Region and the major challenges it faces.

...and galvanising civic and political engagement in theTri-State Region

TheTri-State Region has traditionally benefitted from significant public-policy leadership in the private and non-profit sectors. The region could thus benefit from leveraging this leadership, which has historically articulated the need to increase the region's competitiveness through a region-wide approach. Indeed the top 100 private foundations alone in theTri-State Region control USD 17 billion in assets and USD 1 billion in giving annually. Civic engagement is essential if the region's residents and key institutional stakeholders are to be in a position to evaluate the challenges they face and judge the merits of the strategies designed to address them. The following could be considered as integral components of planning to maximise the economic performance of theTri-State Region:

- On-going *community outreach* to neighbourhood organisations, organised labour, philanthropic and not-for-profit institutions and business groups to solicit input to the planning process and participation in monitoring (and measuring) progress in implementing these plans;
- Expanding the organisations of *mayors and county executives* to encompass all members from the Tri-State Region and ensure that they meet regularly to discuss Tri-State level regional issues and the strategies required to address them;

- Regular meetings of the three *state governors* meet regularly - perhaps annually by themselves but at other times with their state secretaries of commerce, transportation and workforce development as well – to focus on Tri-State Region-wide issues and develop and implement integrated cross-boundary strategies to address them;
- Regular meetings of *state legislators* representing districts from across the Tri-State Region focussing on Tri-State Region-wide issues;
- The establishment of a *US congressional caucus* of elected officials representing all parts of the Tri-State Region to focus regularly on Tri-State Region-wide issues.

Summing up

The Chicago Tri-State Metro-Region is an economic powerhouse of international consequence with significant innovation potential but faces several structural challenges related to sustaining innovation-driven economic development, its transportation and logistics-hub functions, the effectiveness of its workforce development strategies over the long term and reducing negative environmental impacts while harnessing the potential of its green sector. These include skills mismatches at the low, medium and high ends of the workforce spectrum due to unco-ordinated and incoherent education and training programming that is fragmented across state lines and de-linked from businesses across the region. These challenges also include a transit system that is underfunded and a lack of integrated multi-modal, region-wide planning to maximize the seamless, fluid movement of goods, services and people into, within, and out of the region. These challenges speak to fragmented relationships between the stakeholder groups that together drive innovation and ensure long-term growth: businesses, universities and researchers and governments. They speak to the need for tailored, multi-facetted branding strategies to attract foreign investment and talent into the Tri-State Region and expand foreign-market opportunities for the goods and services produced in the region. Not only are these challenges *not* insurmountable, key stakeholders across the Tri-State Region are fully cognisant of their significance and of what to do to address them effectively. How to do so relates to the will to enhance the effectiveness of the region's institutional arrangements, particularly those that cross state-lines, in recognition of the Tri-State Region's functionality and its importance to America's national and international economic performance. As Daniel Burnham, a lead author of Chicago's first comprehensive development strategy, said in 1909, "*Make no little plans*..."

Chapter 1

Assets and challenges for the Tri-State Metropolitan Region's competitiveness

This chapter describes the spatial unit of analysis for the Review: The Chicago Tri-State Metro-Region is the third most populous metropolitan area in the United States, and its GDP ranks eighth out of the 90 OECD Metropolitan Regions. The chapter describes the main characteristics of the region's economy, including new sectors in nanotech, biotech, ICT and green engineering. The chapter assesses the main challenges facing the regional economy: growth rates are slipping due in no small part to the relatively poor productivity of its workforce, with a serious mismatch between skills demand and supply at all levels of business activity. The chapter then outlines the diagnostics that will frame the rest of the Review.

Key Findings

- *Home to approximately 9.5 million people, the Chicago Tri-State Metro-Region is the third most populous metropolitan area in the country, and the tenth largest among the OECD Metro-Regions. Its GDP ranks 8th out of the 90 OECD metropolitan areas', and third in the US behind Los Angeles and New York.*
- *The region's economy is broadly based. Manufacturing is important, if declining. The region continues to be a major hub for both domestic and international passenger and freight traffic. New sectors in nanotech, biotech, ICT and green engineering are growing in international importance. Approximately 34% of the population 25 years old and over have at least a Bachelor's degree, a higher proportion than the national average. The region boasts world-class academic and research centres. It is an attractive place in which to live, with its parks, museums, theatres, music and world-famous architecture. Chicago regularly ranks near the top in global city attractiveness.*
- *Yet the region's growth rates are slipping. The region ranks 50th out of 74 OECD Metro-Regions and 22nd out of 29 US Metro-Regions. A major reason for this lies in the relatively poor productivity of its workforce. One factor may be the continuing decline in employment in manufacturing. And while the region's population is comparatively young, its working-age population is ageing. But this is not the whole story.*
- *A serious mismatch between skills demand and supply at all levels of business activity affects the region's capacity to innovate and grow. This skills divide is linked to a racial divide. Unemployment rates for African Americans tend to reach nearly four times those for whites, while Hispanics' are at more than double those of whites. Social exclusion and spatial segregation both reflect and reinforce these issues in the region. Many training programmes exist but spending, much of which is federal, is low by OECD standards. Programming is unco-ordinated and made worse by petty intra-regional competition to attract business activity.*
- *The region's hub functions – key to the region's competitiveness – need to be addressed in a systematic way. Public transit in the region, also key to its competitiveness, is inadequate. Comprehensive inter-modal, region-wide planning is required, along with a funding plan based on sources that include congestion and value-capture charges.*
- *The region should focus on its emerging green-tech clusters. Most importantly, the region's stakeholders need to articulate and implement an integrated region-wide vision for growth and prosperity for the entire Tri-State Region and its residents.*

Like most other OECD countries, the United States is emerging from the Great Recession with a large budget deficit, high public debt and stubbornly high unemployment. The pace of growth is expected to be more moderate than most expansions, as recovery from severe financial crises is often slow and protracted (Sharpe, 1994; Reinhart and Rogoff, 2009; IMF, 2010). Moreover, with sluggish growth in demand, the US labour market will also take a relatively long time to recover fully. The US administration is seeking to stabilise the debt-GDP ratio by the middle of the decade by not renewing the stimulus measures introduced in the aftermath of the financial melt-down in 2008, by restraining discretionary federal spending and by efforts to reduce overpayments, waste, fraud and abuse in Medicaid and Medicare. Significant constraints on federal fiscal room are exacerbated by the fiscal challenges facing state and local governments, caused primarily by unfunded operating budget gaps in pension and health-care costs for public employees (OECD Economic Survey: United States, 2010). The current US fiscal situation, like that in most OECD countries, thus precludes any significant capacity to contribute public incentives to sustain economic growth, which requires innovative responses in public policies.

Hence, the United States, like countries across the OECD area, is looking for a new growth model. In what the OECD calls a "paradigm shift" (OECD Regional Outlook, 2011), many national and sub-national governments have begun focusing on growth, equity and environmental health not as policy *trade-offs* but as – potentially, at least – mutually reinforcing policy goals. The recognition that these goals can be mutually interdependent and reinforcing implies a "whole-of-government" approach to policy design, which can among other things lead to more efficient management of limited public investment resources. This is critical in a tight fiscal environment, as it represents one of the most important levers for governments to "do better with less", which they must do if they wish to support growth while pursuing fiscal tightening. Equally important is the implication that policy implementation is best carried out when it is based on harnessing the specific strengths and assets of a given geographic space.

This paradigm shift thus emphasises the important of place – and of place-based development models – if governments and their public and private partners are to design and implement multi-sector, integrated growth strategies effectively (Box 1.1). The United States is no exception to this trend, which can best be seen in the current administration's 2009 decision to engage in "an interagency process focused on investing in what works by evaluating existing place-based policies and identifying potential reforms and areas for inter-agency co-ordination". The White House asked heads of departments and agencies across the US Administration to "develop proposals that advance this Administration's policy priorities in the most effective way possible, whether by improving place-based strategies already operating or by adopting such strategies where there is significant potential for impact on problem(s)" (US White House, 2009).[1]

The present Review argues that this shift in approach represents a significant opportunity for the Chicago Tri-State Metropolitan Region. Though one of the wealthiest and most dynamic metropolitan areas in the world, the region has recently been under-performing, both relative to other large conurbations and in terms of the aspirations of its citizens.

Box 1.1. **How to define place-based policies?**

This *Outlook* discusses benefits of place-based policies as opposed to a spatially blind approach. The terminology defining place based policies carries different meanings to different people. For the purposes of this *Outlook* we consider place-based polices to reflect the OECD's "new regional paradigm", as opposed to the old paradigm (see table below). Broadly speaking, regional policy has evolved from top-down, subsidy-based interventions designed to reduce regional disparities into a much broader "family" of policies designed to improve the performance of regions. These can be characterised as follows:

- a development strategy covering a wide range of direct and indirect factors affecting the performance of local firms;
- a greater focus on endogenous assets rather than exogenous investments and transfers;
- an emphasis on opportunity rather than disadvantage; and
- a collective/negotiated approach to governance involving national, regional and local government along with other stakeholders, with the central government taking a less dominant role.

The rationale for the new regional approach is based on the principle that opportunities for growth exists in the entire territory and across all types of regions as documented in this *Outlook*. The aim is to maximise national output by assisting and encouraging each individual region to reach its growth potential endogenously.

Old and new paradigms of regional policy

	Old paradigm	New paradigm
Objectives	Compensating temporarily for location disadvantages of lagging regions	Tapping underutilised potential in all regions for enhancing regional competitiveness
Unit of intervention	Administrative units	Functional economic areas
Strategies	Sectoral approach	Integrated development projects
Tools	Subsidies and state aids	Mix of soft and hard capital (capital stock, labour market, business environment, social capital and networks)
Actors	Central government	Different levels of government

Source: OECD (2009), *Regions Matter: Economic Recovery, Innovation and Sustainable Growth.* OECD Publishing, Paris.

In the current conjuncture, macroeconomic policies are unlikely to generate the kind of robust recovery that might allow the Tri-State Region simply to "rise with the tide" of economic growth, and substantial financial assistance from federal or state governments cannot be expected. The need for a place-based approach is evident: generating a turnaround in the Tri-State Region's performance will require strategies to identify the best ways to use limited public resources and to make the most of Chicago's human, physical and financial assets. Fortunately, these are considerable, but mobilising them will require both strategic policy vision and effective governance.

It would not be the first time the Tri-State Region has needed such vision. In 1909, Daniel H. Burnham, lead author of Chicago's first comprehensive development plan, is

said to have admonished his political leaders to, "make no little plans; they have no magic to stir men's blood".[2] In the introduction to his Plan, one of America's first comprehensive metropolitan development frameworks, he wrote that "there can be no reasonable fear lest any plans that may be adopted shall prove too broad".[3] More than a century has passed since his magisterial metropolitan vision was adopted by the City of Chicago. Yet this spirit of thinking big, whether applied to public policy or governance to address challenges in the Metropolitan Region, is as badly needed today, if not more so, than at the dawn of the last century. As the United States emerges from the Great Recession, this Metro-Region's ability to drive national growth into the future, as it has in the past, is reaching a tipping point.

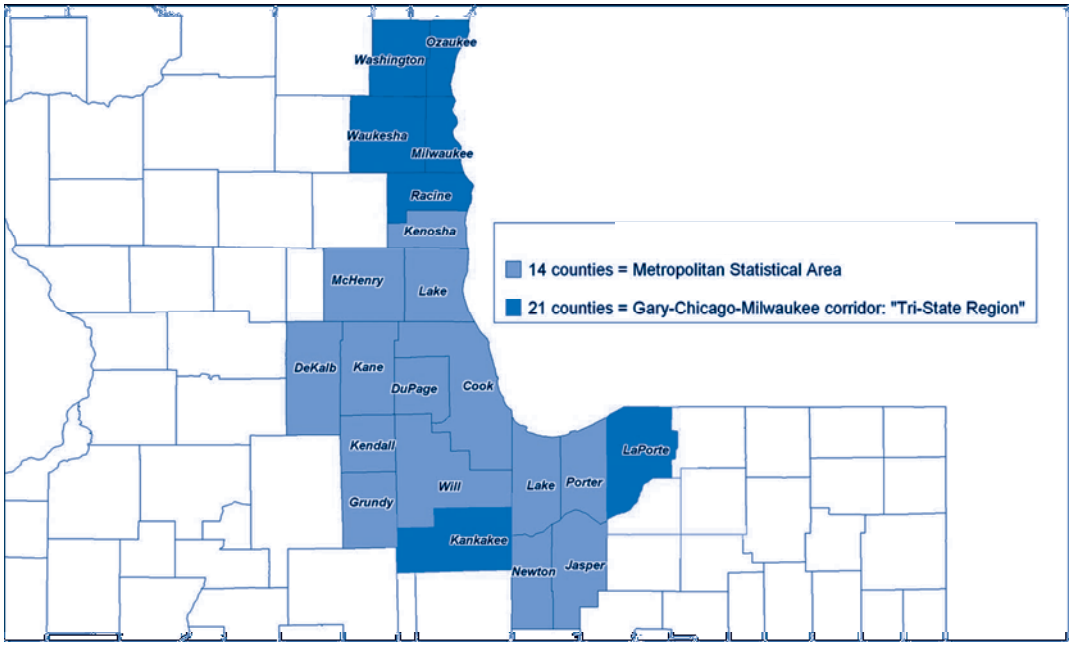
To demonstrate the validity of this assessment, the first chapter of the Review presents an analysis of the trends that characterise the region's economic performance. The chapter:

- describes the spatial units of analysis used in the Review;
- analyses the state of the region's key economic and workforce attributes, with a specific focus on the state of the region's innovation ecosystems;
- presents an analysis of the policy and governance constraints facing the region, focusing on lagging output and productivity bottlenecks, factors affecting the region's innovation capacity, transportation infrastructure challenges and workforce development issues;
- analyses the region's potential for addressing economic and environmental challenges simultaneously through the green economy; and
- concludes by identifying the need for a truly region-wide, multi-sector strategic vision to drive long-term growth, the policy components of which are laid out in the subsequent chapters in this Review

1.1. Chicago: a large metropolitan region straddling three states

The **Chicago Tri-State Metro-Region**, as defined by the 14-county Chicago-Naperville Joliet Metropolitan Statistical Area (MSA), is the third most populous metropolitan area in the United States (Figure 1.1). Its 9.46 million inhabitants (in 2010) place it behind the New York and Los Angeles MSAs. The Chicago Tri-State Metro-Region comprises 0.2% of the total surface area of the United States, is home to 3.1% of the total US population, and contributes 3.4% to the US GDP. The region is characterised by numerous relatively small municipalities, more than 300 in number. Each has its own municipal government which provides public services, such as public safety, and in many instances is responsible for land use zoning and issuing building permits. In addition, there are several special-purpose governments, or regional authorities, that have responsibility for water treatment, sanitation, transportation and the like. An extended area relevant to region is the **Chicago-area 21-county region** (also called the Gary-Chicago-Milwaukee corridor). This 21-county region extends beyond the Chicago Tri-State Metro-Region to also include five counties in the Milwaukee Metro-Region, a county in Illinois to the south of the Metro-Region and a county in Indiana to the east of the Metro-Region.

Figure 1.1. **Map of the Chicago Tri-State Metro-Region**



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: OECD elaboration with data from *Census 2000 County and County Equivalent Areas Cartographic Boundary Files*, U.S. Census Bureau.

One particular feature of the Chicago Tri-State Metro-Region is that it extends over three US states (Illinois, Wisconsin and Indiana). Most (90.8%) of the Metro-Region's population resides in Illinois (IL), with 1.8% living across the border in Wisconsin (WI) to the north and 7.5% living in Indiana (IN), to the east. The boundaries of many metropolitan regions in the OECD extend beyond administrative borders, which raises important challenges. Cross-border regions between countries (e.g. Copenhagen/Malmö, Vienna-Bratislava) or between states or provinces in federal countries face the challenge of co-ordination at a higher level of government (inter-country, inter-state). As will be developed in Chapter 6, efforts to increase growth and competitiveness in the Chicago region will require new, innovative approaches to co-operation, especially to bridge the barriers to region-wide planning caused by the state boundaries. This is further complicated by the fact that the Metro-Region is characterised by many special government districts, which in some cases cross municipal boundaries and which have been formed to provide particular services (e.g. water treatment, street lighting). The State of Illinois is notable for having more special purpose districts than any other state in the US (U.S. Census Bureau, 2007). The disconnect between existing administrative borders and the spatial and functional organisation of social-economic relationships within the region (as determined by commuting flows, inter-business transportation and business linkages), prevents the Chicago Tri-State Metro-Region from realising economies of scale.

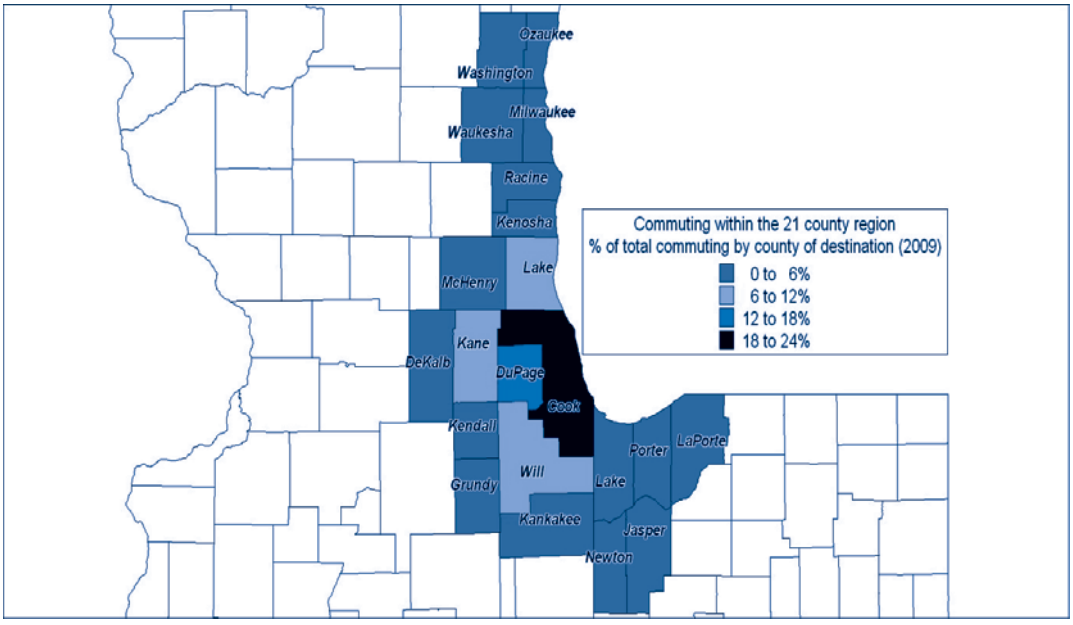
The City of Chicago dominates the Metro-Region, with 28% of the area's population and an equal percentage of the area's total jobs, albeit to a lesser degree than principal cities in other US Metro-Regions, such as New York, Los Angeles, Houston or Phoenix. Of the ten largest Metro-Regions in the US, the Chicago Metro-Region ranks fifth in the percentage of jobs located in the central city. Residents and employers thus face a relatively more dispersed and fragmented labour market than in some other metropolitan areas of comparable size. While there is some concentration of residents and jobs in the City of Chicago, much of the Metro-Region's population and jobs are spread throughout the more than 300 relatively small municipalities and unincorporated areas. Each municipality has its own government (or depends on a county or township) that provides public services, such as public safety, and is typically responsible for land-use zoning and issuing building permits (see below).

Journey-to-work patterns in the Chicago Tri-State Metro-Region are strongly influenced by the dominance of Chicago's central business district in terms of employment. As with most US metropolitan areas, many more people work in the central business district than live there, and workers commute many miles from their suburban homes to work in the central business district. As a consequence, the region's extensive rail and highway system has developed along a hub-and-spoke pattern, highways and rail lines emanating from the centre of the city to outlying areas. Commuting trips have become more and more varied, however. The Chicago Tri-State Metro-Region is situated on a virtually featureless plain, with Lake Michigan to the east creating the only natural barrier to expansion and connectivity, and thus businesses have increasingly located throughout the Metro-Region. Several employment sub-centres have developed, including in Evanston, Aurora and Naperville.

The 21-county region is characterised by nascent commuting linkages. For example, in 2009, 21 135 workers living in the Milwaukee Metropolitan Region, part of the 21-county region, commuted to work in metropolitan Chicago and 4 368 of these workers travel the extra distance to jobs in Cook County (Background Report). However, these commuters represent only a small percentage of the working residents of metropolitan Milwaukee, amounting 3% and 0.6%, respectively, of their resident workers. Therefore, the linkages through commuting between these two metropolitan regions and Chicago do exist but remain weak.

The Chicago-area 21-county region may be a functional area in the making. Workers in the Chicago Metro-Region continue to commute to work chiefly from outside Cook County into the City of Chicago and DuPage County (Figure 1.2). However, recent commuting flows are increasingly taking place between Chicago Tri-State Metro-Region and its belt. Commuting flows from the seven counties lying outside the Chicago Tri-State Metro-Region (what can be called the Tri-State belt surrounding the Chicago metropolitan area which can in turn be called the core) to the core, are growing at 2.16% annually, which is faster than any other origin-destination commuting combination in the region (Table 1.1). In the opposite direction, workers going from the Chicago Tri-State Metro-Region and to the Tri-State belt are growing at 1.96% annually, the second fastest speed in the period. These flows are growing 80% and 63% faster between the Tri-State core and belt respectively than what the flows within the Chicago Tri-State Metro-Region are growing (1.2% annually). In particular, Milwaukee is increasingly playing a destination role with commuters from the Chicago Tri-State Metro-Region growing at 3.3% annually.

Figure 1.2. **County destination for commuting flows in the Chicago-Area 21-county region**



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: Author's calculations based on data Chicago Metropolitan Agency for Planning provided by Chicagoland local team on 13 May 2011.

Table 1.1. **Commuting in the Chicago-Area 21-county region**

Annual average growth (2002-09)

Region	%
Within the Chicago Tri-State Metro-Region	1.20
Within the Chicago-area 21-county region	1.18
From the Chicago Tri-State Metro-Region to the Tri-State belt	**1.96**
From the Tri-State belt to the Chicago Tri-State Metro-Region	**2.16**
Within the Tri-State belt	0.77
Milwaukee case	
From Chicago-area 21 county to Milwaukee	1.60
From the Chicago Tri-State Metro-Region to Milwaukee	3.33
From Tri-State belt to Milwaukee	1.46

Notes: Chicago Tri-State Metro-Region: 14 counties of the Metropolitan Statistical Area. Chicago-area 21-county region: the total of 21counties (14 of the Chicago Tri-State Metro-Region plus 7 in the belt). Tri-State belt = 7 counties lying outside the Chicago Tri-State Metro-Region but part of the Chicago-area 21-county region.

Source: Author's calculations based on data Chicago Metropolitan Agency for Planning provided by Chicagoland local team on 13 May 2011.

In this report, we will refer mainly to three units of analysis when speaking about Chicago (Table 1.2).

- The **Chicago Tri-State Metro-Region** will be the primary unit of analysis (9.5 million inhabitants in 2010). It corresponds to the Chicago-Joliet-Naperville, IL-IN-WI 14 Counties Metropolitan Statistical Area (MSA) as defined by the U.S. Office of Management and Budget, and is also often referred to as Chicagoland.[4] This area is a good proxy to the OECD's definition of Metro-Regions, which makes it possible to compare the Chicago Tri-State Metro-Region with the other 89 metropolitan regions with 1.5 million or more inhabitants in the OECD metropolitan database. [5] This definition includes the municipalities that currently have a high degree of functional integration with the City of Chicago as measured by commuting flows. It comprises nine counties in Illinois (Cook, DeKalb, DuPage, Grundy, Kane, Kendall, Lake, McHenry and Will), four in Indiana (Jasper, Lake, Newton, Porter) and one in Wisconsin (Kenosha).
- To analyse trends particular to Chicago proper, including socio-economic data, and concentration of certain income groups, the Review will refer to data from the **City of Chicago**, that is, the municipality (2.7 million inhabitants in 2010). The city of Chicago is located almost exclusively within Cook County, which is the second most populated county in the US, but portions extend into DuPage County in the vicinity of O'Hare Airport.
- To discuss larger questions of inter-regional co-ordination, the **21-county Chicago Region** *w*ill be utilised (11.5 million inhabitants). This region is also referred to as the Gary-Chicago-Milwaukee (GCM) corridor. It is increasingly regarded by civic, business and political leaders as comprising a common economic area. The 21-county Chicago Region encompasses the Chicago Tri-State Metro-Region along with the Milwaukee-Racine-West Allis, Wisconsin MSA[6] and two additional, but smaller, MSAs on the edge of the Chicago Metro-Region: Kankakee – Bradley in Illinois and Michigan City-La Porte in Indiana.[7]

These three units will in some cases be complemented by two other units, where data limitations make this necessary:

- **The CMAP Region** is the unit of analysis for the Chicago Metropolitan Agency for Planning (CMAP) *Go To 2040 Comprehensive Regional Plan*, published in 2010. The CMAP plan, which is the federally recognised Metropolitan Planning Organization (MPO) for the Illinois portion of the Chicago Tri-State Metro-Region, area covers the seven counties closest to the City of Chicago, and represents 89% of the Metro-Region's population.[8] This unit will be used primarily to discuss transportation and environmental data. The MPO corresponding to the Indiana portion of the Chicago Tri-State Metro-Region is the *Northwestern Indiana Regional Planning Commission* (NIRPC), and the MPO corresponding to the Wisconsin portion of the Chicago Tri-State Metro-Region is the *Southeastern Wisconsin Regional Planning Commission* (SEWRPC).
- **TL2 Regions** (Territorial Level 2) is an OECD unit that refers to the first level of sub-national units, which in the US corresponds to states. These units will be used especially when discussing innovation data to provide comparisons with other TL2 OECD Regions.[9] In this case, we will refer essentially to Illinois which corresponds to 91% of the population Metro-Region.

Table 1.2. **Basic indicators for different levels of analysis in the Chicago region**

		States represented	Surface (km²)	Population (2010)	Employment (2010)	Labour Force (2010)	GDP (Current USD, millions)	Population Density (population/ km²)
Chicago Tri-State Metro-Region		Illinois, Indiana, Wisconsin	20 353	9 461 105	4 374 102	4 870 138	532 331	465
Including	City of Chicago (municipality)	Illinois	606	2 695 598	–	–	–	4 447
	CMAP	Illinois	–	8 431 386	–	–	–	1 773
Chicago-area 21-county region		Illinois, Indiana, Wisconsin	28 268	11 437 337	5 282 014	5 870 780	623 620	405
UNITED STATES		–	9 826 675	308 745 538	153 186 000	13 323 000	14 861 000	31

Sources: Surface data comes from the background report of March 9, 2011; Population data comes from the 2010 US Census Data Redistricting Summary File, except for US population, which comes from *http://2010.census.gov/2010census/data,* Chicago population data is from *http://2010.census.gov/news/releases/operations/cb11-cn31.html,* Employment and Labour Force data come from Bureau of Labor Statistics (revised as of July 2011), GDP data come from U.S. Bureau of Labor Statistics (revised as of September 2011), US data except for population comes from background report of March 9, 2011. US Population comes from *http://quickfacts.census.gov/qfd/states/00000.html.*

1.2. A wealthy global Metro-Region with key assets

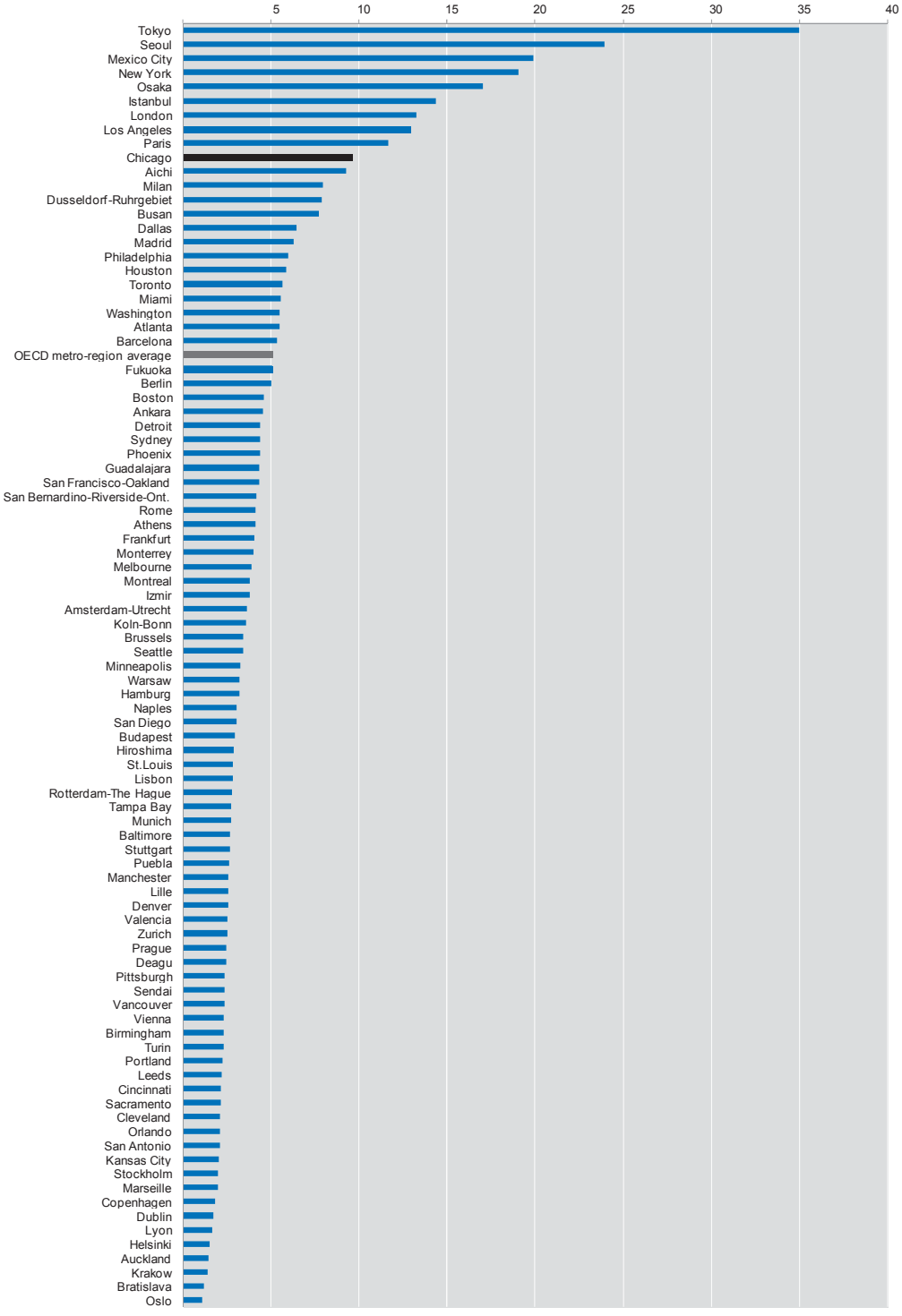
An economic powerhouse with a young population

Chicago is a large metropolitan area by OECD standards in terms of population and size of the economy. With 9.5 million inhabitants, the region is the tenth largest metropolitan area among the 90 OECD Metro-Regions, and the 3rd largest urban agglomeration in the US (behind only New York and Los Angeles) (Figure 1.4). Also, Chicago is one of the richest Metro-Regions in the world. With more than USD 523 billion in GDP in 2008, the Chicago Metro-Region ranked 8th among the 90 Metro-Regions and the third among US cities. The size of Chicago's economy is about 40% that of New York's, and twice that of Madrid, Atlanta, Seattle or Miami (Figure 1.5).

The Chicago Tri-State Metro-Region also stands among the richest and most productive Metro-Regions in the world, though not among the richest in the US. Although its ranking in terms of GDP *per capita* among OECD Metro-Regions is not as high as in terms of GDP (16th among the 90 Metro-Regions vs. 8th), the Chicago Tri-State Metro-Region still counts among the big players in the OECD urban world. With GDP *per capita* over USD 55 000 in 2008, the Chicago Tri-State Metro-Region ranked higher than traditionally rich European Metro-Regions such as London, Stockholm, Helsinki, Amsterdam-Utrecht, Paris, and Milan (Figure 1.5). Among US Metro-Regions, Chicago's GDP *per capita* is similar to that of San Diego and Philadelphia, but below that of a number of US Metro-Regions such as New York, Los Angeles, San Francisco-Oakland, Boston or Houston. In the same vein, the Chicago Tri-State Metro-Region ranks 13th out of 90 OECD Metro-Regions for its level of labour productivity (expressed as GDP per worker), above all non-US OECD Metro-Regions except Oslo, but below many US Metro-Regions including Philadelphia, Denver and Dallas (Figure 1.6).

Figure 1.3. **Population in OECD Metropolitan Regions, 2009**

Inhabitants (in millions)

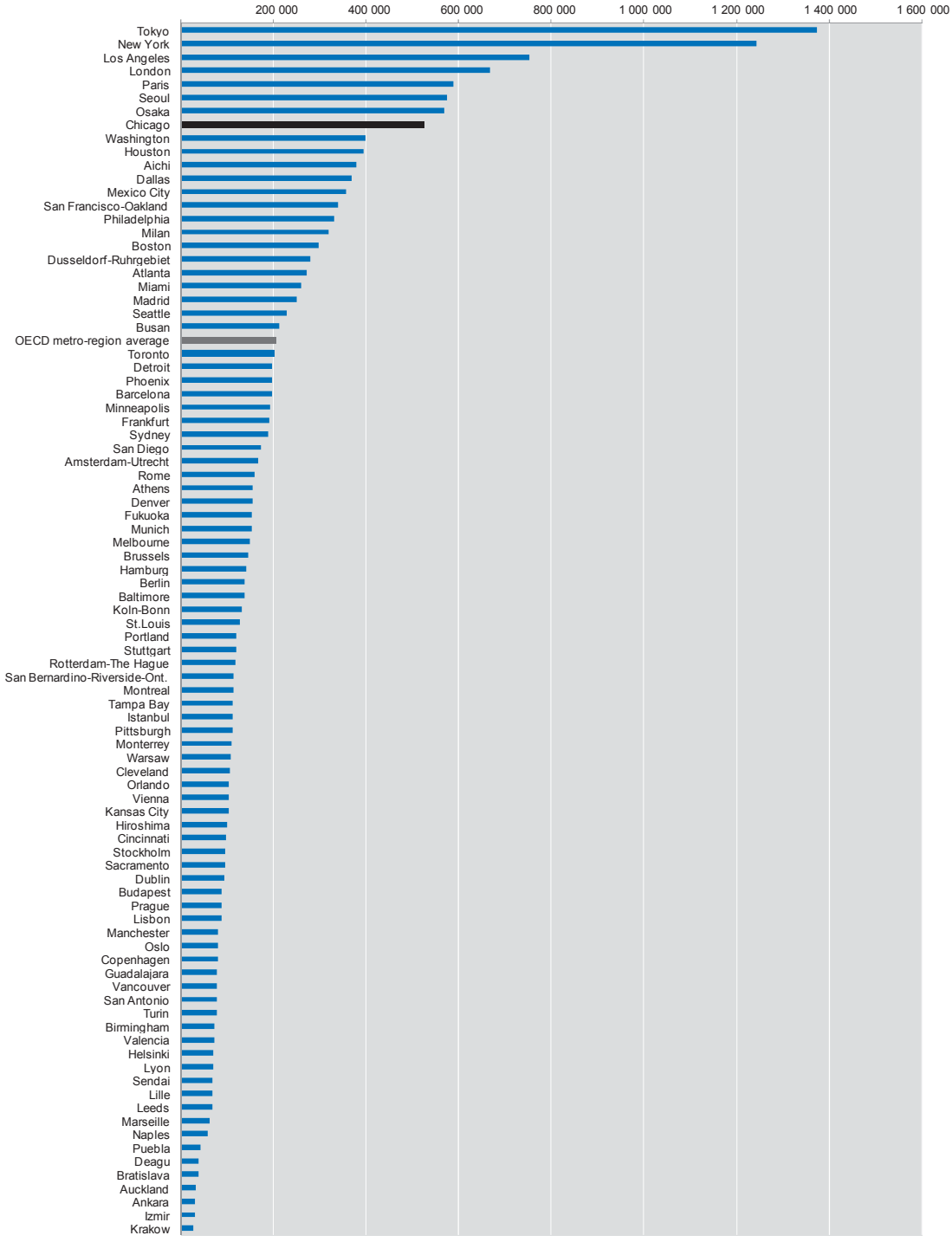


Note: Data for Australia, Belgium, Finland, France, Germany, Japan, Korea, Norway, Turkey, and United Kingdom refer to 2008. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.4. **GDP in OECD Metro-Regions, 2008**

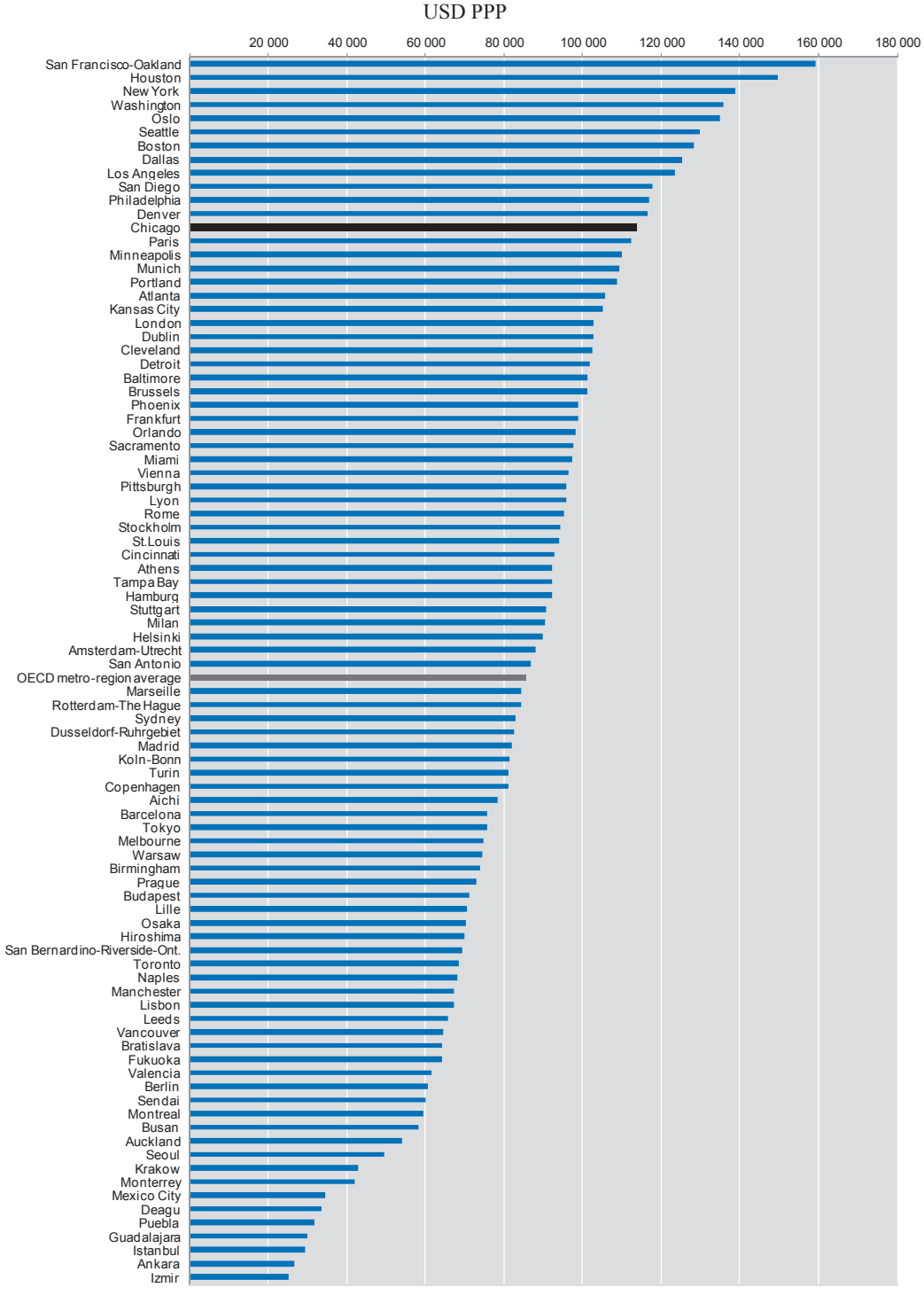
Million of USD PPP



Note: Data for Turkey refer to 2001; data for New Zealand refer to 2003; data for Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan. Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, and the United Kingdom refer to 2007. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

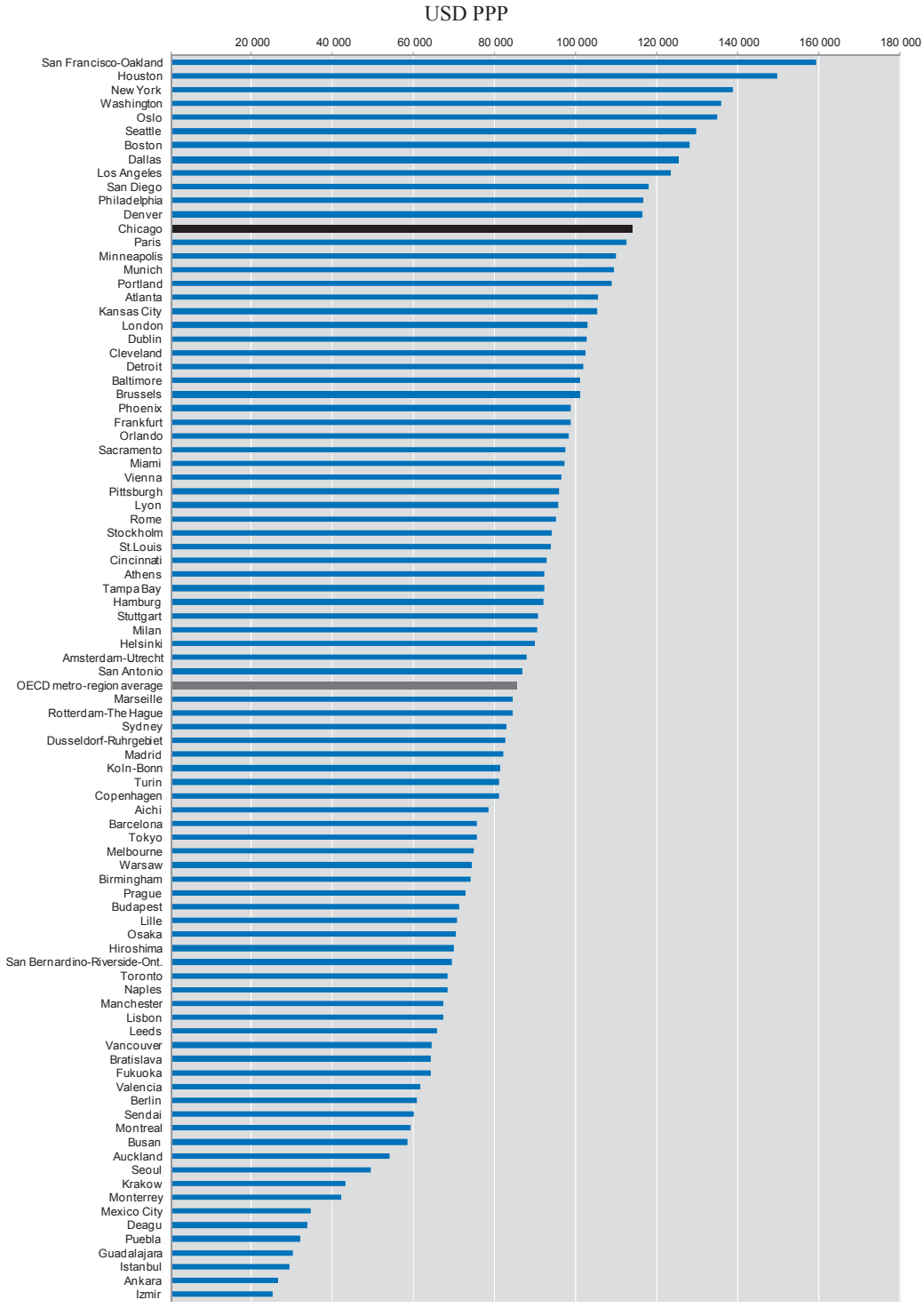
Figure 1.5. **GDP *per capita* in OECD Metro-Regions, 2008**



Note: Data for Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, and United Kingdom refer to 2007; data for New Zealand refer to 2003; data for Turkey refer to 2001. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.6. **Labour productivity (GDP per worker) in OECD Metro-Regions, 2008**

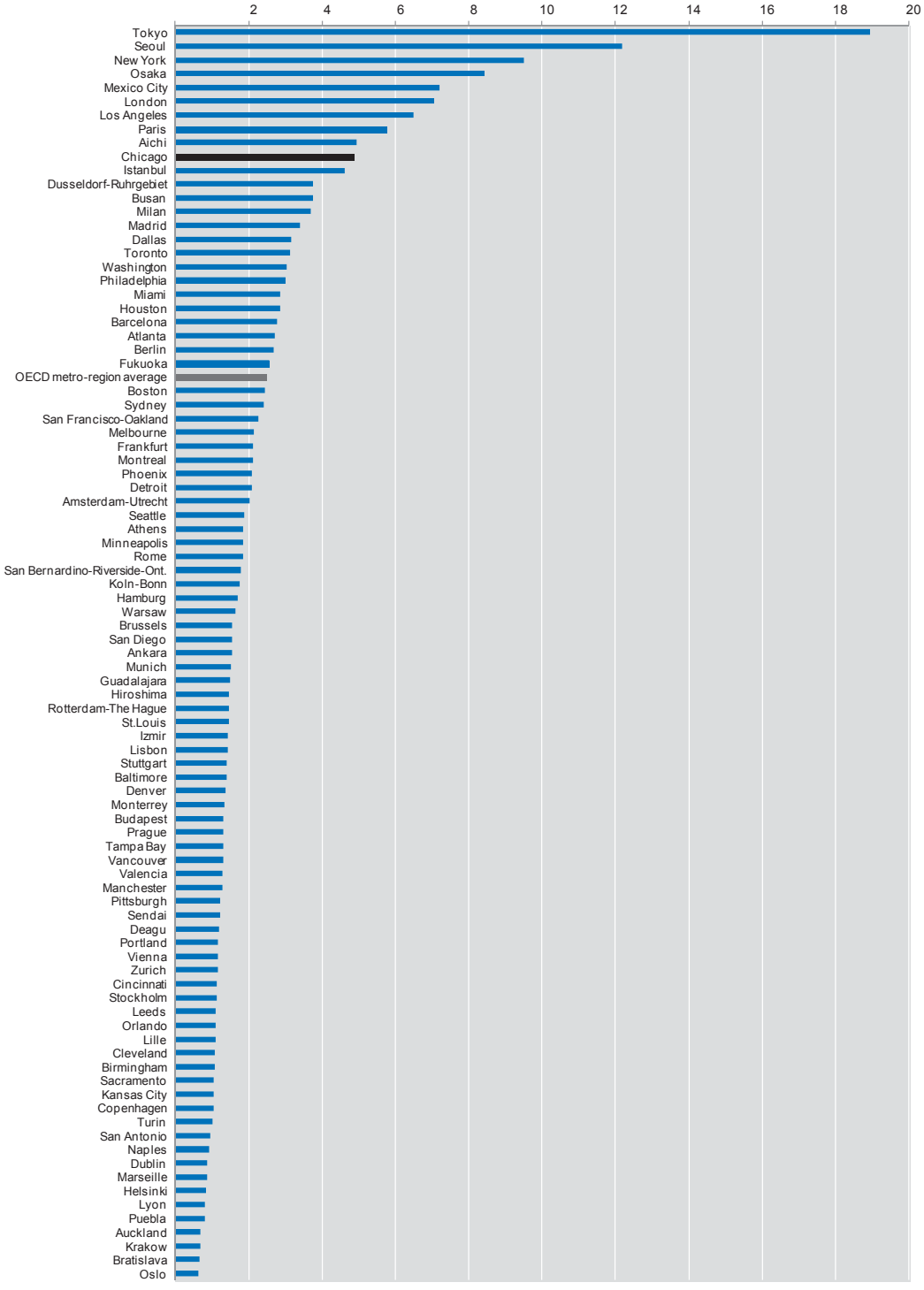


Note: Data for Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, and United Kingdom refer to 2007; data for Belgium and Ireland refer to 2006; data for New Zealand refer to 2003; data for Mexico and Turkey refer to 2000; data for Switzerland were not available. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.7. **Labour force in OECD Metro-Regions, 2009**

Total number of people employed and unemployed (million)

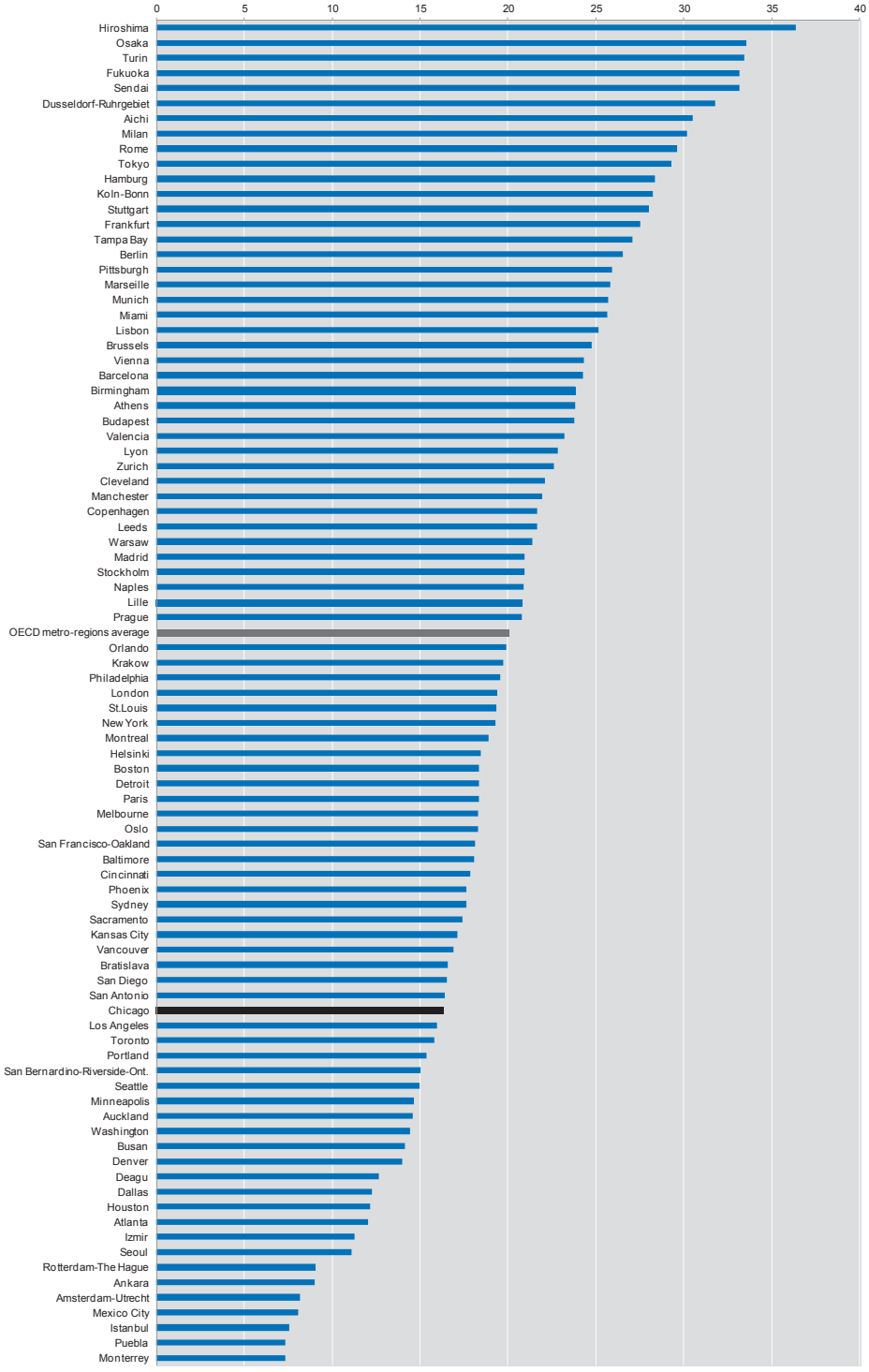


Note: Data for Belgium refer to 2006; data for Finland, Norway refer to 2008; data for Mexico, Turkey refer to 2000; data for Portugal refer to 2007. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.8. **Elderly dependency rate in OECD Metro-Regions, 2008**

Percentages



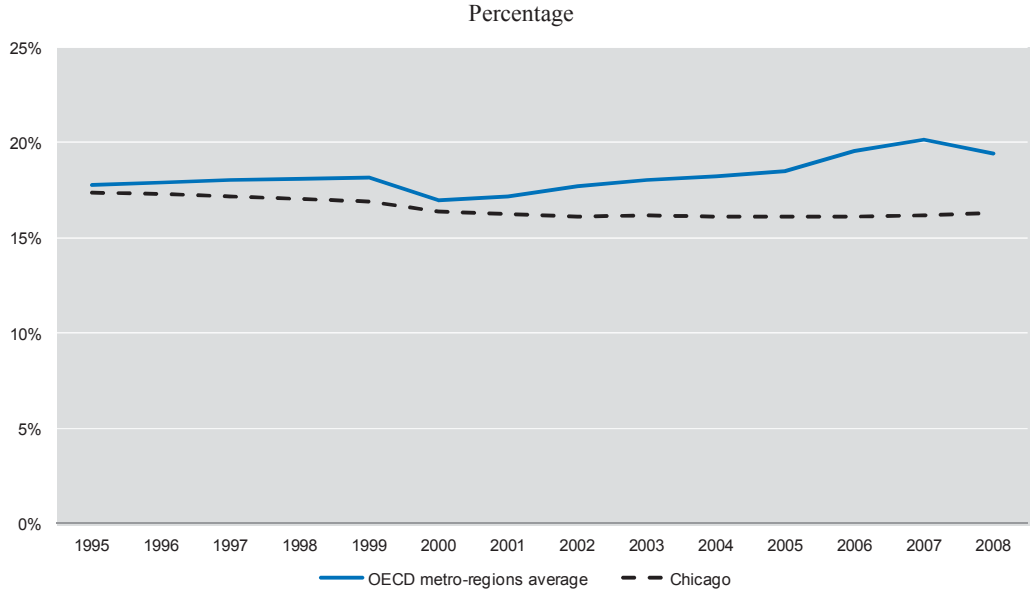
Notes: Data for Canada refer to 2005; data for Germany refer to 2007. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

With a young and a large labour force...

The Chicago Tri-State Metro-Region benefits from a large and young labour force. Nearly 5 million people were economically active in the Chicago Tri-State Metro-Region in 2009, making it the tenth largest labour market among OECD Metro-Regions, behind only Tokyo, Seoul, New York, Osaka, Mexico City, London, Los Angeles, Paris and Aichi (Figure 1.7). Contrary to many OECD European and Japanese Metro-Regions, the population of the region is comparatively young, a trend that is common in most US regions. Consequently, the elderly dependency rate of the Chicago Tri-State Metro-Region, the ratio between the population aged 65 and over and the working age population (aged 15-64), is below the OECD Metro-Region average (Figure 1.8). This gap is increasing, as over 1995-2009 the elderly dependency rate of the Chicago Tri-State Metro-Region stood at 16-17% while the average for the OECD Metro-Regions rose to 20% (Figure 1.9).

Figure 1.9. **Elderly dependency rate in the Chicago Tri-State Metro-Region compared to OECD Metro-Regions average, 1995-2008**



Source: OECD, Metropolitan Regions Database.

...A good presence of a skilled labour force and quality higher education institutions...

A key strength of the Chicago Tri-State Metro-Region lies in its top-quality higher education institutions. Two private, not-for-profit institutions, Northwestern University and the University of Chicago, are recognised as leading research universities in the country, if not the world. A world ranking places the University of Chicago 9th and Northwestern University 29th.[10] The University of Chicago and Northwestern University are ranked number two and eleven in the world in economics and business, and Northwestern is ranked twelfth in engineering, both disciplines that are important for a region's economic growth. Complementing these two universities are scores of public and private not-for-profit and for-profit colleges and universities in the 21-county region, some of which are more specialised and offer a variety of programs and experiences to meet student needs and preferences. As discussed in the section on workforce skills, the Metro-Region ranks fourth among the ten largest Metro-Regions in the US in terms of share of people over 25 with a bachelor's degree or higher.

...And an attractive business environment and quality of life

The Chicago Tri-State Metro-Region is attractive to domestic and international firms. The City of Chicago is regularly placed in the top five or top ten of global city rankings, primarily due to its well developed infrastructure, excellent research facilities, strong human capital and high network connectivity. The Financial Times publication *Foreign Direct Investment* ranked the City of Chicago second among "American Cities of the Future" in 2011/12 (behind New York, and including North and South American cities), based on criteria that assess the attractiveness to business investment (fDi, 2011). Chicago was chosen for its economic potential, business development and investment promotion, and infrastructure. The growing presence of headquarters of multinational firms such as from Boeing or Mittal attests to these strengths in the Metro-Region. A recent study from PricewaterhouseCoopers (2011) on "Cities of Opportunity", which assesses 26 world cities on ten indicators of economic energy and intellectual vitality, ranks the City of Chicago in the top five for technological readiness, cost, transportation infrastructure, and health, safety and security (Table 1.3). These rankings were based on *i*) the region's public transit coverage and miles of transit track; *ii*) the ease of doing business, including the fluidity of the labour market, low cost of business occupancy, low cost of living, and high purchasing power; and *iii*) the great number of hospitals the city offers; and iv) low crime rates (PricewaterhouseCoopers, 2011). Similarly, the Global Cities Index prepared by A.T. Kearney, *Foreign Policy*, and the Chicago Council on Global Affairs ranked the City of Chicago 6th of 65 cities in 2010, up slightly from the city's 8th place ranking (out of 60 cities) in 2008 (Table 1.4).

Table 1.3. **Chicago's ranking among "Cities of Opportunity"**

	Ranking (out of 26 international cities)
Intellectual capital and innovation	10
Health, safety, and security	3
Sustainability	23
Cost	3
Demographics and liveability	8
Technology readiness	5
Transportation and infrastructure	2
Economic clout	13
Ease of doing business	8
Lifestyle assets	11
Overall ranking	7

Source: PricewaterhouseCoopers (2011), "Cities of Opportunity 2011".

Table 1.4. **Chicago's ranking among global cities**

	2010 ranking	2008 ranking
Business activity	10	12
Human capital	4	3
Information exchange	23	24
Cultural experience	10	20
Political engagement*	23	20
Overall ranking	6	8

Note: *Policy engagement in the 2010 ranking.

Source: Foreign Policy (2008), "The 2008 Global Cities Index;" A.T. Kearney (2010), "Chicago Overview;" A.T. Kearney (2010), The Urban Elite: The A.T. Kearney Global Cities Index 2010.

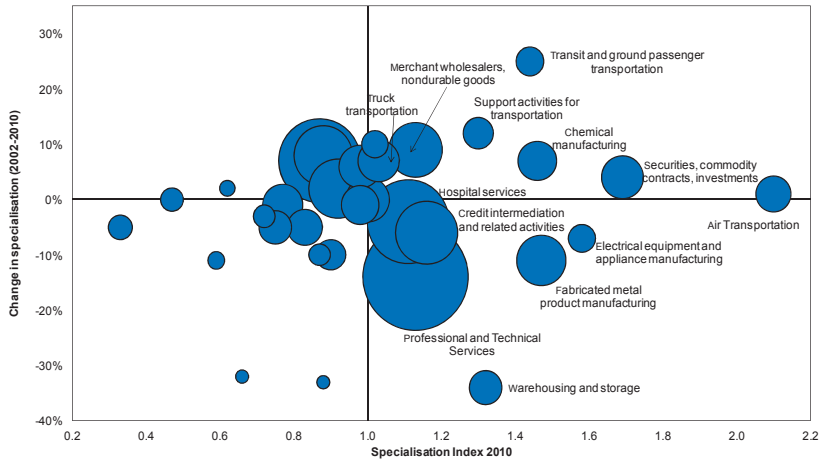
An important asset for the Chicago Tri-State Metro-Region is the richness and density of its cultural offerings and urban amenities. Being the birthplace of the skyscraper, the City of Chicago has attracted signature buildings throughout the 20th century from architects such as Frank Lloyd Wright and Ludwig Mies van der Rohe, and enjoys the image of being the most architecturally interesting city in America (The Economist, 2006). As the birthplace of the Chicago Blues style of music, home to an award-winning theatre scene and well-regarded classical music companies, the City of Chicago distinguishes itself for the strength and breadth of its performance art offerings. Finally, Millennium Park has become a key urban amenity for the Metro-Region's residents as well as a tourist attraction, drawing four million visitors a year. Having received 40% of its funding from private sector donations, it also provides a model of public-private investment and has brought added vitality to Michigan Avenue (Moskow *et al.*, 2007).

A diversified and globally oriented industrial mix

The Metro-Region industry mix reflects not just its past as a leading manufacturing centre or its convenient geographic location as a logistics hub, but also its attractiveness for modern and knowledge-intensive activities. The Chicago Tri-State Metro-Region's transformation into a knowledge-based economy is a common process among large Metro-Regions in the US. Such a process features a decline of most manufacturing and a surge in financial, professional and educational services. However, while the Metro-Region is competing to consolidate its knowledge-based economy, traditional activities such as manufacturing and transportation are still strong in the economy. Although the share of manufacturing in the region's total employment has been declining since the late 1960s, the region still shows a larger share than the nation's and therefore is still specialised as an industrial centre in the US. In fact, some branches such as chemicals, which are more capital-intensive than other manufacturing industries, are still increasing in specialisation (Figure 1.10). Transportation is not only an important but growing sector in the economy. But growing industries in financial, professional and educational services will continue to drive the economy and the demand for labour.

Figure 1.10. **Sectoral dynamics in the Chicago Tri-State Metro-Region, 2002-10**

Change in specialisation



Notes: 1. Specialisation is measured as (Lijt/Ljt)/(Lit/Lt) where L is employment, i is industry, j is region and t is time. Thus, specialisation is the outcome of measuring employment shares in one industry i in region j compared to national industrial shares as a proportion of total national employment. 2. Changes in specialisation refer to the difference in the value of specialisation in 2010 compared to that in 2002. 3. Bubble size denotes sector size in terms of employment in 2010.

Source: OECD calculations based on data from Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics. Consulted on 5 September 2011 at: *http://data.bls.gov/location_quotient/ControllerServlet.*

Using industry clusters further illustrates the importance of manufacturing and transportation and logistics in the ChicagoTri-State Metro Region (Table 1.5). It also shows that the economic strengths of the balance of the larger 21-county region, largely through the addition of the Milwaukee-Racine metro region, is complementary to the ChicagoTri-State Metro Region by increasing location quotients in establishments, employment and wages in manufacturing super cluster and in key component clusters: advance materials, chemical and chemical based products, electrical equipment manufacturing, and fabricated metal manufacturing.

Table 1.5. **Location quotients on establishments, employment and wages**

Cluster	21-county region			ChicagoTri-State Metro Region		
	Est. LQ	Empl. LQ	Wage LQ	Est. LQ	Empl. LQ	Wage LQ
Advance Materials	1.52	1.2	1.08	1.4	1.18	1.06
Biomedical & Biotechnical (Life Sciences)	1.54	1.2	1.23	1.61	1.26	1.27
Business & Financial Services	1.24	1.15	1.19	1.3	1.2	1.25
Chemical & Chemical Based Products	1.28	1.28	1.26	1.23	1.3	1.31
Electrical Equipment, Appliance and Component Manufacturing	1.97	2.22	2.18	1.79	1.6	1.48
Fabricated Metal Products Manufacturing	1.7	1.69	1.6	1.54	1.52	1.43
Machinery Manufacturing	2.17	1.52	1.45	1.92	1.12	1.01
Manufacturing super cluster	1.69	1.25	1.06	1.53	1.06	0.87
Primary Metal Manufacturing	1.72	2.35	2.42	1.58	2.34	2.46
Printing and Publishing	1.53	1.33	1.25	1.59	1.31	1.27
Transportation & Logistics	1.37	1.13	1.1	1.41	1.19	1.15

Source: U.S. Bureau of Labor Statistics (2009), Quarterly Census of Employment & Wages (QCEW) and Purdue Center for Regional Development (cluster definition), as calculated on *www.statsamerica.org*).

The Chicago Tri-State Metro-Region faces intense competition from other large and prosperous US Metro-Regions in becoming a knowledge-based economy. All large US Metro-Regions show a decline in labour-intensive activities and a surge in high-value added manufacturing and services (Table 1.5). Besides Los Angeles, the Chicago Tri-State Metro-Region is the sole large US Metro-Region to keep a larger specialisation in manufacturing than the national average (Table 1.6). The competing Metro-Regions are already and successfully moving into knowledge-intensive activities. Boston, seems to be the only large US Metro-Region ahead of Chicago in all three sectors that feature knowledge-intensive services: financial, professional and educational. In financial services, New York is the absolute leader, followed by Dallas and Boston, with the Chicago Tri-State Metro-Region fourth only ahead of the US west coast cities of San Francisco and Los Angeles. Although the Chicago Tri-State Metro-Region is ahead of New York in professional services, it still falls considerably behind San Francisco and to a lesser extent Boston. In educational services, the Chicago Tri-State Metro-Region is third with New York and Boston leading the way.

Table 1.6. **Industrial specialisation in selected US Metro-Regions, 2010**

Industry	Chicago	Los Angeles	New York	Dallas	Houston	Boston	San Francisco
Natural Resources and Mining	0.11	0.19	ND	0.60	2.33	0.11	0.19
Construction	0.77	0.74	0.82	ND	1.57	0.72	0.95
Manufacturing	1.05	1.08	ND	ND	0.95	0.81	0.66
Trade, Transportation, and Utilities	1.00	0.94	0.96	1.06	1.06	0.81	0.86
Information	ND	1.88	1.44	ND	ND	1.40	1.51
Financial Activities	1.13	1.00	1.50	1.34	0.91	1.22	1.11
Professional and Business Services	1.17	1.09	1.13	1.12	1.09	1.20	1.36
Education and Health Services	1.00	0.83	1.22	0.77	0.77	1.27	0.86
Leisure and Hospitality	0.90	1.00	0.81	0.95	0.91	0.88	1.05
Other Services	ND	1.59	1.11	ND	0.87	1.09	1.63
Unclassified	0.90	2.19	2.93	0.33	ND	0.01	1.87

1. Specialisation is measured as (Lijt/Ljt)/(Lit/Lt) where L is employment, i is industry, j is region and t is time. Thus, specialisation is the outcome of measuring employment shares in one industry i in region j compared to national industrial shares as a proportion of total national employment.

2. ND: Not Disclosable.

Source: OECD calculations based on data from Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics.

The Chicago Tri-State Metro-Region is well known for being the freight crossroad of the nation. Approximately 50% of U.S. rail freight passes through the Metro-Region's yards. The Metro-Region is the largest intermodal container handler in the Western Hemisphere and the fifth biggest in the world. It handles more containers than Los Angeles and Long Beach combined, and three times as much as New York and New Jersey. Not surprisingly, these activities (trade, transportation and utilities) are the largest single employer sector in the Chicago Tri-State Metro-Region, accounting for 23.1% of total employment in 2010 (Table 1.7). This sector includes air and ground passenger transportation as well as goods' transportation services for which the Chicago Tri-State Metro-Region's employment level and share of the US total have been growing over the past ten years. The transportation and logistics sectors' contribution to the regional economy put them in a position to contribute to future growth (Box 1.2).

Table 1.7. **Employment shares and growth in the Chicago Tri-State Metro-Region by industry, 2001-10**

Industry	Employment share 2010	Annual average growth 2001-10
Trade, Transportation, and Utilities	23.08%	-1.1
Professional and Business Services	18.34%	-0.4
Education and Health Services	17.59%	2.4
Manufacturing	11.40%	-4.2
Leisure and Hospitality	11.05%	1.0
Financial Activities	7.86%	-1.4
Other Services	6.40%	-1.8
Construction	3.97%	-4.2
Natural Resources and Mining	0.18%	-2.8
Unclassified	0.13%	-0.2

Source: OECD calculations based on data from Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics. Consulted on 5 September 2011 at: *://data.bls.gov/location_quotient/ControllerServlet.*[11]

Box 1.2. **The potential of the logistics hub**

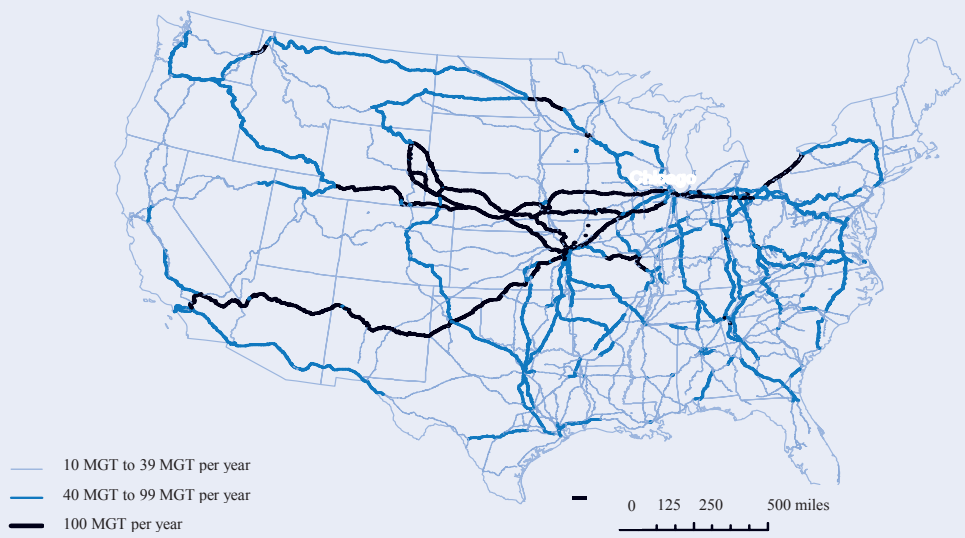
The 21-county region is served by five public airports accepting commercial air service: Chicago's O'Hare and Midway International airports, Milwaukee's General Mitchell International airport, the Gary/Chicago International airport in Indiana, and the DuPage County Airport in the western suburbs of Chicago. An additional twenty two public airports across the 21-county region serve general aviation and are critical resources for executive aircraft operations. Rockford airport, Illinois, although outside of the 21-county region is also considered to be a significant potential resource for air cargo and commercial air service for the area.

Three major commercial ports are located within the 21-county region. The Port of Indiana, Burns Harbour, located 30 miles by land from Chicago, serves agricultural and manufacturing markets in Indiana, Illinois Michigan and Ohio. It handles 15% of all US steel trade with Europe and has ten steel processors onsite. It has access to world markets via inland rivers to the Gulf of Mexico and handles more ocean-going cargo than any other US port on the Great Lakes. It is a designated foreign trade zone and is part of a state-wide ports system of the Ohio River and the Great Lakes that is connected by water, rail and road (Ports of Indiana, 2011).

The Port of Milwaukee is located in Milwaukee. It is the furthermost northern point that an inland river barge may transit. It is served by two railroads, the Union Pacific and Canadian Pacific Railways, and has immediate access to the interstate highway system (Port of Milwaukee, 2011).

The Illinois International Port District operates facilities in Chicago at the Iroquois Landing Lakefront Terminus and at Lake Calumet. The Iroquois Landing terminus specialises in intermodal container services with direct truck and rail access. The Port owns two grain elevators at Lake Calumet with a capacity of 14 million bushels. It also has liquid bulk storage capacity of 80 000 barrels. The Port district is a foreign trade zone operator with two general purpose zones located at Lake Calumet and near O'Hare airport. Twelve main line railroads in the Chicago rail hub feed into selected terminals. The major railroads serving the Chicago area have reciprocal switching arrangements. The port has access for interstate trucking. (Illinois International Port District).

Nationwide rail volumes



Source: Federal Railroad Administration, National Transportation Atlas Database (2011).

Box 1.2. **The potential of the logistics hub** *(cont.)*

Being the primary freight hub for North America the Chicago region plays a crucial role in the US economy. Around 500 freight trains move 37 500 rail cars on 2 800 miles through 78 rail terminals every day, constituting 50% of United States rail freight movement (Chicago Metropolis 2020, 2004; Ken Button). The Chicago region handles more containers than any other hub or gateway in the country (United States Bureau of Transportation Statistics, 2011 / Ken Button) (cf. Figure below). On six Class 1 railroads and 14 smaller railroads, every year USD 350 billion in goods (310 million tons in 2007) are moved to, through and from the Chicago region (Chicago Metropolis 2020, 2004). Being a rail hub for both carload and intermodal traffic, the transcontinental connections serve both for local goods distribution as well as for the transfer of goods (Cambridge Systematics, 2010). Thus, freight is not only a central part of the region's economy, but also plays an important economic role in the wider Midwest region. General freight, including intermodal containers (the second largest commodity after coal), is expected to grow by at least 240% by 2040.

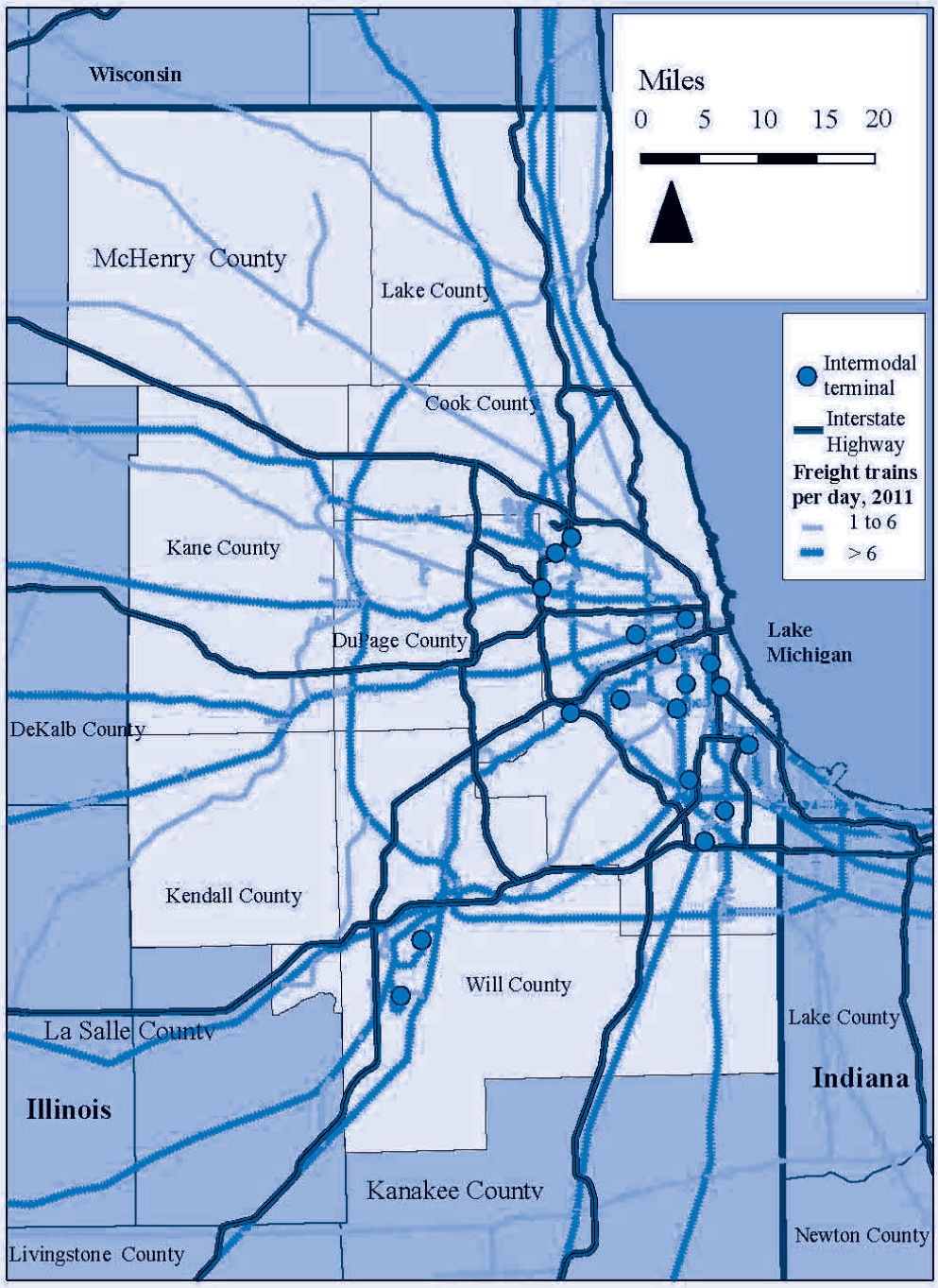
The region is an important intermodal transhipment point. Key for Chicago as being a freight hub and gateway is its large amount and growing capacity of intermodal facilities, in particular between rail and truck (little connectivity exists between water and rail), that specifically characterises the region as a transcontinental and international transhipment point (Cambridge Systematics, 2010). The spatial relationship between the region's intermodal terminals, important freight railways, and the Interstate Highway System is depicted in the Figure below.

The shipments that come through the region's air freight gateway are the second highest air freight by value in the US. However, air cargo still represents the smallest share of freight in the Metro-Region. The set of commodities travelling via air is of a higher variety and value than rail or waterborne freight, including machinery, transportation equipment, and precision instruments (Cambridge Systematics, 2010). The air cargo inbound value of USD 5.4 billion and the outbound value of USD 3.2 billion (2007) are expected to increase to USD 59 billion and USD 7.5 billion respectively by 2040 (Cambridge Systematics, 2010). The actual state of the air cargo business reflects difficult times however and the sector shows signs of going through a restructuring from previously focusing on freighters towards an increasing combination of freight and passenger travel much as it used to be the case in the 1960 (Cambridge Systematics, 2010). The possibility of volatile and rising fuel prices further endangers the stability of the sector which is highly sensitive on cost of fuel and labour. While growth projections are respectively moderate for the near term, the medium- and long-term perspective is positive, built on the estimation that air cargo will significantly rise in importance (Cambridge Systematics, 2010).

The most important airport by far is O'Hare airport with about 1.4 million tons handled in 2008, from which one third were domestic, and two thirds international shipments (Cambridge Systematics, 2010). While two more airports within the Chicago/Gary Regional Airport Authority provide air freight service (Chicago Midway and Gary Chicago International Airport), O'Hare lacks room for expansion, and discussion about a fourth freight airport is thus underway, focusing on Peotone as offering the necessary space and other advantages for a new cargo airport (Cambridge Systematics, 2010). O'Hare is ranked 5^{6h} (1.376 metric tons of total cargo) in the United States and Canada for calendar year 2010. General Mitchell International Airport in Milwaukee (within the 21-county Chicago region) is ranked 51st (78 000 metric tons) and Chicago Midway International Airport is ranked 85th (26 thousand metric tons). (Airports Council International – North America, Published results of member survey, 2010). Rockford International Airport, immediately west of the 21-county region and near the Illinois and Wisconsin border, also serves the area as an air cargo facility and has large unused capacity. The main US air freight trading partners (by value) of Chicago are Anchorage, New York, San Francisco, Los Angeles and Cleveland. This order of importance is expected to change however due to the rise in electrical machinery trade with high-tech markets in California (Cambridge Systematics, 2010). While the perception of air cargo performance is generally well, both from the public and the private sector, room for improvement can be identified mainly in system monitoring to reduce delay and improve safety and reliability, as well as in regards to connections between airports and highways (Cambridge Systematics, 2010).

Box 1.2. **The potential of the logistics hub** *(cont.)*

Highway-rail intermodal terminals



Note: Figures include overhead trackage rights for many railroads, including Metra, the regional commuter railroad.

Source: Estimate prepared by CMAP based on data from National Transportation Database, 2011 and Intermodal Association of Chicago. Updated with information from createprogram.org, Illinois Commerce Commission Grade Crossing Database, Google Earth, and personal communications. Missing data was interpolated. See *http:/www.cmap.illinois.gov/freight-snapshot*.

Box 1.2. **The potential of the logistics hub** *(cont.)*

Chicago's position as a rail freight hub, intermodal transhipment point and air freight gateway benefits the Chicago region's economy, the Midwest and beyond. The movement of freight to and through Chicagoland is not only a key economic asset for the region, but the related economic activities affect and connect the larger Midwest region and other US states. Globally, the economic impact of moving goods on local economies continuously rises with increasing trade. With more goods being moved faster and cheaper, efficient freight hubs are increasingly essential for regional competitiveness, representing a key economic asset both for the region and connected trading partners. The traffic handled on CREATE corridors in Chicagoland produces USD 10 billion or 29% of the US Class I freight railroads revenues (CREATE, 2010). At the same time 58% of the region's rail freight jobs originate or terminate outside of Illinois, the four most affected states beyond Illinois being California (8% of trade value), Texas (7%), Ohio (3%) and New Jersey (3%). While 60% US intermodal freight is processed in the region, the multiplier effect of the trade flows going through Chicago and related services result in 5 million jobs, USD 782 billion in output, and USD 217 billion in wages nationwide (CREATE, 2010). Given the scale, the interconnectedness and the outreach of Chicago's logistical hub, and of the freight movement and intermodal transfer, every operational optimisation results in wide ranging economic benefits, not only for Chicagoland, but also for the Midwest, other US states and the US economy as a whole.

Note: These maps are for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by these maps.

Source: Cambridge Systematics (2010).

The Chicago Tri-State Metro-Region position in the centre of North American freight movements makes it attractive for international trade. Thirty-nine countries host trade commissions[12] in the Metro-Region, with the goal of expanding trade between their countries and Chicago and the Midwest region (CITCA, 2011). International exports from the region are small compared to exports from the region to the rest of the US, in part due to the large volume of interstate trading. However, in 2007 international exports were directly responsible for over 100 000 jobs in the Metro-Region (114 000 in the 21-county region), and international exports reached USD 37.6 billion for the Metro-Region (USD 42.7 billion for the 21-county region).[13] The largest exporter activity was machinery and equipment, followed closely by IT and chemicals (REIM Input-Output Analysis).

Despite the fact that Chicago's manufacturing jobs have been in decline faster than in the US, the region remains strongly specialised in this sector and moving towards high value-added manufacturing. Manufacturing remains a significant employer in the region, 11.4% of total employment in 2010 moving upwards in the value-added chain, and one of the industries in which Chicago's Metro-Region is specialised (Table 1.7). The resilience of manufacturing activities in Chicago's Metro-Region (something comparable only to what is observed in Los Angeles) reflects the importance of high value-added manufacturing in the region including chemicals, paper, foodstuff, and petroleum-based products but also the historical relevance of Chicago's manufacturing for the rest of the nation.

The Chicago Tri-State Metro-Region has become one of the most influential financial and business centres in the world. It is a major financial centre in North America and the centre of the global derivatives market, being home to the largest derivatives exchanges. Its outstanding position as a world leader region in financial and business services has attracted the headquarters and facilities of a substantial number of large and influential firms in the world making the Chicago Tri-State Metro-Region a leading employer in financial and business-related activities in the US. Specifically, the Chicago Tri-State Metro-Region is the global centre for derivatives and home to 57 headquarters in the Fortune 500, including Boeing, McDonald's, Motorola Solutions, Discover Financial Services Abbott, and United Airlines. Professional and Business Services and Financial Activities combined represented 26.2% of total employment in the region in 2010 (Table 1.7).

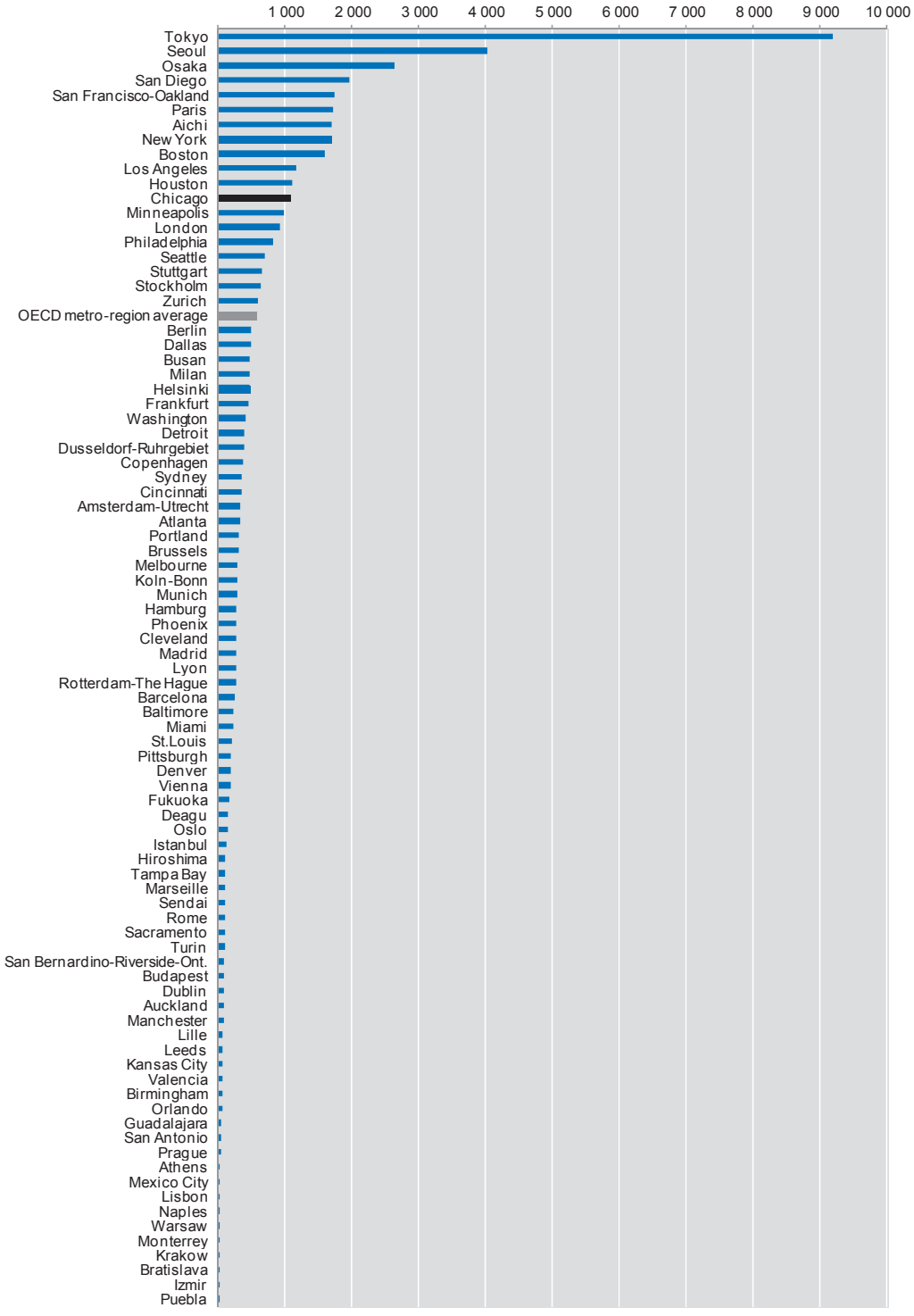
High-calibre educational institutions and health services in the Chicago region have played a central role in attracting world-leading firms and high-value added activities into the region. Although the Chicago Tri-State Metro-Region is not specialised in these activities, their concentration in this region is larger than in Los Angeles, Dallas, Houston or San Francisco. Very importantly, educational and health services jobs have been notably resilient to the effects of economic crisis, as employment in these activities has grown 2.4% annually over the last ten years and accounted for 17.6% of total employment in 2010 (Table 1.7).

Abundant natural resources in combination with the business and logistics importance of the Chicago Tri-State Metro-Region have made local leisure and hospitality activities an important employer. The Chicago Tri-State Metro-Region not only has an attractive workforce and provides a convenient location for business and logistic activities, but it also has abundant natural resources, including a magnificent system of parks, open spaces, trails, and waterways, with access to Lake Michigan for drinking water and recreation. As a result, leisure and hospitality accounted for 11.1% of total employment in 2010 (Table 1.7).

A region with a large volume of innovative activity

The Chicago region ranks high among OECD Metro-Regions on many technology-based innovation indicators. In terms of patents, the Chicago Tri-State Metro-Region's number of patent applications is higher than the OECD Metro-Region average. In 2009, the Chicago Tri-State Metro-Region ranked 12th out of 86 OECD Metropolitan Regions in terms of the number of Patent Co-operation Treaty (PCT) patents, just behind San Diego, San Francisco, New York, Boston, Los Angeles, and Houston in the US (Figure 1.11).[14] The Chicago Tri-State Metro-Region ranks particularly high for PCT patents in nanotech, green technologies, ICT and biotech (Table 1.8 and Figure 1.12). Illinois is also among the top 20 OECD TL2 regions in terms of patenting volume overall and in different sectors such as biotech and information and communications technology (ICT).[15] In terms of the volume of R&D investment by all sectors, Illinois ranked 13 of 258 OECD TL2 regions. For the number of high and medium-high-technology jobs, the state ranks 14 out of 268 TL2, and even stronger with respect to knowledge-intensive services, at 7 out of 272 TL2.[16]

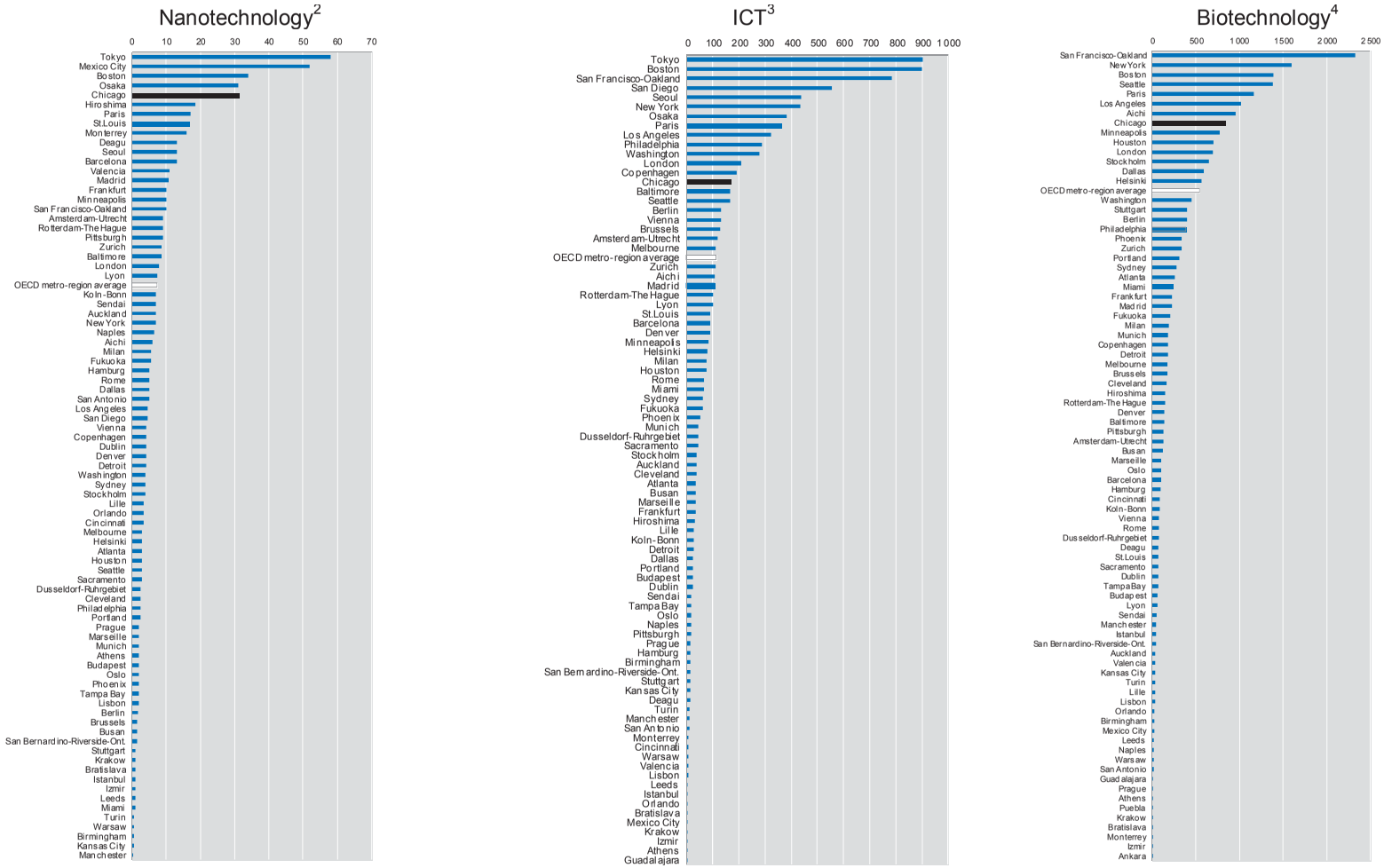
Figure 1.11. **PCT patent applications in OECD Metropolitan Regions, 2009**



Note: PCT refers to *Patent Cooperation Treaty,* an international patent law treaty that provides a unified procedure for filing patent applications. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.12. **PCT[1] patent applications in nano, bio and ICT technologies in OECD Metropolitan Regions, 2009**



Notes: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

1. PCT refers to *Patent Cooperation Treaty,* an international patent law treaty that provides a unified procedure for filing patent applications.

2. For nanotech, data for Sydney, Vienna, Lille, Lyon, Marseille, Milan, Naples, Rome, Hiroshima, Sendai, Auckland, Madrid, Barcelona, Valencia, Stockholm, Istanbul, Izmir, Leeds, Cleveland, Tampa Bay, San Bernardino-Riverside-Ont., Cincinnati, Sacramento and San Antonio refer to 2008; data for Krakow, Birmingham, Miami, St. Louis, and Orlando refer to 2007; data for Monterrey, Warsaw, Lisbon, and Kansas City refer to 2006; data for Athens refer to 2005; data for Mexico City refer to 2004; data for Bratislava refer to 2003; data not available for Guadalajara, Puebla and Ankara.

3. For ICT, data for Guadalajara and Izmir refer to 2008; data for Puebla refer to 2003; data for Ankara refer to 2000.

4. For biotech, data for Krakow and Istanbul refer to 2007; data for Izmir refer to 2006; data not available for Puebla and Ankara.

Source: OECD Metropolitan Regions Database.

Table 1.8. **Selected types of PCT patent applications, 2009**

Number of applications

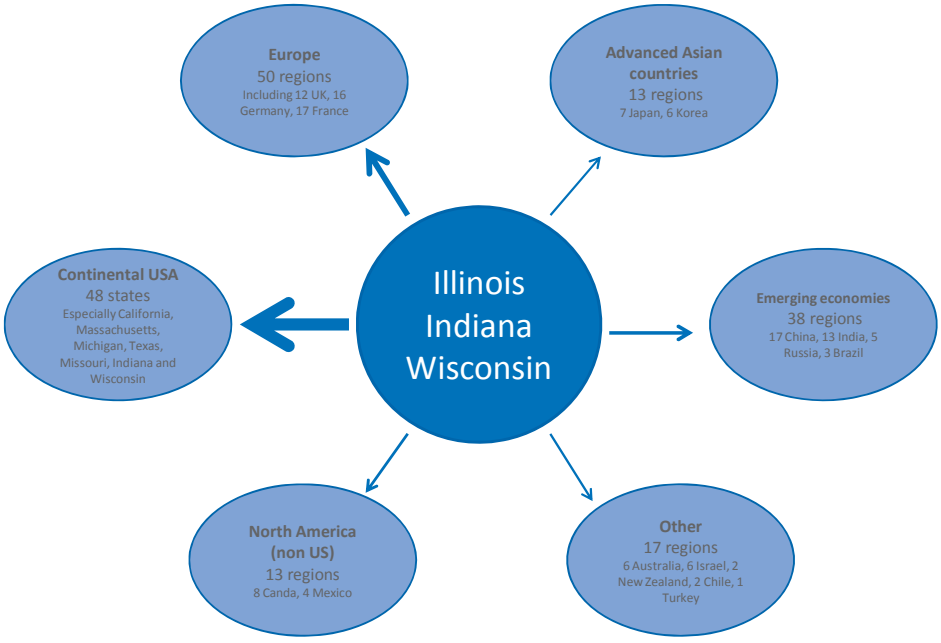
Type of technology	Chicago Tri-State Metro-Region	OECD Metro-Region average
Nanotech	31	7
Green technologies	100	54
Biotech	167	112

Note: PCT refers to *Patent Cooperation Treaty,* an international patent law treaty that provides a unified procedure for filing patent applications.

Source: OECD Metropolitan Regions Database.

The Chicago region has also become increasingly connected to global co-invention networks and has maintained its position as these networks have expanded. Illinois has ranked consistently in the top 5% of co-patenting regions as the global network has expanded for all technologies. Co-patenting data reveal that the number of partner regions has dramatically increased since the late 1970s, from 14 regions, all in the US, in the late 1970s (out of 116 regions in the global network) to 130 regions around the world (out of 451) in the mid 2000s. Many of the co-inventions occur with leading US states such as California, Massachusetts, New Jersey or Texas, as well as with nearby Midwestern states such as Indiana, Wisconsin, Missouri and Ohio. This can be explained in part by the importance of other US innovation hubs. For example, from 2005-07, Illinois inventors were involved in 63 co-patents with Baden-Württemberg (Germany) and 535 with California. Taking into account not only the number of regional partners but also the intensity of those partnerships, 79% of co-patenting activities in Illinois are with other US states, 12% with European TL2 regions, 4% with TL2 regions in emerging economies, 1.4% with TL2 regions in Advanced Asian countries, 2.5% with non-US North American TL2 regions, and 1.2% with other TL2 regions (Figure 1.13).

Figure 1.13. **Regions worldwide with a patent co-inventor in Illinois, Indiana or Wisconsin**



Notes: The intensity of connections is illustrated by thickness of the arrow.

Source: Calculations based on the OECD Regional Database and REGPAT.

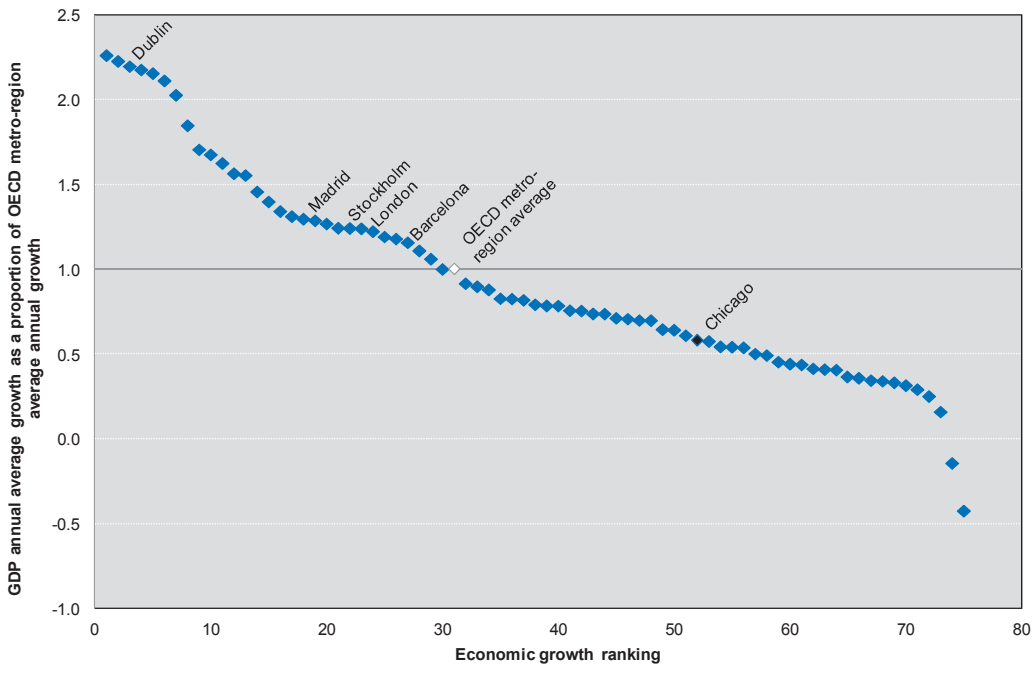
1.3. Constraints to regional growth

Output and productivity growth rates have been lagging behind Chicago's peers

While the Chicago Tri-State Metro-Region has one of the highest levels of output and GDP *per capita* among OECD Metro-Regions, its economic and labour productivity growth (expressed as GDP per worker) have lagged in recent years. During 2001-07, real GDP growth averaged 1.6%, which is lower than the OECD average for Metro-Regions during the period (2.6%). Major European Metro-Regions such as London, Madrid, Dublin, Barcelona, and Stockholm all recorded faster growth during those years (Figure 1.14). During the years before the crisis, the Chicago Tri-State Metro-Region's growth rate also lagged that of the US economy as a whole, which grew at an average rate of 2.4% over the period (Figure 1.15). Los Angeles and New York, by contrast, grew almost at the same average rate than the national economy. Growth in the Chicago Tri-State Metro-Region did pick up just before the crisis – it exceeded the average for all US metro regions in 2006-07 – but even then it was below the average for all OECD Metro-Regions. The subsequent shock of the crisis, moreover, hit the Chicago Tri-State Metro-Region very hard indeed (Box 1.3). Performance in terms of *per capita* growth, which rose by just 0.85% per year on average, was also somewhat lacklustre. Overall, the Chicago Tri-State Metro-Region ranked 51th in terms of *per capita* growth among the 76 OECD Metro-Regions for which data are available over the period and 16th among US Metro-Regions; its GDP *per capita* growth performance was comparable to that of Bonn, Sendai, and Stuttgart, but substantially poorer than that of Houston, Los Angeles and San Francisco, which were above the OECD Metro-Region average.

Figure 1.14. **Economic growth in OECD Metro-Regions, 2001-07**

OECD Metro-Region average annual GDP growth = 1.0

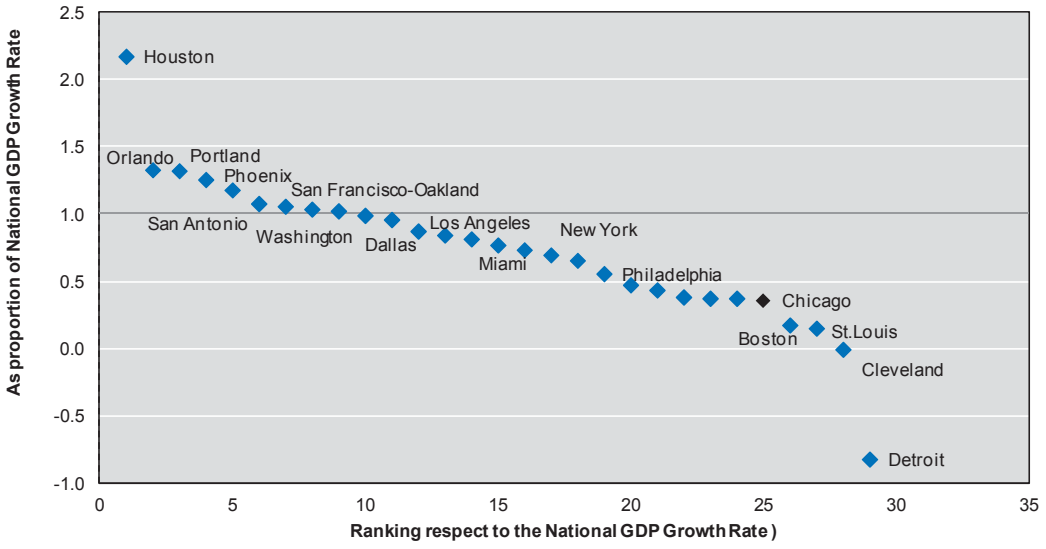


Note: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database.

Figure 1.15. **US OECD Metro-Regions annual real GDP growth rates, 2001-08**

(United States=1.0)



Note: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

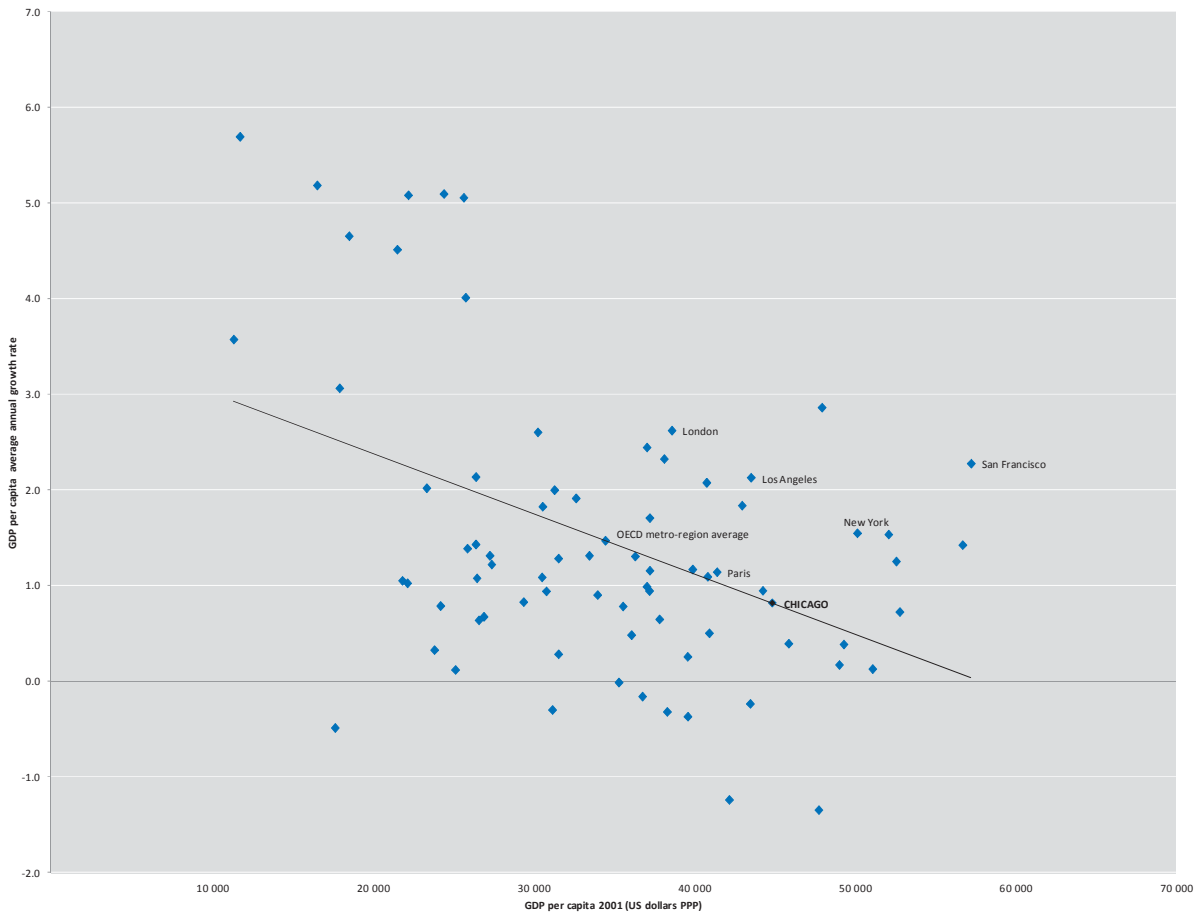
Source: OECD own calculations based on OECD Metropolitan Regions Database and OECD Regional Database.

It should be noted that the data presented above cover a relatively short period, owing to the limited availability of data on GDP and GDP *per capita* for US metropolitan regions. Moreover, the period in question follows the boom years of the late 1990s and begins with a period which saw a marked slowdown in US growth, in large part due to the bursting of the internet bubble, the terrorist attacks of 11 September 2001 and the fall-out from such corporate scandals as Enron and WorldCom. These shocks were felt worldwide but they were to some extent focused on the United States. Confining the analysis to the period from 2003 until the onset of the crisis, for example, shows almost all US Metro-Regions performing better relative to their OECD peers – adjusting the period by just one year raises the Chicago Tri-State Metro-Region's ranking in terms of *per capita* growth to 43rd, though its ranking among US Metro-Regions slips to 20th. In both instances, moreover, the Chicago Tri-State Metro-Region's growth rates lag behind the OECD average for Metro-Regions by a significant margin.

This performance needs to be contextualised in another way as well. Across the OECD, metropolitan regions have been experiencing a process of convergence. In other words, regions with lower initial levels of *per capita* output display, on average, higher growth rates than regions with higher initial levels (Figure 1.16), implying that there is a general tendency for less productive regions to "catch up" (that is, to converge with the leaders). Poorer economies have the potential to grow at faster rates than developed ones (albeit subject to certain conditions), in large measure because they are less likely to

experience diminishing returns to capital, in particular, and because they can replicate production methods, technologies and institutions currently used in developed countries. To sustain strong growth, economies closer to the productivity frontier must rely more on innovation as opposed to imitation (in the sense of borrowing technologies developed elsewhere). The Chicago Tri-State Metro-Region clearly belongs to this group: it has above-average levels of both GDP *per capita* and productivity and thus is in no position to benefit from "catch-up" growth. Thus, when compared to all OECD urban regions, its performance is not spectacular, as seen above. However, when compared to other high-income Metro-Regions (where growth rates tend to be lower), the picture looks better: the Chicago Tri-State sits more or less exactly on the trend line in Figure 1.16, implying that its performance is about average – but no more than that – for a Metro-Region at its level of development. Compared to other US Metro-Regions, though, its performance was slightly below-average.

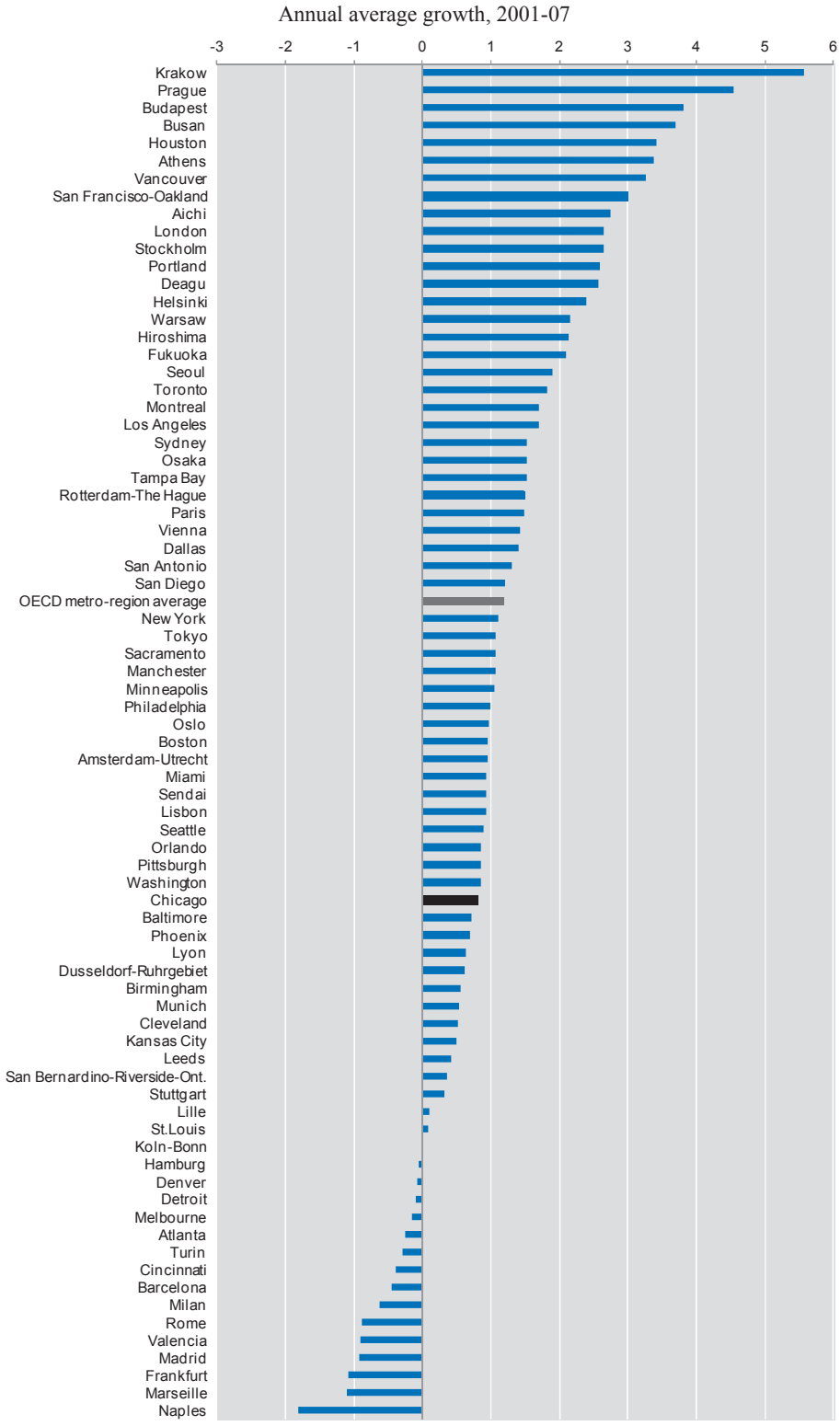
Figure 1.16. **Growth and convergence, 2001-07**



Note: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Database.

Figure 1.17. **Average annual growth of GDP per worker in OECD Metro-Regions**



Source: OECD Metropolitan Regions Database. Data for Milwaukee was extracted from U.S. Department of Commerce, Bureau of Economic Analysis, Regional Data.

Labour productivity performance (expressed as GDP per worker) is crucial to the Chicago Tri-State Metro-Region's prosperity and dynamism, as this is what underlies its relatively high GDP *per capita*. A decomposition analysis which compares regional and national GDP *per capita* in terms of productivity, employment, participation rates and demographic trends reveals that the Chicago Tri-State Metro-Region's *per capita* GDP was 16.2% above the US average in 2008, with superior levels of labour productivity accounting for 93% of this difference. The balance reflected differences in demography and activation of labour (participation and employment rates). Yet this advantage has been eroded in recent years: the disappointing growth performance of the early 2000s was in large part the product of rather unimpressive productivity performance. While the Tri-State Chicago Metro-Region boasts high *levels* of labour productivity compared with OECD Metro-Regions, labour productivity *growth* was not only lower than in most US Metro-Regions over 2001-07, it was also only about two-thirds of the average for all Metro-Regions in the OECD area (Figure 1.17).

The Milwaukee Metro-Region (MSA), on the other hand, has somewhat lower output per worker but recorded growth above the average for OECD regions during the period in question. Once again, it makes sense to control for initial levels, though, since one would expect, all other things being equal, for lower-productivity economies to have greater potential for achieving high productivity growth. This is indeed the case, overall, for OECD Metro-Regions, but the Chicago Tri-State Metro-Region actually turns out to *under*-perform, albeit slightly, compared with other OECD regions when labour productivity growth is plotted against levels of output per worker. This is a loss not only for the Chicago Tri-State Metro-Region but, given the region's size, for the US economy as a whole, since it means that this large, developed region has not in recent years been making the contribution to aggregate growth that it probably could (Box 1.3). A more dynamic Chicago Tri-State Metro-Region could give an important contribution to national growth.

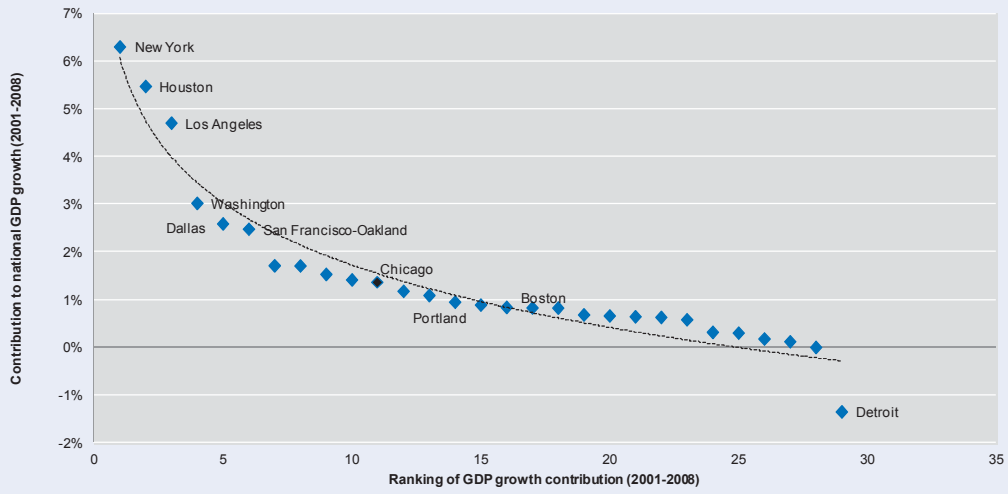
Box 1.3. **And if the Tri-State Region had performed better?**

Although theTri-State Region is a major contributor to US GDP, along with other Metro-Regions, its growth has been lower than the US average. The Tri-State Region's GDP represented 3.4% of the US economy in 2008, which is somewhat above its share of the national population (3.1%), reflecting the fact that productivity and GDP *per capita* tend, all other things being equal, to be higher in urban areas than elsewhere. The total contribution of the 29 largest US Metro-Regions to the US GDP was 53.4% in 2008, as compared with their combined population share of just under 45% Over 2001-08, however, the Tri-State Region's contribution to aggregate US GDP *growth* (as opposed to its share of output) over the period amounted to less than 1.5% (Figure below), reflecting the fact that its growth rates lagged those of the economy as a whole by a significant margin. For the 2001-08 period, the Tri -State Region ranks 11th among the 29 US metro regions in terms of its contribution to aggregate US growth, although it ranks third in terms of both population and size of the economy. Indeed, the Tri-State Region's contribution to aggregate growth over the period was far smaller than the contributions of Metro-Regions like Houston and Dallas, which are a fraction of its size.

Box 1.3. **And if the Tri-State Region had performed better?** *(cont.)*

US Metro-Regions' contribution to national GDP growth,2001-08

Percentages



To understand what might have been, one can simply estimate (without including any potential growth spill-overs to other regions) what might have happened if the Tri-State Region had grown at the same average annual rate as the United States as a whole – in short, if it had been not an outstanding performer but merely an average one. In such a scenario, its contribution to aggregate US growth would have been around 3.4%. The Tri-State Region's end-period GDP would have been about 12% higher and aggregate US GDP would have been around 0.4% higher – a modest but palpable effect.

This analysis of growth contributions highlights the significance of what happens in the Tri-State Region for the US economy as a whole. For policy-makers, the performance of the Tri-State Region and other under-performing Metro-Regions must be seen as both a challenge and tremendous potential opportunity: enhancing the dynamism of such urban centres could, on its own, have a palpable affect on aggregate performance and would probably also generate positive spill-overs for neighbouring regions.

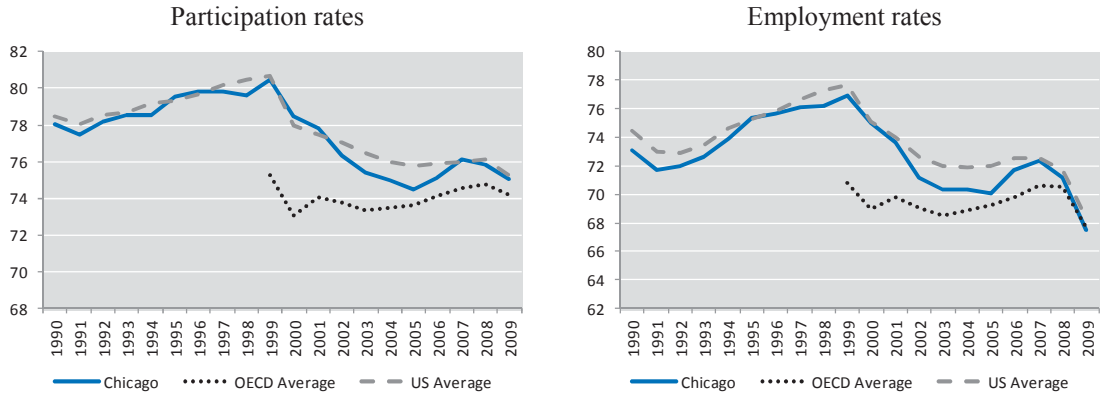
Source: OECD calculations based on OECD Metropolitan Regions Database and OECD Regional Database.

Even before the crisis, labour-market performance was unimpressive

The Tri-State Region's labour market has traditionally been characterised by high employment and relatively low unemployment rates, but the economic crisis that began in late 2007 disrupted this trend (Box 1.3); the rise in unemployment recorded in the Tri-State Region in 2009-10 was substantially larger than the average for OECD Metro-Regions. Yet the crisis is far from the whole story. The Chicago Tri-State Metro-Region faces a number of longer-term structural challenges with respect to the labour market. During 2000-07, employment growth in the region amounted to just 0.4% per annum, less than half the average figure for all US Metro-Regions – which was itself below the national average rate of just over 1.1%. In recent years, moreover, the labour force has actually been shrinking in absolute terms.[17]

Both participation and employment rates declined steadily from 1999 through 2005; a modest rise in both indicators in 2006-07 was followed by further declines, as the crisis took hold (Figure 1.18).[18] These trends were by no means unique: they closely tracked developments across Metro-Regions in the United States. That said, however, the Tri-State Region was below the average for US Metro-Regions in terms of both participation rates and employment throughout almost all of the 1990-2007 period. Overall, moreover, the decade since 2000 has witnessed a gradually convergence of the employment rates of US Metro-Regions, including the Tri-State Region, toward the average levels for Metro-Regions across the OECD. Traditionally, US cities have had significantly higher participation and employment rates, but this seems to have been changing even before the crisis – and changing as a result of adverse trends in the United States rather than rising activity rates elsewhere.

Figure 1.18. **Labour-market trends in Metro-Regions, 1990-2009**



Notes: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA). Owing to insufficient data, Mexico and Turkey are not included in the calculations.

Source: OECD Metropolitan Regional Database.

Most major sectors of the Chicago Tri-State Metro-Region's economy under-performed the nation in terms of employment creation (Table 1.9). This performance contrasted sharply with the 1990s, when employment growth in the Chicago Tri-State Metro-Region was somewhat stronger and rather closer to the average rate of growth of Metro-Regions. The goods-producing sector was shedding jobs even during the years of growth that preceded the crisis, and the services sector, which is usually more resilient to both cyclical and structural changes, also under-performed the nation and even lost jobs in some key sub-sectors. It should be noted that Chicago Tri-State Metro-Region's slower growth should not in all respects be counted as "under-performance": it is clear in hindsight that a great deal of the very rapid growth in construction employment during the early 2000s was driven by real estate (and, in particular, housing) bubbles in many markets. Partly for this reason, OECD (2011a) finds that the impact of the crisis on labour markets was worse and the subsequent employment recovery weaker in regions that had experienced faster-than-average employment growth during 2002-07, suggesting the presence of structural fragilities in the growth path of this period. Such regions typically saw an increase in the share of employment in construction and in financial, real estate and business activities, but not in the productivity of those sectors, which in many cases began to decline well before the recession hit.

Table 1.9. **Percent employment change in the Chicago Tri-State Metro-Region and the US, 2002-07**

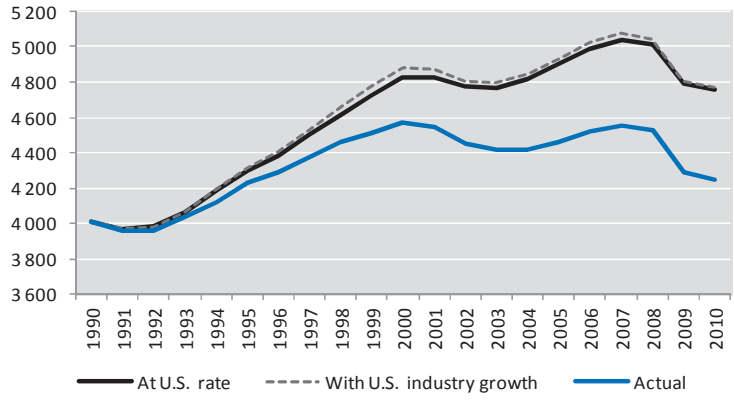
Sector	Chicago	National
Goods-producing	-8.62%	-1.44%
Manufacturing	-11.87%	-9.04%
Service-providing	4.59%	7.03%
Private service-providing	5.49%	7.97%
Trade, Transportation and Utilities	1.02%	4.44%
Wholesale Trade	-0.20%	6.42%
Retail Trade	1.32%	3.29%
Information	-16.07%	-10.69%
Financial Activities	1.86%	5.79%
Professional and Business Services	9.68%	12.31%
Education and Health Services	11.89%	13.11%
Leisure and Hospitality	9.97%	12.02%
Other Services	4.08%	2.27%
Construction	-0.37%	13.61%
Government	-0.30%	3.28%

Source: U.S. Bureau of Labor Statistics Quarterly Census of Occupations and Wages.

Weak employment growth over an extended period might be partly explained by the inability of businesses in the Chicago Tri-State Metro-Region to keep pace with their national counterparts. As shown in Figure 1.19, if employment in the Chicago Tri-State Metro-Region had grown at the national rate during 1990-2010, the region would have gained nearly 600 000 more jobs than it has today. The difference, moreover, is not due to the Tri-State Region's industrial structure. If the growth estimates are adjusted to reflect growth rates in specific branches, weighted according to the Metro-Region's specialisation in those sectors, then it turns out that the industrial composition of the Tri-State Region over the two decades in question was actually slightly more favourable than the national average in terms of job creation, although the difference was quite small. Thus, the problem is not that the Chicago Tri-State Metro-Region was specialised in sectors that did not grow over the period; it is that businesses in those sectors did not grow.

Figure 1.19. **Effect of industrial structure and business competitiveness on employment**

Actual vs. potential at US rate



Source: U.S. Bureau of Labor Statistics State and Metro Area Employment Hours and Earnings Current Employment Statistics.

Box 1.4. **The impact of the crisis on the Tri-State Region's labour market**

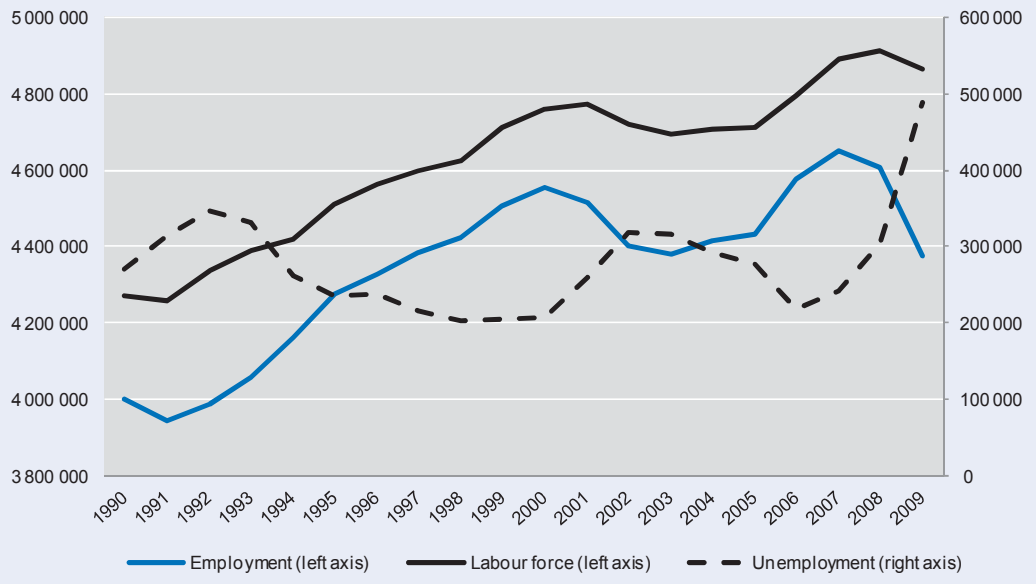
Since regional-level GDP data have yet to be released for 2009-10, labour-market indicators offer perhaps the best evidence available as to the impact of the crisis at regional level. Although Metro-Regions across the OECD were hit hard by the crisis, the Chicago Tri-State Metro-Region's labour-market response was more drastic than most: the unemployment rate topped 10% in 2009, well above the average for OECD Metro-Regions (7%) and more than double the pre-crisis low of 4.4% recorded in mid-2007. The unemployment rate peaked in 2010 at 11% before falling back. In late 2011, though, it was rising once again, breaching the symbolically important 10% threshold. For most of this period, the Chicago Tri-State Metro-Region's unemployment rate has been higher than the national average, in part because of the importance in the Metro-Region of the housing construction and manufacturing sectors, both of which were particularly hurt by financial crises of 2008.

The crisis has also had an effect on the size of the labour force. Between 1990 and 2009, the labour force in the Chicago Tri-State Metro-Region grew from around 4.2 to nearly 5 million people (Figure below) at the beginning of 2008. By early 2011, the labour force had shrunk by about 2.6%. Employment numbers closely mirrored labour-force movements.

As in the rest of the US, almost all industries have been hit by the crisis, although construction and manufacturing were hit much harder than services (Figure below). Within the service sector, the sharpest declines in employment were recorded in the retail and financial sectors. Only education and health services managed to expand employment during the recession. During 2007-09, the employment situation across nearly all industries was worse in the City of Chicago than in the outlying areas.

Labour force trends in the Tri-State Region

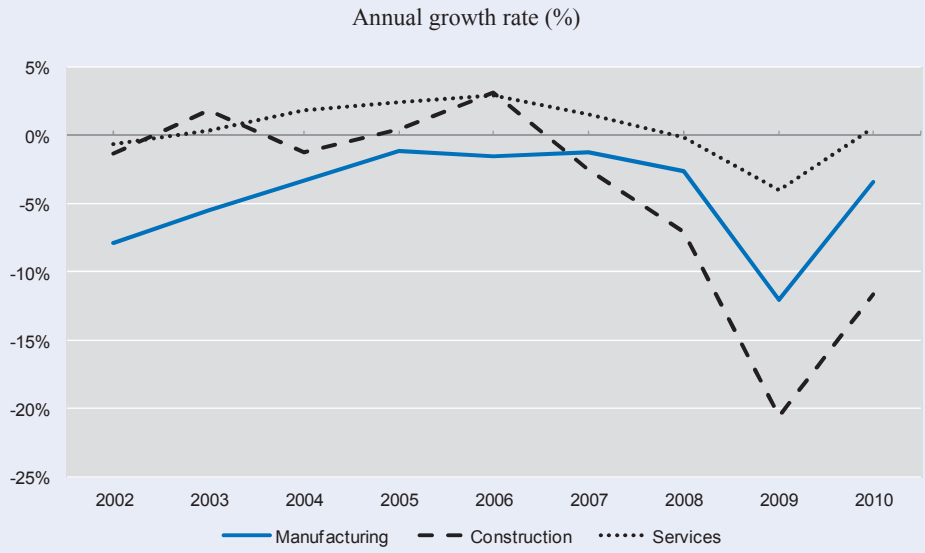
Labour force, employment and unemployment in absolute values (1990-2009)



Source: OECD based on U.S. Census Bureau, Local Employment Dynamics Program (2011), *http://lehd.did.census.gov/led/led/led.html.*

Box 1.4. **The impact of the crisis on the Tri-State Region's labour market** *(cont.)*

Employment growth by major sectors in the Chicago Tri-State Metro-Region (2002-10)



Source: OECD calculations based on data from Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics.

The crisis has particularly affected African-Americans and Latinos when compared to Whites and younger workers. Over 2007 to 2009, the City of Chicago's unemployment rate was nearly 3% higher than that of the rest of the metropolitan area, and it is home to the region's largest concentration of African-Americans, whose unemployment rate was more than triple that of whites in the city and somewhat over double the rate prevailing among whites in the rest of the region (first table below). Not surprisingly, younger people also suffered much higher rates of joblessness, due to their lack of skills and experience (table below). The unemployment rate drops with the age of the worker until the 55-59 age bracket, when there is a small uptick for residents in the City of Chicago (for residents of the rest of the Metro-Region a small increase occurs at ages 60-64). Many of these experienced workers have been displaced from struggling industries, such as manufacturing. Some may opt for labour-force withdrawal or bridging employment that will take them to retirement rather than returning to their previous or similar jobs at lower wages. Others are likely to require retraining assistance in order to get back to work.

Percent of unemployment by race in the City of Chicago and the Chicago Tri-State Metro-Region (2007-09)

Racial Classification	City of Chicago	Rest of Metro
Total, all races	10.4	7.5
White	6.1	6.8
Black	22.4	16.9
Hispanic or Latino	10.2	9.1
Other racial groups	8.5	6.8

Source: Ruggles, Steven *et al*. (2011), *Integrated Public Use Microdata Series: Version 5.0,* University of Minnesota, Minneapolis, MN, US, *http://usa.ipums.org/usa/cite.shtml.*

Box 1.4. **The impact of the crisis on the Tri-State Region's labour market** *(cont.)*

Percent unemployment by age in the City of Chicago and the Chicago Tri-State Metro-Region (2009)

Age Group	City of Chicago	Rest of Metro
Total, all ages	13.1	10.5
16 to 19 years	42.9	25.1
20 to 24 years	20.9	16.1
25 to 29 years	11.5	12.3
30 to 34 years	10.6	9.9
35 to 44 years	11.1	9.1
45 to 54 years	11.5	8.6
55 to 59 years	12.2	7.8
60 to 64 years	9.1	8.2
65 to 74 years	4.3	5.7
75 and older	9.5	6.4

Source: U.S. Census Bureau (2009), American Community Survey.

Several factors could be cited to explain the inability of firms in the Chicago Tri-State Metro-Region to keep up with their counterparts in the rest of the country. One explanation has commonly been that the tax structure and regulatory environment in the region hamper business growth. The state and local tax burden in Illinois has remained close to the US average over the last 35 years or so; Indiana's has been lower but slowly increasing towards that of Illinois, while Wisconsin's has been consistently higher than the US average. This undermines the commonly held view that Illinois business taxes are significantly higher than those in Indiana. In any case, the attractions of Chicago as a place to do business have much to do with the opportunities presented by the Tri-State region as a whole: relatively modest differences in tax rates may, at the margin, affect some decisions about where to locate *within* the region but they are most unlikely to be critical factors in determining where to locate in the larger Chicago region or elsewhere. A higher cost of living has also been cited as a potential factor, but the City of Chicago performs fairly well on this compared with other US and OECD cities. It was not listed as being one of the 50 most expensive cities in ECA international ranking in 2010 and 2011, and it scored sixth in the PricewaterhouseCoopers' Cities of Opportunity ranking in 2011 for cost of living,[19] better than Toronto, Berlin or Stockholm, and fourth for competitive advantage,[20] behind only Los Angeles, San Francisco and Houston (ECA 2011, PWC 2011).

The decline in participation rates in the Chicago Tri-State Metro-Region that began at the end of the 1990s may signal an attractiveness problem, in part because it coincides with an in-migration trend among working-age people that is below the national average. In particular, the Metro-Region performs less well than most other large Metro-Regions in the US when it comes to attracting immigrants from abroad (Ruggles *et al.*, 2011). This may indicate that younger and more highly skilled people are increasingly looking for opportunities elsewhere. In theory, the decline in participation rates might be explained by population ageing, as labour-force withdrawal tends to increase among cohorts approaching retirement age (particularly among women). Alternatively, a past baby boom

could lower participation and employment rates if, for example, rising young cohorts exhibited a higher propensity to remain in education than had previous generations.[21] The latter of these explanations does not really apply to the Chicago Tri-State Metro-Region, but the former – population ageing – may be playing some role.

As noted above, its population is comparatively young on average, and it is not undergoing an unusually rapid ageing process, as are some OECD regions. The ratio of working-age to total population in the Chicago Tri-State Metro-Region actually rose by about 1.6 percentage points over the decade to 2007 and has since been roughly stable at just under 68%, a level very close to the averages for both US and OECD Metro-Regions. However, although the working-age population has not fallen, it has grown older. The number of adults of prime working age (24-44) fell by 7% from 2000 to 2010, even as the number of people aged 25-64 rose by 15%, implying that a large increase in the number of people in the cohorts approaching retirement.[22] This reflects the fact that the post-war "Baby Boom" generation is approaching retirement age. While the share of prime working age adults in the Chicago Tri-State Metro-Region's workforce is still about average for the 20 largest American metro regions (40% or so), this trend suggests that an ageing workforce could limit growth prospects, particularly as older workers are less likely to return to employment following layoffs. On the whole, lower participation rates are thus more likely to reflect sluggish employment growth, which prompts discouraged workers to leave the labour force, particularly older workers. Nonetheless, it is worth reiterating that the downward trend in participation and employment rates is common to US and OECD Metro-Regions.

Chicago needs to focus on raising productivity growth

A growth accounting analysis performed on the regional manufacturing sector over 2002-07 underscores the role of total factor productivity growth.[23] Over that period, gross value added in the manufacturing sector grew at an average annual rate of just over 2.4%. The main factor behind the expansion in manufacturing was, in effect, technical progress, since increases in total factor productivity (TFP) accounted for virtually all growth in industry.[24] Capital investment grew at an average rate of 1.6%, which was roughly the rate at which labour inputs *declined* over the period. Given the limitations of the available data, one cannot interpret these findings with precision, but they do suggest a degree of capital deepening (i.e., an increasing capital intensity of production). One cannot be certain of this: since some investment would be needed merely to hold the capital stock constant, one cannot be sure that the growth of investment was sufficient to ensure that the capital stock per worker actually increased. However, the contrast between the growth of investment and the contraction in labour supply suggests that this is likely to have been the case. This suggests that the 2.4% growth rate achieved can be explained more or less entirely in terms of the growth of total factor productivity.

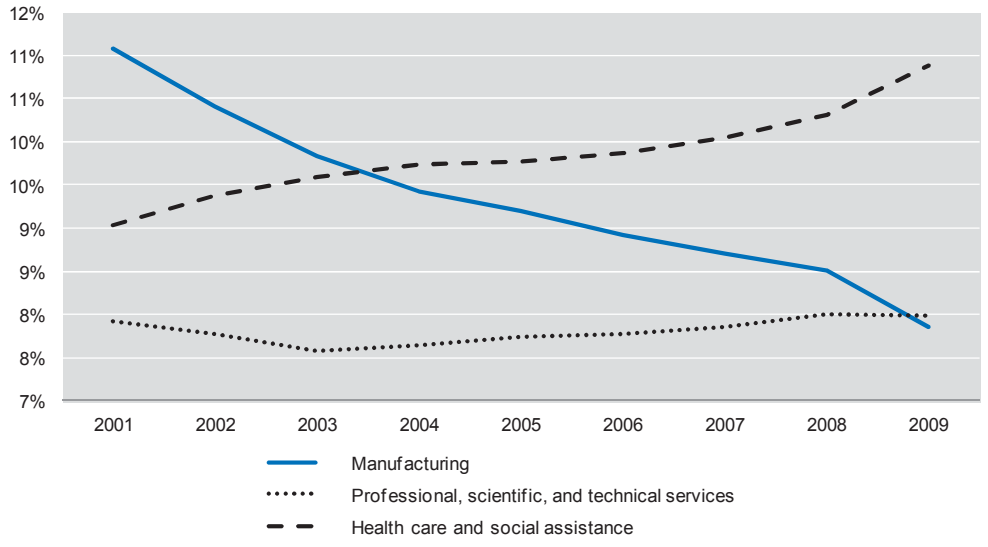
The results of this analysis are not necessarily applicable to the whole economy, however, as manufacturing only represented 12.6% of the Chicago Tri-State Metro-Region's GDP in 2007. Nevertheless, they suggest that the main productivity challenges concern the non-manufacturing sector, particularly services. This impression is reinforced if the exercise is repeated for the whole economy, albeit for only part of the Chicago Metro-Region. The available data permit such an exercise for the period 1997-2007, for the CMAP counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. Not surprisingly, with the inclusion of services and construction, the picture changes: at least in the seven counties covered, the bulk of growth came about as a result of increases in capital and labour inputs, with TFP growth accounting for about 45% of growth.

TFP performance is crucial if the Chicago Tri-State Metro-Region is to sustain strong growth of GDP *per capita* over the long term. Its economy is already rather capital-intensive by international standards, so returns to additional capital are likely to be diminishing, and the scope for increasing labour supply is limited, given current population trends and relatively high participation and employment rates.[25] Like most developed economies (and, indeed, like the US as a whole), the Chicago Tri-State Metro-Region must generate strong TFP gains in order to maintain growth. Since the Metro-Region's economy is very advanced – *i.e.*, it is close to the productivity frontier – this implies, among other things, a need to raise its innovation performance. It also points to the necessity of increasing the region's stock of human capital, both by addressing skills mismatches and problems with human capital formation in the region and by attracting high human capital individuals to come to – or, in the case of graduates of the region's top-flight universities, to remain in – the metro-region.

Human capital is the key

Sluggish productivity and job creation might partly be explained by a skill mismatch problem. In contrast to manufacturing, employment in services has risen, including in the healthcare and professional, scientific, and technical services sectors. Employment in the healthcare and social assistance sector alone has surpassed the number of workers in manufacturing (Figure 1.20). This restructuring creates challenges for workers, as jobs are lost in one industry and demand for jobs increase in another, more than likely requiring significantly different skills sets for qualified workers. In terms of occupations, jobs requiring either little or no preparation (Job Zone 1) or requiring only some preparation (Job Zone 2) were less 50% of total employment in the region in 2009 (Figure 1.21), but this proportion will be even smaller in the years to come. One recent modelling exercise concludes that only about 14% of upcoming vacancies require little or no preparation; just under one-third require low-level skills, and around 55% require skills necessitating at least some higher education

Figure 1.20. **Employment shares of key sectors in the Chicago Tri-State Metro-Region, 2001-09**



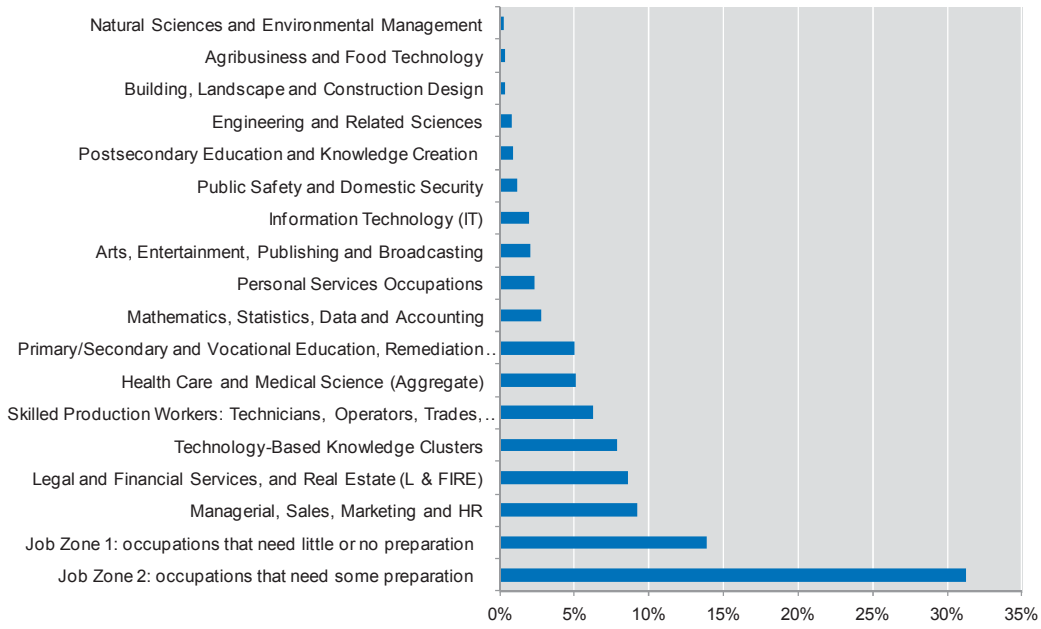
Note: Data based on the NAICS system.

Source: U.S. Bureau of Labor Statistics State and Metro Area Employment Hours and Earnings Current Employment Statistics.

The increase in specialisation towards higher value-added activities in the Chicago Tri-State Metro-Region has not gone hand in hand with an increase of the share of the labour force with high qualifications. Skills shortages have been reported in several advanced economic sectors. In manufacturing, many firms are reporting problematic skills shortages in basic math skills as the sector has grown more sophisticated.[26] In terms of current vacancies in the region, the occupations in greatest demand are in the computer and mathematical category (17%), ranging from systems analysts and engineers to web developers and database managers. Other occupations in high demand include management (13% of openings), sales (12%), office and administrative support (10%), business and financial (8%) and healthcare practitioners (7%). Among these jobs, a significant share requires some form of post-secondary education.[27]

A recent assessment of the fit between workforce skills and labour demand (Şahin *et al*., 2011) finds that, in aggregate, the Chicago Tri-State Metro-Region labour market is better balanced than those of most US Metro-Regions, albeit with two caveats. First, there is the question of the extent to which formal educational qualifications really map onto employer needs: persistent employer complaints about skill shortages in the presence of large numbers of potential workers with high formal qualifications suggest that this may be a problem. Secondly, Şahin *et al*. (2011) find that there may well be a significant deficit in medium-skill segments of the labour market – those requiring complete secondary and/or some higher education. The image that emerges from the analysis is of a region with large pools of under-skilled and high-skilled workers but with gaps in between. Since workers in this intermediate category are often needed to support the work of the high-skilled, this may represent a constraint employment growth at the top of the skill distribution as well.

Figure 1.21. **Share of employment by occupation in the Chicago Tri-State Metro-Region, 2009**



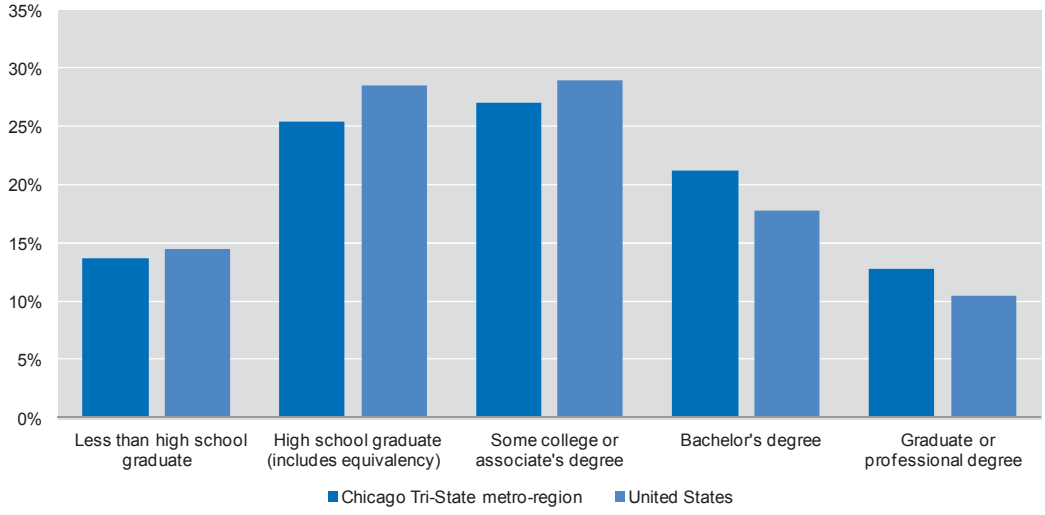
Note: The level of skills required to perform an occupation are ordered in job zones from 1 to 5 being 1 the lowest skilled level (no preparation needed). In this chart, only those occupations requiring skills levels zones 1 and 2 are grouped as such. The other occupations displayed require skills levels from zones 3 up to 5.

Source: Economic Modeling Specialists Inc. (2010).

Standard measures of educational attainment indicate that on average, the Chicago Tri-State Metro-Region's workforce is fairly well trained (Figure 1.22), though perhaps not to the levels that would be expected given its good higher education infrastructure. The Chicago Tri-State Metro-Region has a very diverse workforce in terms of skills, if years of schooling are taken into account. One-third of people between the ages of 25 and 64 have either a bachelor's degree (20%) or a graduate/professional degree (12%). Just over one-quarter of the same age group have some college (20%) or an associate degree (7%). Overall, educational attainment in the Chicago Tri-State Metro-Region is slightly higher than the national average, as measured by the percentage of the population with Bachelor of Arts (BA) degrees or more advanced degrees. Of the ten largest Metro-Regions in the US, Chicago (29%) ranks fourth in this category, with only Boston (37%), New York (30%) and Atlanta (31%) boasting higher percentages (U.S. Census Bureau, 2009a).

Figure 1.22. **Educational attainment in the Chicago Tri-State Metro-Region**

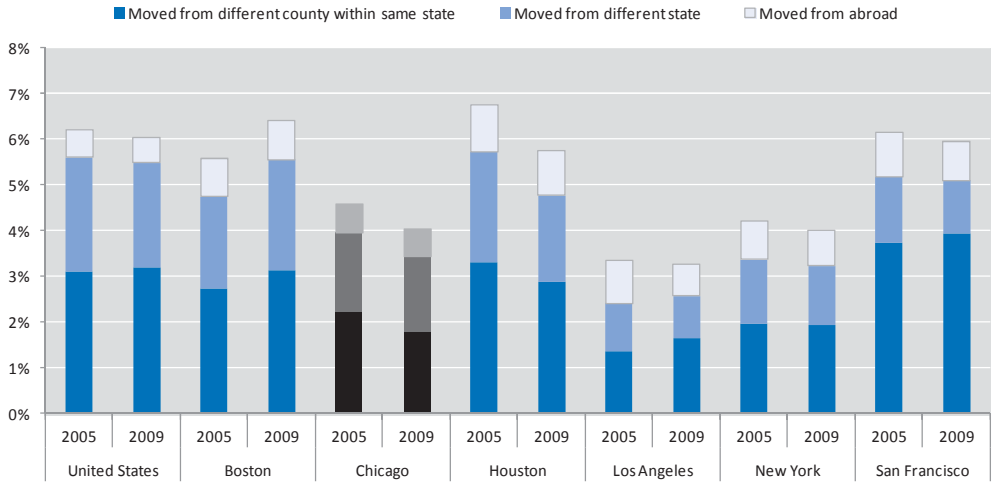
Estimated percentages for 2005-09



Source: U.S. Census Bureau (2010).

The region's educational attainment figures are, however, still fairly close to national averages, implying that the concentration of high-calibre universities in the region has had little impact on the skill mix of its workforce. This is a further indicator of potential attractiveness problems, since it suggests that graduates of Chicago's HEIs are inclined to make their careers elsewhere. Foreign nationals completing their studies at US universities also have the added burden of obtaining work visas, further contributing to the overall loss of talent. The region is not attracting sufficient numbers of graduates from other HEIs to adequately grow the stock of university educated workers. To be sure, the Chicago Tri-State Metro-Region remains an attractive place for many migrants, but it is less attractive than many of its US Metro-Region peers (Figure 1.24). Moreover, if the analysis is confined to highly educated people of prime working age (25+, with at least a bachelor's degree), then the picture is even more problematic. During 2005-09, more such people moved into the area from elsewhere in the United States than left it, but the net gain was relatively small compared with other large US Metro-Regions (Table 1.10). Los Angeles, for example, benefited from a net gain of nearly 80 000 highly educated people in 2009, compared with 3 500 the Chicago Tri-State Metro-Region.[28]

Figure 1.23. **Mobility flows in selected US Metro-Regions, 2005 and 2009**



Note: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD calculations based on data from the U.S. Census Bureau American Community Surveys for 2005 and 2009.

Table 1.10. **Movement of highly educated population age 25 or older into and out of selected US Metro-Regions (MSAs)**

Bachelor's Degree or Higher, Age 25 or Greater

MSA		2009	2008	2007	2006	2005
Chicago	Moving into MSA	54 709	59 198	56 776	56 015	57 610
	Departing MSA	51 251	51 958	59 731	54 606	49 568
	Net	*3 458*	*7 240*	*-2 955*	*1 409*	*8 042*
Boston	Moving into MSA	51 418	49 873	50 181	47 418	42 314
	Departing MSA	34 571	36 768	49 484	46 476	43 566
	Net	*16 847*	*13 105*	*697*	*942*	*-1252*
Los Angeles	Moving into MSA	131 228	124 482	124 207	119 240	128 092
	Departing MSA	51 889	58 696	59 184	65 919	60 160
	Net	*79 339*	*65 786*	*65 023*	*53 321*	*67 932*
San Francisco	Moving into MSA	118 224	110 522	107 882	117 667	119 674
	Departing MSA	23 750	25 663	25 416	25 504	29 703
	Net	*94 474*	*84 859*	*82 466*	*92 163*	*8 9971*
Philadelphia	Moving into MSA	29 256	28 353	32 576	36 124	31 668
	Departing MSA	31 693	34 814	33 718	40 142	33 717
	Net	*-2 437*	*-6 461*	*-1 142*	*-4 018*	*-2 049*
Houston	Moving into MSA	37 592	38 753	44 296	45 505	35 923
	Departing MSA	25 916	28 497	29 753	30 226	29 700
	Net	*11 676*	*10 256*	*14 543*	*15 279*	*6 223*

Note: Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: U.S. Census, Public Use Microdata.

At the other end of the spectrum, the large number of people with very low skills points to a problem of secondary education quality. The issue here is more than a problem of skills mismatch, in the sense of impediments to the smooth functioning of the labour market: it is a more fundamental question of human capital formation. While the Metro-Region is home to a smaller share of adults over 25 years of age with no high school diploma than the national average (7.3% compared to 8.5%), high dropout rates in high schools and low test scores signal problems with public secondary education. The problem is most acute in the City of Chicago. Its high school four-year graduation rate of 57% is well below the US average of 75%. It is also lower than those of San Francisco (69.7%) and Boston (63.5%), although it is higher than the corresponding figures for Milwaukee (56.8%), Philadelphia (54%), Houston (52.2%), New York City (51.2%) and Los Angeles (45.2%). Notably, City of Chicago dropout rates (38.3%) are higher than in any of the above-mentioned cities, as well the US average of 8.1% (NCES, 2010). School districts elsewhere in the Metro-Region generally perform better: Naperville, Indian Prairie (Aurora) and Oswego school districts have graduation rates above 95% and dropout rates at or below 3%, and graduation rates in the Waukegan school district stand at around 65% with dropout rates of around 7.5%.

Table 1.11. **Racial concentration in selected sectors, 2007-09**

Industry	Chicago City				Rest of Metro-region			
	White	Black	Hispanic	Other	White	Black	Hispanic	Other
Total employed	38.9	28.9	25.2	7	68.1	9.6	15.1	7.2
Utilities	46.9	30.7	14.4	8	71.8	14	10.4	3.8
Construction	39.7	17.4	40.8	2	73.9	4.3	20	1.9
Manufacturing	25.9	17.9	50.3	5.9	60.8	6.2	25.6	7.3
Wholesale Trade	43.1	14.7	35.5	6.7	72.3	5.8	14.9	6.9
Retail Trade	34.2	31.6	27.8	6.4	69.2	10.3	12.9	7.6
Transportation and Warehousing	24.9	49.3	20.7	5.1	63.2	18.2	12.2	6.3
Information	51	27.9	14.4	6.7	70	11.6	9.7	8.7
Finance and Insurance	53.5	22.9	14.4	9.1	73.3	9.3	8.8	8.6
Real Estate and Rental and Leasing	53.4	27.5	15.5	3.7	77.8	8.5	9.7	4.1
Professional, Scientific and Technical Services	66.3	13.8	11.2	9	78	5.2	6.1	10.7
Management of Companies and Enterprises	66.1	8.4	12.2	13.2	81.4	5	10.5	3.1
Administrative Support and Waste Management	28.7	35.5	31.9	3.9	56.1	10.9	29.5	3.5
Educational Services	47.9	30.3	14.8	7	77.4	9.3	7.5	5.7
Health Care and Social Assistance	30	44.3	16.1	9.6	62.9	15.5	9.1	12.4
Arts, Entertainment and Recreation	50.2	25.6	17	7.2	79.1	5.9	12.1	2.9
Accommodation and Food Services	29.4	23.4	37.3	9.9	53.4	8	30.6	8
Public Administration	41.4	39.9	14.4	4.4	70.5	17.6	8.2	3.7

Source: Ruggles, Steven *et al.* (2011), *Integrated Public Use Microdata Series: Version 5.0* University of Minnesota, Minneapolis, MN, US**,** *http://usa.ipums.org/usa/cite.shtml*.

There are also gaps in STEM skills (science, technology, engineering and math), a problem for the US generally. For example, the 2009 OECD PISA results, which measure the skills of 15-year-olds, reveal that the United States ranks rather poorly for an

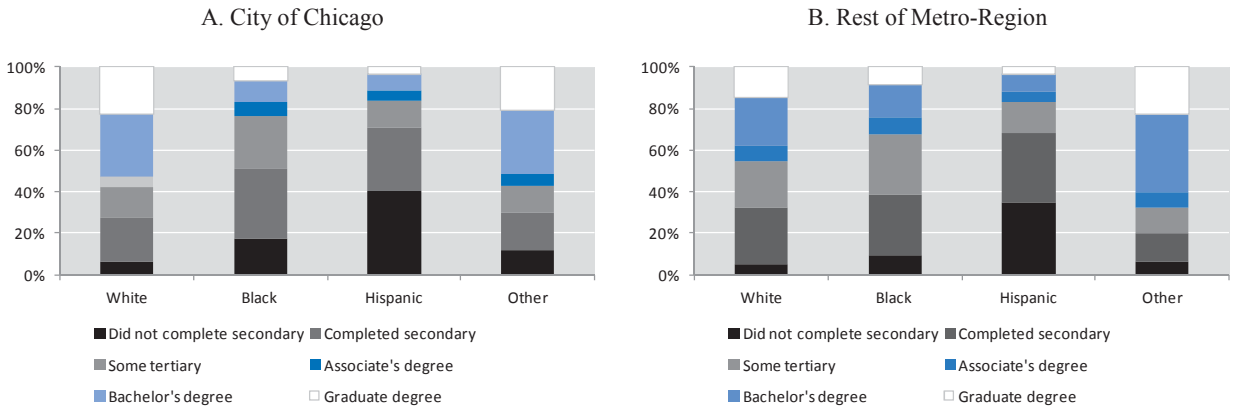
advanced economy, with math skills significantly below the OECD average and science around the average. Illinois 15-year-olds ranked 31st among the US states in terms of math proficiency; Wisconsin and Indiana both ranked somewhat higher, respectively 37th and 35th (OECD, 2009).

The skills divide is linked to a racial divide. The racial or ethnic composition of the workforce varies by industry and by area within the Chicago Tri-State Metro-Region (Table 1.11). In the City of Chicago, whites make up the largest share of employees in management and the professions; blacks predominate in transportation and warehousing, as well as healthcare and social assistance; and Hispanics predominate in manufacturing. In the rest of the Metro-Region, the relative concentrations of the racial/ethnic groups within different industries are about the same, but the actual concentrations are lower, reflecting the overall lower percentage of minorities outside the city.

The concentration of racial/ethnic groups within certain industries is linked to differences in educational attainment by race (Figure 1.24). The most striking aspect of this picture, apart from the obvious disparities among racial groupings, is the geographic breakdown: whites in the City of Chicago are far more likely to have a bachelor's degree or higher than whites outside it, whereas the story is reversed for blacks: educational attainments are far higher for blacks living in the suburbs than for those in the city. For Hispanics, the differences between the city and the surrounding region are not as great.

Figure 1.24. **Average educational attainment by race, 2007-08**

City of Chicago and surrounding Metro-Region



Source: Ruggles, Steven *et al.* (2011), *Integrated Public Use Microdata Series: Version 5.0* University of Minnesota, Minneapolis, MN, US**,** *http://usa.ipums.org/usa/cite.shtml.*

Current projections suggest that both the skills shortages that affect some segments of the job market and the increasingly difficult position of those with very low skills and weak labour-market attachment will get worse if these problems are not addressed. The U.S. Bureau of Labor Statistics projects that job openings in the Chicago Tri-State Metro-Region will grow by 9.8% between 2008 and 2018. It estimates that 42% of the new jobs will be high-skill jobs, requiring at least a bachelor's degree, and many will require advanced degrees and/or significant work experience. By contrast, low-skill jobs, defined as those requiring no more than short-term training, are expected to account for 3% of the growth. High-skill jobs already account for the largest share of openings (39% in 2008). The expected growth of high-skilled jobs could also reflect an anticipated expansion in

higher-value industries, since the growth-to-replacement ratio of high-skill jobs is higher than that of low- and medium skill jobs. The downside to these projections is that there will be fewer and fewer jobs in the future for people with a high school education or less. Even those with some tertiary education and/or an associate's degree will have relatively fewer employment opportunities (IDES, 2011).

Social exclusion both reflects and reinforces labour-market problems

The Chicago Tri-State Metro-Region's labour market is characterised by a high degree of geographic segmentation that reduces low-income residents' access to employment, since they are likely to find it hardest to bear the cost of commuting. Eight percent of the residents in Cook County and 5% of residents in the Metro-Region live in high poverty neighbourhoods (in which 35% or more of residents live in poverty), which suggests that poverty is relatively isolated and concentrated in specific neighbourhoods. Residents in high-poverty areas typically have access to fewer jobs, in part because businesses tend not to locate in them. The shortage of jobs available to low-wage workers in their neighbourhoods is reflected in the disconnect between low-income neighbourhoods and centres of employment (Figure 1.25). Low-wage residents are less likely to have access to a car, and commuter train lines and bus routes do not serve the south side of the Tri-State Region as well as they serve other parts of the region. Commuting times are even longer for those who commute across the region instead of following the hub and spoke system. As will be seen later in this chapter, investment in public transport infrastructure does not sufficiently respond to demand for access to jobs, especially in lower-income neighbourhoods.

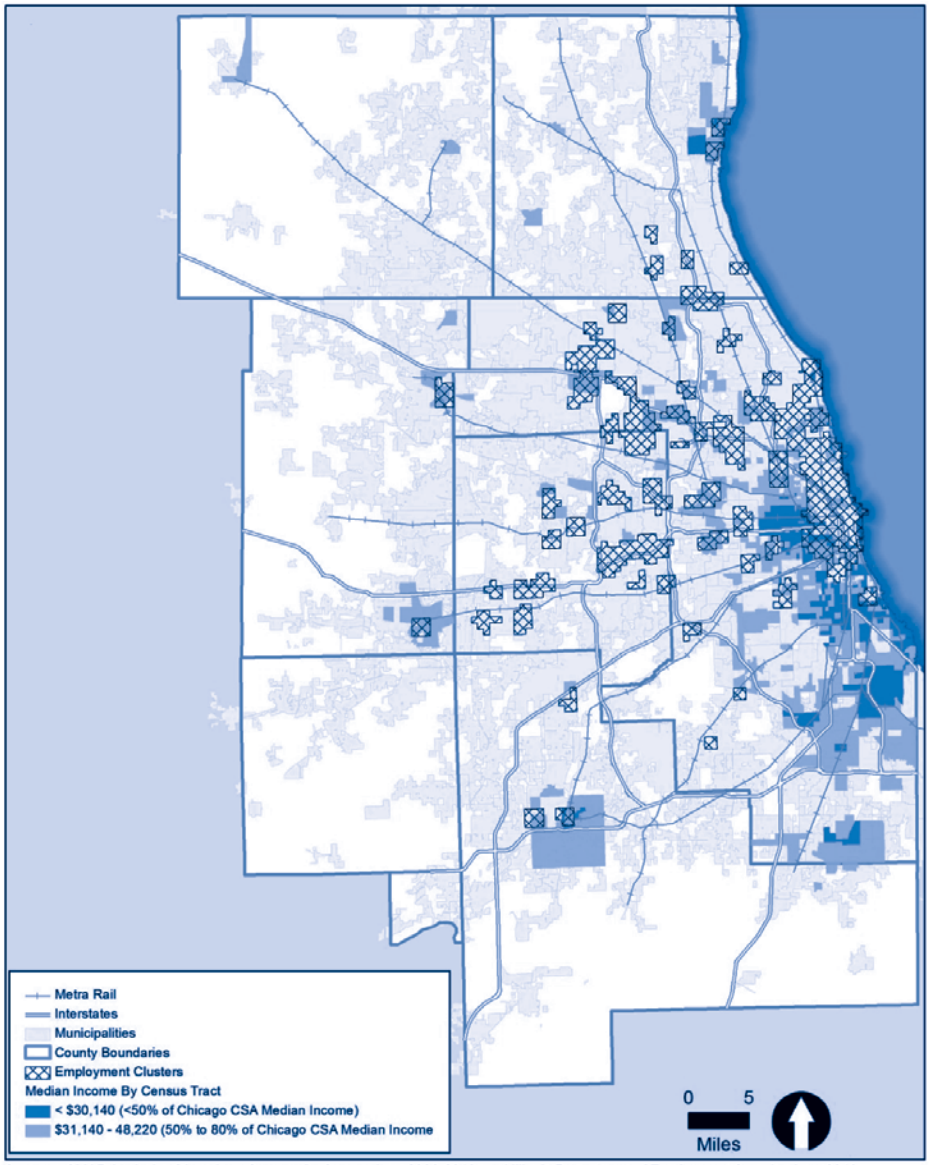
Poverty both contributes to, and is aggravated by, spatial segmentation of the labour market. The City of Chicago has the highest concentration of poverty in the region. The city's 21.6% poverty rate (based on individuals in 2009) is much higher than the corresponding figures of 15.9% for Cook County and 12.8% for the entire Metro-Region. The poverty rate has increased over the decade for all three entities, with the city increasing the most and the Metro-Region the least, implying an increasing concentration of poverty at the core. The city's rate rose by 4.4 percentage points, from 17.2% in 2000 to 21.6% in 2009. The Metro-Region's poverty rate increased by 2.1 percentage points over the same period.29 Women are particularly susceptible to poverty, which can arise suddenly following a divorce or the birth of a child out of wedlock. More than 40% of single women raising one or more children in the City of Chicago live in poverty (Table 1.12).

Table 1.12. **Poverty rate of females age 16+ by marital status and children, 2007-09**

Marital Status	City of Chicago		Rest of Metro	
	No children	Children present	No children	Children present
Married, spouse present	5.9	10.1	2.1	3.4
Married, spouse absent	25.1	27.8	27.3	18.4
Separated	35.6	31.2	23.3	23
Divorced	22.9	17.8	14.9	11.5
Widowed	30.1	14.3	20.4	6.7
Never married / single	26	41.1	15.1	30.1

Source: Ruggles, S. *et al.* (2011), *Integrated Public Use Microdata Series: Version 5.0* University of Minnesota, Minneapolis, MN, US, *http://usa.ipums.org/usa/cite.shtml*.

Figure 1.25. **Disadvantaged communities and major employment centres**



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: CMAP Analysis of American Community Survey data, 2006-2010, and Illinois Department of Employment Security data, 2010.

Low-income populations in the Chicago Tri-State Metro-Region are concentrated in pockets of poverty, which represent a challenge for connecting the local workforce to jobs. Poverty is concentrated in the south, southwest, and west portions of the city (Figure 1.25). Twenty-five percent of Cook County residents who live in poverty are located in neighbourhoods where 35% or more of the residents earn less than the poverty level. These neighbourhoods house 8% of the residents in Cook County. For the Metro-Region, the share of those in poverty who live in high-poverty neighbourhoods is 20%, implying that poverty in the region is far less concentrated outside the city. Moreover, poverty became slightly less concentrated across the metropolitan area during this period as it expanded in the suburbs (U.S. Census Bureau, 2009a).

Rather than a problem of housing affordability, is a problem of housing quality and adequate services in neighbourhoods with high concentrations of poor residents. The median cost of renting in the City of Chicago is lower than many other cities and just above the US median (USD 901 vs. USD 842). While 52% of tenants spent 30% or more of their household income on housing, this is the same share as nationally, indicating that this is not a problem that is particular to Chicago. Instead, the Metro-Region faces a situation of a high concentration of affordable housing in neighbourhoods with low-quality services. Poor areas typically provide lower quality education and fewer job opportunities than more prosperous ones, to which they tend to be poorly connected by public transport. Addressing these problems, however, can have unintended effects, particularly if individual aspects of what is a multi-faceted problem are addressed in isolation. Improving neighbourhood services can result in higher housing prices, pushing poor residents to other areas that are still less-well served by transport, education, safety and social services. Any attempt to tackle the problems of low human capital, concentration of poverty and social exclusion thus needs to adopt a horizontal rather than a sectoral approach, incorporating the fact that the region is confronting both an economic and a social problem, entailing economic costs for the wider society as well as very high human costs for those most affected. The concentration of large populations with very low skills and little labour-force attachment represents a drag on future growth as well as a factor aggravating the shortages in medium-skill occupations in the labour market.

The Tri-State Region can do more to realise its enormous innovation potential

As argued above, human capital formation is just one part of the challenge of generating sustained TFP growth. Innovation is another – and, indeed, is one that depends in no small measure on human capital. The two are closely inter-related. While the Tri-State Region ranks high among OECD regions on many technology-based innovation indicators in terms of volume, its position has slipped and it is not among top regions when controlling for the size of its population and economy. For instance, in terms of patents *per capita*, the Tri-State Region ranked 23rd among OECD Metro-Regions and 11th among US metro areas in 2007, the last year for which data are available; its ranks were 27th and 12th, respectively, when adjusting for GDP (Table 1.13). These are hardly poor scores, but neither do they suggest that the Tri-State Region is fulfilling its innovation potential, particularly given that it ranks below so many other US Metro-Regions, including San Diego, San Francisco, New York, Boston, Los Angeles, and Houston. The same pattern can be identified at the level of particular types of technologies: for example, the Tri-State Region was the sixth largest in terms of nanotech publications over 1990-2006 (Shapira & Youtie, 2008), but the patent data suggest that its performance when controlling for population and economic size has been unspectacular.

Table 1.13. **Chicago Tri-State Metro-Region's patent intensity rankings**

Patent applications (fractional count, by inventor and priority year)	*Per capita*		Per unit of GDP (measured in million of USD PPP)	
	Among 90 OECD Metropolitan Regions	Among 29 US Metropolitan Regions	Among 90 OECD Metropolitan Regions	Among 29 US Metropolitan Regions
Green technologies	32	11	43	11
ICT	9	8	16	7
Nano technologies	47	11	30	11
Bio technologies	78	17	34	18
Total PCT patent applications	23	11	27	12

Note: All the Canadian Metro-Regions (Montreal, Toronto and Vancouver) were excluded as there was no information available for these regions in the database.
Source: OECD Metropolitan Regions Database.

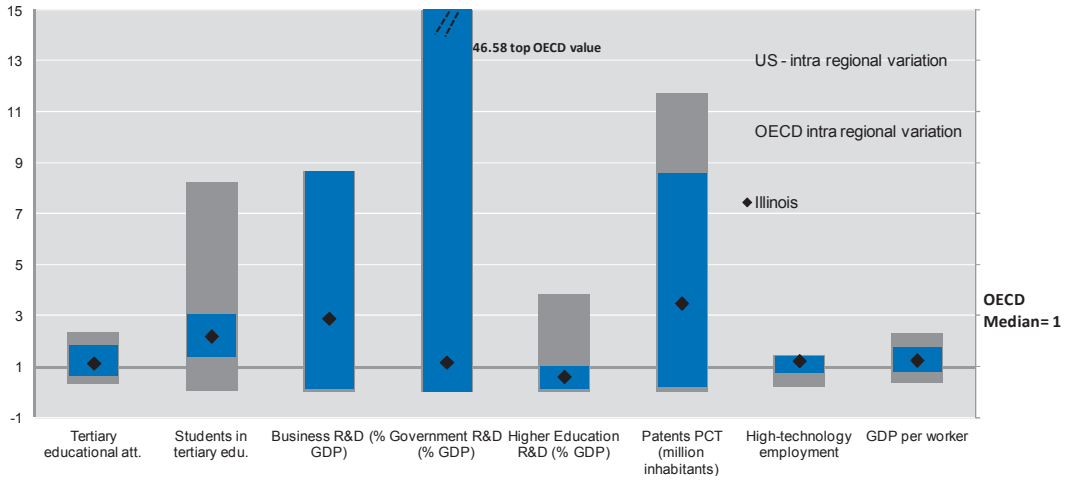
A lack of internationally comparable data makes it difficult to benchmark other dimensions of Chicago's innovation performance, but a look at the state of Illinois, the TL2 region of which most of the Chicago Metro-Region is a part, provides some further insight into its strengths and weaknesses. Although it is a major knowledge-generator in aggregate, Illinois, as well as Indiana and Wisconsin, does not rank particularly well on indicators that control for size of economy and population. For example, Illinois ranks only 105th out of 297 OECD TL2 regions for the share of the labour force with tertiary education (27%). Wisconsin and Indiana rank even lower: respectively 156th and 204 (23% and 20% of tertiary educated labour force) (Figure 1.26). The three states are in a somewhat better position in terms of the technology level of jobs (26th out of 269 regions for Illinois, 51st for Indiana and 83rd for Wisconsin) with around half of its employees in high or medium-high-tech manufacturing and knowledge intensive services. As most of the R&D in Illinois, Indiana and Wisconsin is business-driven (78%, 75% and 68% in 2007), that investment is more likely to have economic impacts than in regions where the largest share is performed by public/ non-profit actors. Illinois is ranked 38th out of 255 regions for its business R&D intensity (R&D expenditure as a share of GDP), at 1.84%. Indiana and Wisconsin rank 35th and 54th, performing respectively 1.98% and 1.46% of business R&D (share of GDP). However, the low levels of public/non-profit R&D relative to the economy size is an area for improvement, as a greater critical mass is needed to become a "hot spot" of high-tech innovation activity. For example, the R&D intensity of higher education institutions, at 0.46% in Wisconsin, 0.36% in Indiana and 0.3% in Illinois, ranks only 122nd, 178th and 198th out of 250. That figure for public research at 0.15% in Illinois ranks the state only 113th out of 250 regions, Indiana and Wisconsin rank even lower: 206th and 231st (0.04% and 0.02%).[30]

Other indicators suggest that the Chicago Tri-State Metro-Region does not rank as highly among the US knowledge hubs as one might expect, given the size of its economy and population and its concentration of world-class research universities. For example, the US New Economy Index ranked Illinois only 15th out of 50 states in 2010, although this does represent improvement on the 1999 rank of 22.[31] The neighbouring states are ranked lower, and while Wisconsin's ranking increased over 2002-10 to 29th, Indiana's ranking declined over 2002-10 to 35th. The Chicago Tri-State Metro-Region still performs behind several other US Metro-Regions.

When compared to other OECD TL2 regions, the Chicago TL2 Region (Illinois) is, with Indiana and Wisconsin, among 38 US states that fall within the category of Industrial Production Zones rather than Knowledge and Technology Hubs (Figure 1.27 and Box 1.5). Industrial Production Zones are characterised by average science and technology (S&T) performance. US states stand out in an OECD context due to higher national wealth and productivity levels, R&D investment and patenting, but they generally perform more poorly than other OECD TL2 regions in terms of other factors, such as education levels. Illinois does perform better in terms of S&T than most US states that are Industrial Production Zones, but it scores less well on S&T indicators that those than OECD regions categorised as Knowledge and Technology Hubs. Average R&D expenditure as a share of GDP for all Knowledge and Technology Hub TL2 regions is 4.14% (double that of Illinois), and the average number of PCT application per million inhabitants is 58% higher than in Illinois (291 versus 184 – the corresponding figure for the Chicago Tri-State Metro-Region in 2008 was 163). While composite indices of groups of peer regions have some limitations, it is significant that Illinois consistently performs below Knowledge Hub regions on the above indicators.

Figure 1.26. **Illinois innovation snapshot in OECD context**

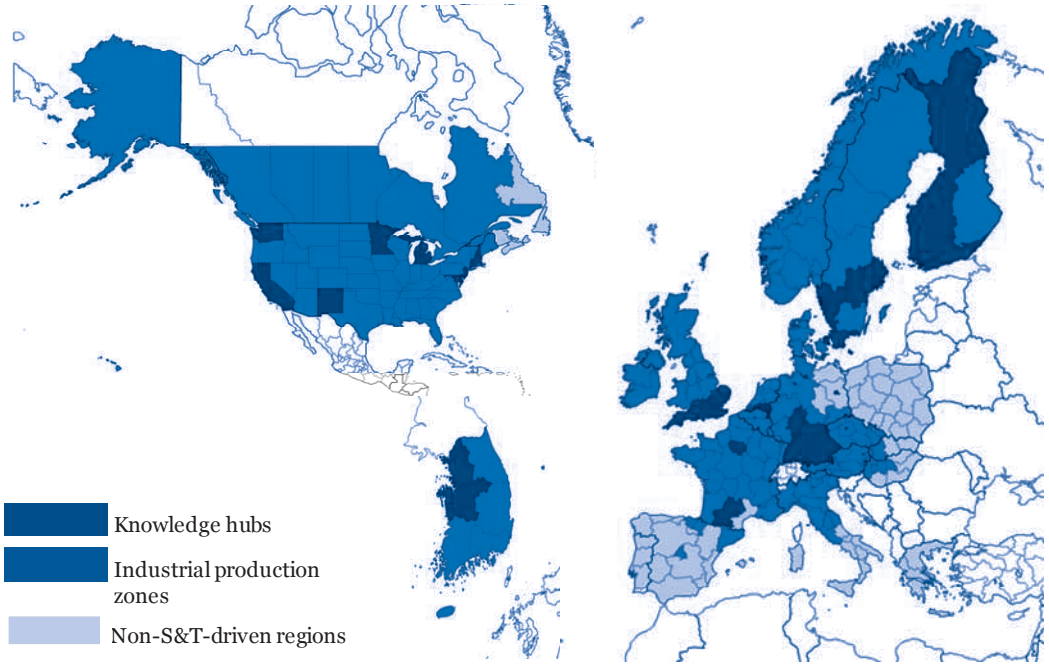
OECD regional median value=1



Notes: Data is for 2007 or the latest year available. Each variable is normalised to an OECD median of 1 for regions with data. The light colour band represents the range of values for the United States. The dark band represents the range of values for OECD regions. Not all OECD regions have data for all variables.

Source: Calculations based on data from the OECD Regional Database.

Figure 1.27. **Illinois, Indiana and Wisconsin are not among OECD global knowledge hubs**



Notes: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map. Maps may be cropped for ease of display. Eight different types of regional profiles, based on an analysis of 12 indicators in OECD regions with available data, were grouped into these three categories (Box 1.5).

Source: Ajmone Marsan, G. and K. Maguire (2011), "Categorization of OECD Regions Using Innovation-Related Variables", *OECD Regional Development Policy Working Papers*, OECD, Paris.

Box 1.5. **A categorisation of OECD regions using innovation-related variables**

To advance the OECD quantitative research on regions and innovation, a categorisation of regions was developed using socio-demographic, economic, and innovation-related variables, in order to highlight the diversity of regional profiles across OECD regions. A cluster analysis methodology was chosen to develop this analysis. Cluster analysis is a statistical method that uses a group of variables to obtain groups (or clusters) of regions that are most similar based on their on their likeness on variables. Such an analysis thus facilitates the development of peer groups and benchmarks among regions with the greatest degree of commonality. It overcomes a drawback of scoreboards, which imply a universal standard for all regions.

The analysis is based on 12 variables for 23 OECD countries covering 240 TL2 Regions, which together account for 78% of total OECD GDP and 71% of OECD population. The list of variables used is the following: GDP *per capita*, population density, unemployment rate, percentage of the labour force with tertiary education, R&D expenditure as a share of GDP, business R&D expenditure as a share of total R&D expenditure, PCT patent applications per million inhabitants, share of employment in the primary sector, share of employment in the public sector, share of employment in manufacturing, high and medium high technology manufacturing as a percent of total manufacturing, and knowledge-intensive services as a percentage of total services. Using the aforementioned variables and methodology, a set of eight regional groupings was obtained. These 8 clusters were grouped together into the following three macro-categories based on relevance for policy recommendations:

- The **Knowledge hubs** account for around 30% of the total sample GDP and 25% of population and contain the following two groups: *Knowledge-intensive city/capital districts* and *Knowledge and technology hubs.*

- The **Industrial production zones** covers 60% of sample GDP and population and contains four groups: *US states with average S&T performance, Service and natural resource regions in knowledge-intensive countries* and *Medium-tech manufacturing and service providers and Traditional manufacturing regions.*

- The **Non-S&T-driven regions** account for 14% of sample population, but only 8% of sample GDP and contain two groups: the *Structural inertia or de-industrialising regions* and *the Primary-sector-intensive regions.*

Source: Ajmone Marsan, G. and K. Maguire (2011) "Categorization of OECD Regions Using Innovation-Related Variables", *OECD Regional Development Working Papers, 2011/03*, OECD, Paris; and OECD (2011c) *Regions and Innovation Policy:* OECD Reviews of Regional Innovation, OECD, Paris.

Improved infrastructure can do much to raise the Tri-State Region's competitiveness

Although human capital is the most robust determinant of regional growth (OECD How Regions Grow, 2009), infrastructure remains a necessary condition. OECD work shows that regions with the highest concentration of economic activity tend to have greater endowments of infrastructure and physical capital, thus a higher stock of infrastructure *per capita* that can positively impact productivity. There are no data available at the local level to establish the link between the stock of capital and the level of productivity. However, a positive correlation between regional productivity and the stock of infrastructure has been detected in eight out of 15 OECD countries, (*i.e.*, the

Czech Republic, Denmark, Germany, Hungary, Japan, Sweden, United Kingdom and United States) (OECD, Region at glance 2005). From a theoretical perspective such a link could be easily supported. For instance R&D infrastructure (e.g. laboratories) and allocation of adequate spaces in Metro-Regions allow for the exchange of ideas and cross-fertilisation of innovative activities. In other words, capital provision in urban areas will not only increase the ratio of capital per worker, but can also allow R&D activities within firms and innovation arising at the production site to take place.

On the side of public capital, evidence shows that the Chicago Tri-State Metro-Region's competitiveness is being undermined in part by the growing inadequacy of its transportation infrastructure, which is typified by high rates of road congestion. Road congestion imposes costs and effectively reduces the size of the labour market in the Metro-Region. In short, it prevents the region for benefitting fully from the potential productivity gains associated with agglomeration economies.[32] According to the Metropolitan Planning Council (2008), if additional public transport investments are not made, annual losses due to road congestion (including lost time, wasted fuel and environmental impacts) are expected to rise by 55%, twice the rate of projected population growth, from USD 7.3 billion in 2008 to USD 11.3 billion in 2030. Most residents travel by passenger car, resulting in high rates of road congestion and emissions. According to one recent estimates road congestion costs passenger vehicle users in the Chicago Tri-State Metro-Region USD 1 568 per commuter per year in terms of value of travel time delay and excess fuel consumption – the highest figure in the United States (Texas Transportation Institute, 2011).[33] Public transportation accounts for only 2.5% of daily commuting in the Chicago Tri-State Metro-Region, while cars, trucks and vans account for 90.9% of commuting trips (U.S. Census Bureau, 2010). Public transport use is higher in the seven counties of the CMAP area, accounting for 13% of all commuting trips and 9% of all weekday trips. Reliance on public transport has declined since 1989, although it has been increasing in recent years (CMAP, 2010).

One of the causes of congestion is the inability of public transport infrastructure to keep up with suburbanisation patterns, which has left most residents in the Metro-Region unable to reach their jobs by public transport. While the Chicago Tri-State Metro-Region has the second-largest public transportation system in the US and 68% of people in the CMAP region (the seven IL counties in the Metro-Region that are closest to Chicago) live within one quarter of a mile (400m) of a fixed-route public transport stop or station, only 24% of the working population living within three quarters of a mile (1.2km) of public transport can get to work using public transport within 90 minutes (CMAP, 2010, 294; Brookings Institution, 2011, 35-44). In suburban areas this figure drops to 14%. Public transport commutes of less than 90 minutes each are even scarcer: only 6% of the working population within three quarters of a mile (1.2km) of public transport can reach their jobs within 45 minutes and only 12% within 60 minutes (Brookings Institution, 2011, 44). The Brookings Institution (2011) ranks the Chicago Tri-State Metro-Region 46th out of the 100 largest US Metro-Regions in terms in terms public transport coverage, job access and frequency of service.

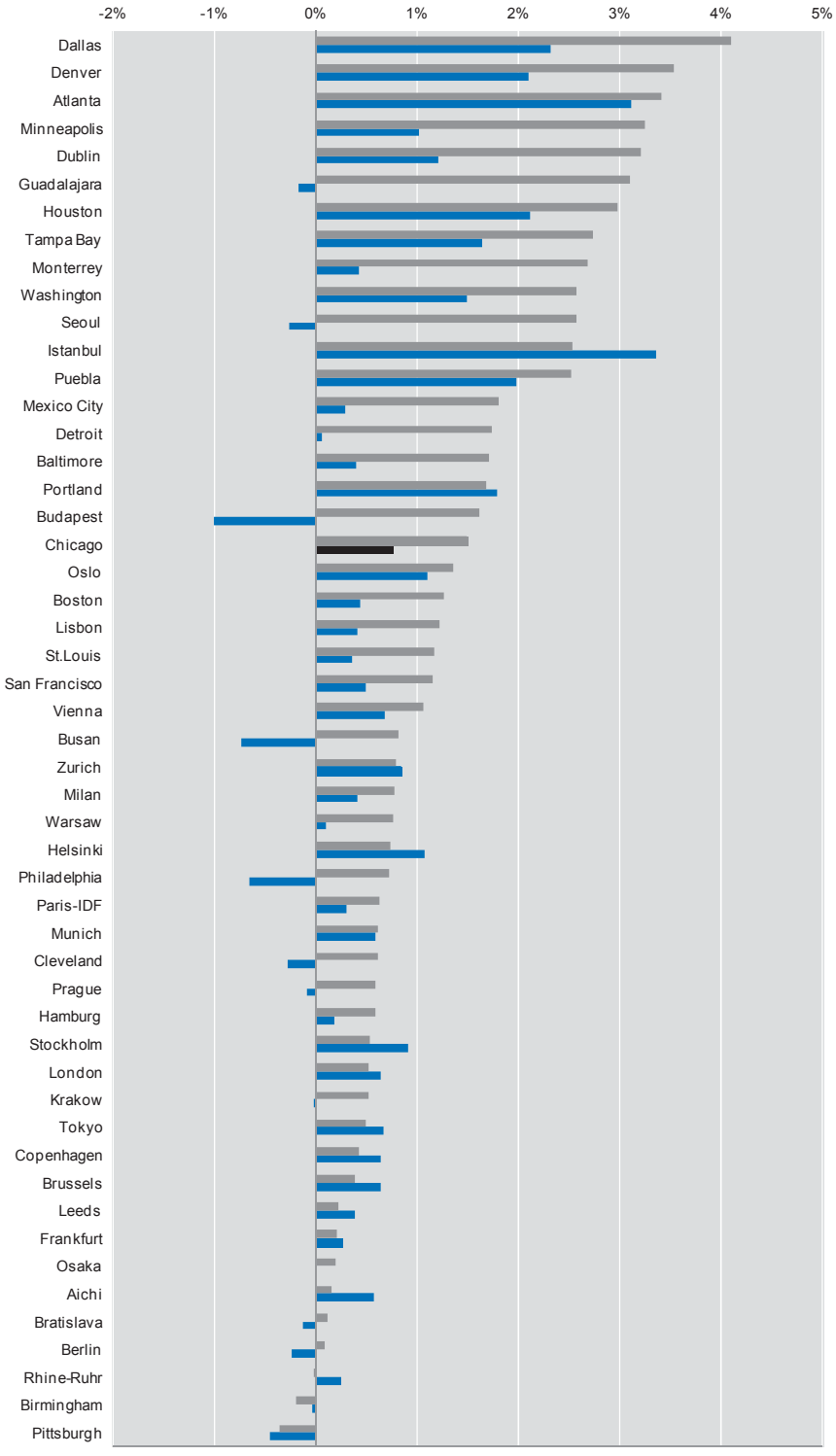
The Chicago Tri-State Metro-Region's sprawling growth patterns contribute to a disconnect between the location of public transport locations, residences and employment. The region ranked 51st out of 90 OECD Metro-Regions in terms of population density, with 383 people/km^2. Density levels in Chicago are not only below the OECD average for Metro-Regions (671.5 people/km^2), but also well below the densities of Los Angeles (864.8 people/km^2) and New York (795 people/km^2). The

Chicago Tri-State Metro-Region is among the top 20 OECD regions in terms of growth of the suburban belt (Figure 1.28).[34] Suburbanisation of housing has been met by suburbanisation of employment. Between 1960 and 1990 over 96% of new jobs in the region were created outside downtown, resulting in an increase in inter-suburban commuting and "reverse commute" trips from the urban core to the suburban belt (Chicago Council on Global Affairs, 2007, 25; CMAP, 2010, 292). Inter-suburban trips are difficult to accommodate within the existing transport system, which is still organised around a hub-and-spoke pattern.

Road congestion in the Chicago Tri-State Metro-Region could be lessened by improvements to public transport, but investment in public transport has not kept up with the Metro-Region's needs. The Regional Transport Authority (RTA), which serves six counties and 88% of the population in the Metro-Region, has applied most of its funding on operations (over USD 2 billion annually) rather than maintenance or capital investment.[35] This is due in part to the rapid increase in operating costs, which have risen 4.5% annually, outpacing inflation (CMAP, 2010). Approximately half of RTA's operating costs are financed by fares and other system-related revenues (e.g. advertising and concession), with the remainder supplied by an RTA sales tax of varying rates by county based on proximity to Chicago and Cook County, a real estate transfer tax in the City of Chicago, and state matching funds and contributions. Capital funds come primarily from federal and state sources; while federal sources of capital funding are relatively consistent from year to year, annual state funding can vary significantly. In 2007, the RTA lacked USD 226 million to keep all services running, which prompted an increase in the RTA sales tax and real estate transfer tax (RTA, 2007). The RTA (2007) estimates that investments of USD 7.3 billion would be necessary over a five year period to maintain the transport system, an additional USD 1.1 billion would be needed to enhance it, and USD 2 billion more would be needed to expand it over that time period. The cost of maintaining, enhancing and expanding the system over 2007-37 is estimated at USD 57 billion (RTA, 2007; CMAP, 2010). It is estimated that investments to maintain and enhance the transport system would result in annual benefits of USD 2 billion (Chicago Metropolis 2020, 2007). While extending public transportation is a matter of large public funding, public opinion is more in favour of maximising funding to improve the system (77%) than maximising funding for new roads (30%) (CMAP, 2010).

Road congestion also slows rail freight movement in the Chicago Tri-State Metro-Region, which undermines the Metro-Region's potential to strengthen its position as a logistics hub. Intermodal transfers from rail to truck, a growing share of freight in the Metro-Region, and transfers from one regional intermodal shipping facility to another are delayed due to road congestion, resulting in high costs (Table 1.13). Metro-region intermodal transfers across the Chicago Tri-State Metro-Region are mainly done by trucks moving trailers and containers on surface streets, which are both delayed by and a contributor to road congestion (NCHRP, 2007). Trucks represent nearly one of every six vehicles on Illinois' urban interstates, and this share is growing as truck freight tonnages may rise by 70% by 2040 (CMAP, 2010). The annual cost of truck freight congestion in the Chicago region, based on the cost of increased time, fuel and other operating costs, is USD 2.3 billion, higher than any other US city (Texas Transportation Institute, 2011) (Table 1.13).[36] Truck congestion is particularly high at at-grade crossings with rail lines, leading to delays for both road and rail freight. The wait times for trucks at at-grade crossings are expected to rise with train lengths, which are expected to increase from the current average of 125 cars to an estimated 175 cars (CMAP, 2010).

Figure 1.28. **Annual average population growth OECD Metro-Regions' core and belt, 1995-2007**



Note: Data for Belgium, Denmark, Germany, Mexico, Sweden, and United States refer to 1995-2005; data for Poland refer to 2000-2007. Chicago here refers to the Tri-State Chicago Metro-Region which corresponds to the Metropolitan Statistical Area (MSA).

Source: OECD Metropolitan Regions Database and OECD Regional Database.

Table 1.14. **Truck commodity value and truck delay in top ten very large US urban areas, 2010**

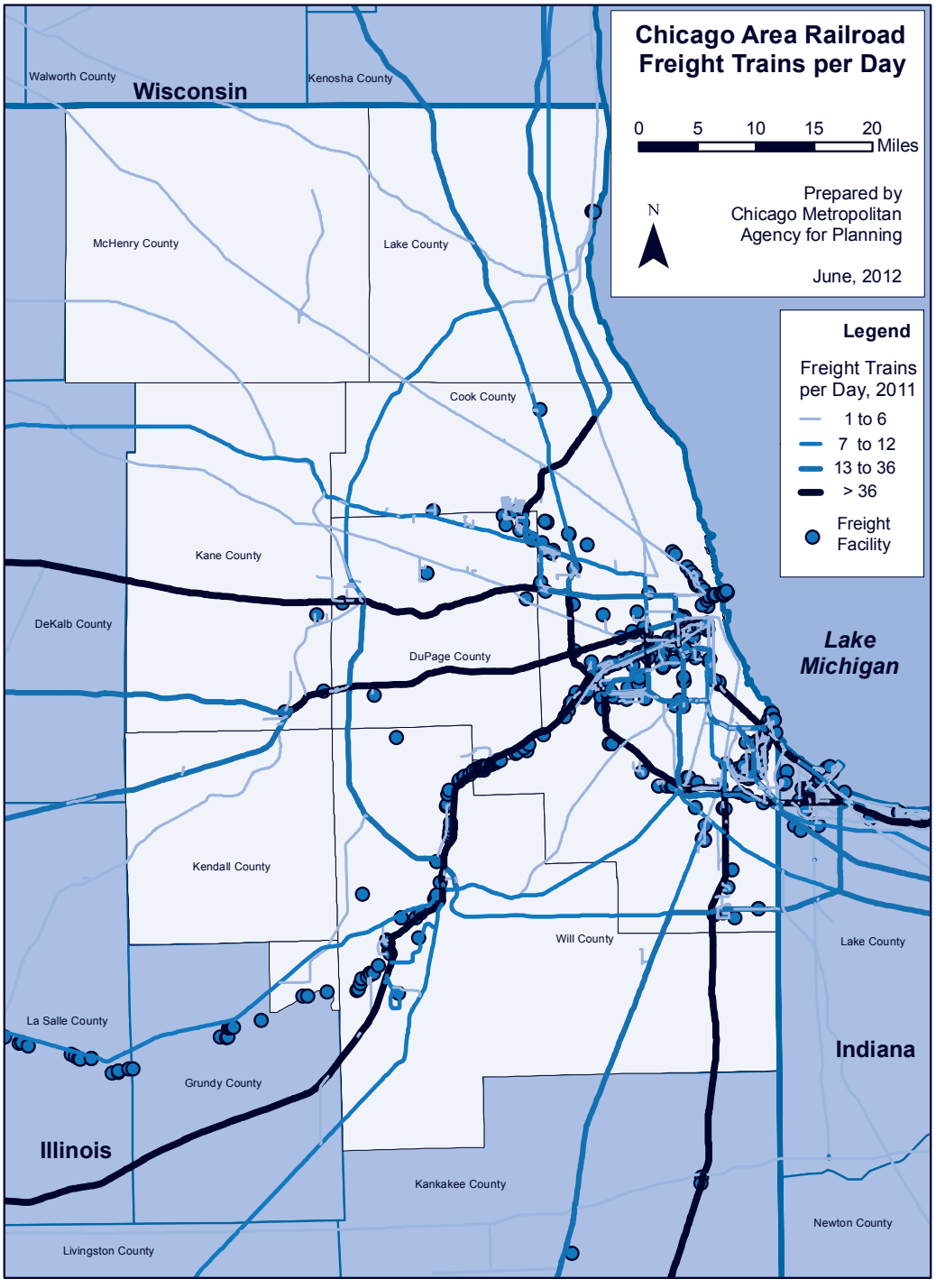
Urban Area	Truck Delay (1000 Hours)	Truck Delay Rank	Truck Congestion Cost (million USD)	Truck Commodity Value (million USD)	Truck Commodity Value Rank
Chicago IL-IN	31 378	1	2 317	357 816	3
Los Angeles-Long Beach-Santa Ana CA	30 347	2	2 254	406 939	2
New York-Newark NY-NJ-CT	30 185	3	2 218	475 730	1
Houston TX	9 299	4	688	230 769	4
Washington DC-VA-MD	9 204	5	683	96 965	17
Dallas-Fort Worth-Arlington TX	9 037	6	666	227 514	5
Philadelphia PA-NJ-DE-MD	8 970	7	659	172 905	7
Atlanta GA	8 459	8	623	189 488	6
Miami FL	8 207	9	604	153 596	9
Phoenix AZ	8 139	10	603	129 894	12

Note: Truck Delay is the travel time above that which is needed to complete a trip at free-flow speeds for large trucks. Truck Congestion Cost is the value of increased travel time, fuel and other operating costs of large trucks (estimated at USD 106 per hour of truck time).Truck Commodity Value is the value of all commodities moved by truck estimated to be travelling in the urban area.

Source: Texas Transportation Institute (2011).

Rail freight movement is also slowed by the high volume of rail freight and interaction with passenger rail lines. The Chicago Tri-State Metro-Region's position as the largest rail freight hub in North America results in high volumes of rail traffic. Most of the rail bottlenecks in the region occur around freight facilities located on rail lines with high freight density (Cambridge Systematics, 2010) (Figure 1.29) While trains move freight in a truck-competitive two days from the West Coast to Chicago, they can take three days to move across the Metropolitan Region (NCHRP, 2007). Freight rail companies own the majority of rail lines used by passenger trains, including Metra commuter rail trains and Amtrak intercity trains. This ownership situation creates competition between freight and passenger uses. In 2008, trains on Amtrak lines coming from the east and south alone experienced over 3 400 hours of delay due to interference with freight and other passenger trains (CREATE, 2010). Plans for the Chicago Tri-State Metro-Region to become the hub of high-speed and upgraded rail service across the Midwest imply further pressure on the conflict between passengers and freight rail. (Cambridge Systematics, 2010). Rail congestion is greatest at at-grade rail-rail crossings, where two or more rail lines intersect. CREATE, an initiative launched in 2003 by the US Federal Surface Transportation Board, State of Illinois and City of Chicago, and the six railroads that pass through the Chicago Tri-State Metro-Region, is addressing the most important bottlenecks of high freight rail density. However, a recent study has identified more bottlenecks along the transcontinental railroads leading out of the region to the west and southwest, in particular where junctions with the Elgin, Joliet and Eastern railway lines coexist with rail yard operations (Cambridge Systematics, 2010).

Figure 1.29. **Regional freight facilities and rail density**



Notes: Figures include overhead trackage rights for many railroads, including Metra, the regional commuter railroad. See *http://www.cmap.illinois.gov/freight-snapshot*.

Source: Estimate prepared by CMAP. Source: National Transportation Database, 2011. Updated with information from createprogram.org, Illinois Commerce Commission Grade Crossing Database, Google Earth, and personal communications. Missing data was interpolated.

1.4. Responding to environmental and economic challenges through the green economy

The Chicago Tri-State Metro-Region faces a number of environmental challenges, which present opportunities for green technologies and services that may be developed in response to those challenges. Greenhouse gas emissions are a primary concern for the Metro-Region, and result both from high demand for heating and cooling buildings, as well as from personal vehicle travel. Emissions from transportation have been exacerbated by a sprawling pattern of development and insufficient investment in public transport, which together have made it necessary for most residents in the Metro-Region to travel to work by car. While water and air quality have improved, they remain substandard in important aspects. Finally, high rates of waste generation point to opportunities for increased recycling.

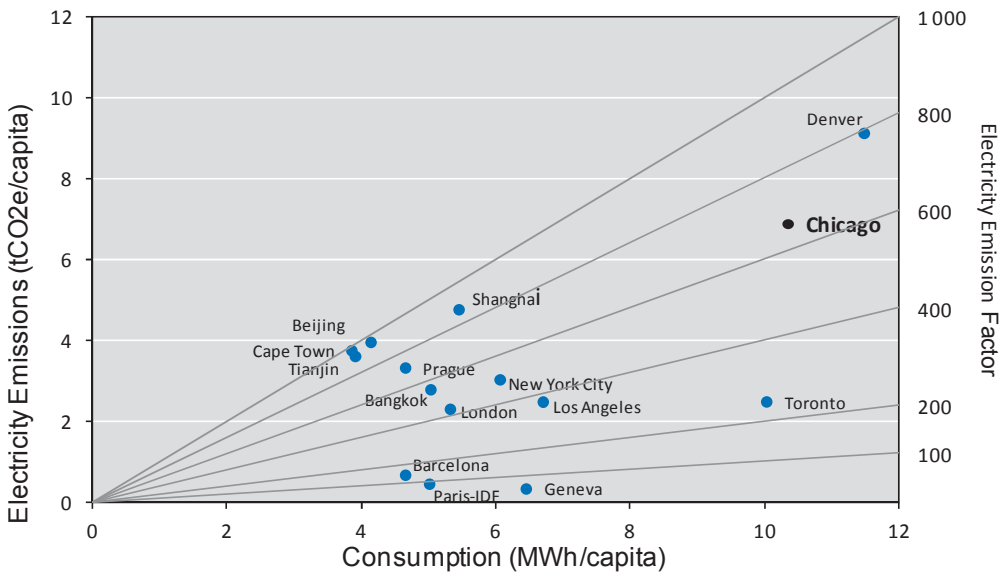
Greenhouse gas emissions and energy consumption

Elevated greenhouse gas (GHG) emissions are among the Metro-Region's most pressing environmental challenges, particularly emissions related to electricity consumption. GHG emissions from electricity consumption in Chicago-CMAP are notably high compared to peer city-regions (Figure 1.30), due to high electricity consumption and the relatively high carbon intensity of the regional electricity grid (664 tons CO_2 equivalent/Gigawatt-hour (t CO_2 e/gWh), which relies heavily on fossil fuels (CNT, 2009).[37] The level of electricity consumption in Chicago-CMAP (10.35 MWh/capita) is similar to the other interior North American city-regions, falling between Toronto (10.04 MWh/capita) and Denver (11.49 MWh/capita). When combined with the carbon intensity of the grid, the resulting GHG emissions of 6.9 t CO_2 e/capita are higher than all of the comparative city-regions except Denver, which also relies heavily on fossil fuels for electricity production (Figure 1.31). On *per capita* level, the second important emission source after electricity is transportation (5.1 t CO_2 e/capita, including aviation) and the third is natural gas (3-5 t CO_2 e/capita) (CNT, 2009).

Most CO_2 emissions in the Chicago-CMAP region come from electricity and natural gas consumptions in buildings. Heating and industrial fuel consumption are slightly above average compared to cities or regions of similar climate (62 GJ/capita; estimate based on CNT emissions for the sector).[38] Energy consumption by buildings accounts for 70% of greenhouse gas emissions in Chicago and 61% in the metropolitan area (City of Chicago, 2010a); commercial and industrial structures account for most building electricity consumption (69%) and households for the biggest share of natural gas consumption (57%). Electricity consumption is rising (25.3% between 2000 and 2005), contrary to decreasing natural gas consumption (6.2% from 2000 – 2005), which is partly due to a 53% rise of the number of hot days per year, on which air conditioning is used, and a 3% decrease of heating days over the same time period (CNT, 2009a). Much of the regional housing stock dates from before the introduction of energy codes (50% from before 1970 and 21% before 1939) and average buildings in the region consume significantly more energy than in the larger Midwest (CMAP, 2010a). Chicago has 27% of roofed area and therewith a large potential for green roofs which reduce heat gain in summer (up to 84%) and reduce heat loss in winter (up to 34%) (Gaffin *et al.*, 2010). Comprehensive energy efficiency measures in buildings lower energy consumption in average by 30%, and Chicago has made great progress with LEED and Energy Star

certifications, ranking first and fourth respectively in the number of certified buildings in the US (CNT, 2011).

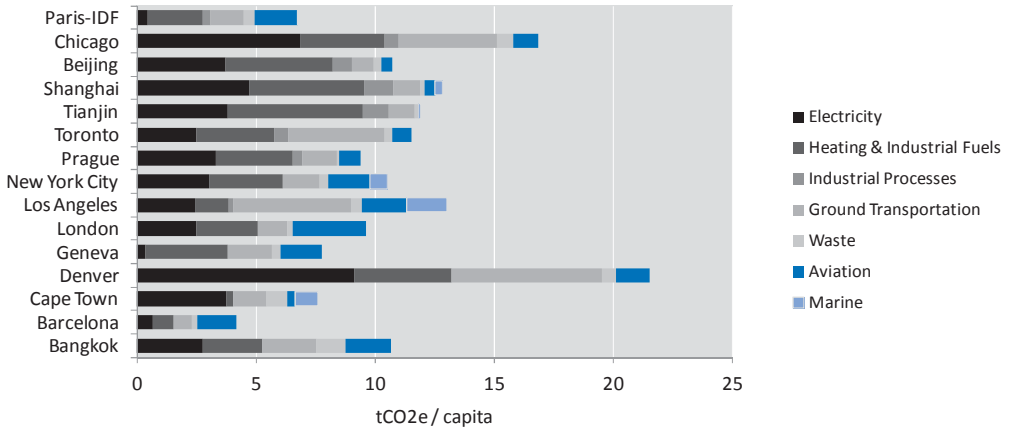
Figure 1.30. **GHG emissions from electricity use**



Note: the Chicago region corresponds to the CMAP region (7 counties).

Source: Kennedy, C. (2011), Calculations (personal communication) adapted by C. Kennedy, October 2011, using methodology from Kennedy, C. *et al.* (2009), "Greenhouse Gas Emissions from Global Cities", Environmental Science and Technology, Vol. 43, No. 19, American Chemical Society, Washington, US, pp. 7297-7302; based on data from Center for Neighborhood Technology (2009), Creating a Chicago Regional Building Energy Efficiency System, Center for Neighborhood Technology, Chicago.

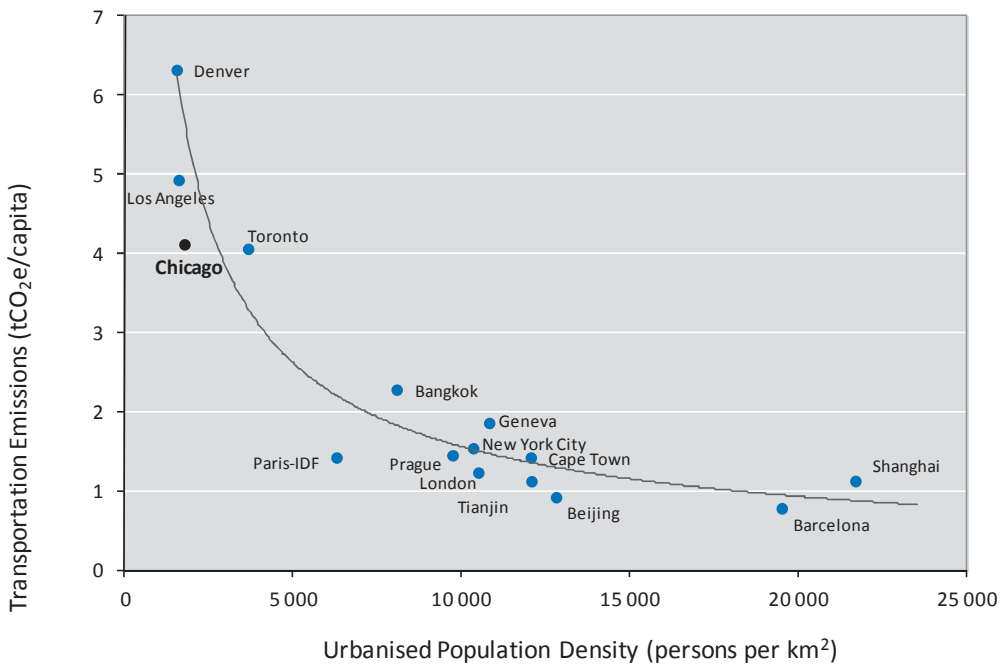
Figure 1.31. **CO_2 emissions *per capita***



Source: Kennedy, C. (2011), Calculations (personal communication) adapted by C. Kennedy, October 2011, using methodology from Kennedy, C.*et al.* (2009), "Greenhouse Gas Emissions from Global Cities", Environmental Science and Technology, Vol. 43, No. 19, American Chemical Society, Washington, US, pp. 7297-7302; based on data from Center for Neighborhood Technology (2009), Creating a Chicago Regional Building Energy Efficiency System, Center for Neighborhood Technology, Chicago.

CO_2 emissions from transportation account for the second largest part of emissions in the Chicago-CMAP region and have been rising over the last decade (CNT, 2009). Transportation emissions for the Chicago-CMAP region are over 4 t CO_2 e/capita, as is typical for North American metro–regions (Figure 1.32). Given the low population density of the CMAP region (4 593 people/square mile or 1 773 people/km^2), transportation emissions in the Metro-Region actually compare favourably against Los Angeles and Denver (Kennedy, 2011). This may be because of the Chicago Tri-State Metro-Region commuter rail system. Interestingly, the Toronto Metro-Region has similar transportation emissions even though it has approximately double the density of the CMAP region, and higher rates of public transit use (22% for the Toronto Census Metropolitan Area vs. 12% for the Chicago Tri-State Metro-Region) (Kennedy, 2011; Statistics Canada, 2006; U.S. Census Bureau, 2009b).

Figure 1.32. **GHG emissions from ground transportation**



Note: Density of urbanised area is calculated excluding green space. The Chicago region corresponds to the CMAP region (7 counties).

Source: Kennedy, C. (2011), Calculations (personal communication) adapted by C. Kennedy, October 2011, using methodology from Kennedy, C.*et al.* (2009), "Greenhouse Gas Emissions from Global Cities", Environmental Science and Technology, Vol. 43, No. 19, American Chemical Society, Washington, US, pp. 7297-7302; based on data from Center for Neighborhood Technology (2009), Creating a Chicago Regional Building Energy Efficiency System, Center for Neighborhood Technology, Chicago.

Air quality presents a concern, but is improving. Northeastern Illinois is considered a non-attainment area for two Clean Air Act pollutants – ground level ozone (smog), and fine particulate matter ($PM_{2.5}$). The situation is improving, as average pollutant levels have decreased fairly steadily over the past decade (CMAP 2010b) and most days the Air Quality Index falls into the "good" or "moderate" range (CMAP 2010b). Particulate pollution is primarily the result of road construction occurring around the region, while emissions from cars and trucks are responsible for the majority of NO_x emissions.

Water quality and scarcity

Water quality is poor in many streams and rivers in the Chicago Tri-State Metro-Region and exacerbated by the release of raw sewage during combined sewer overflow (CSO) events. Water quality is an immediate concern and water supply is likely to become a future challenge. Water quality is relatively poor, with over 80% of the 4 009 stream miles assessed in Illinois considered sufficiently polluted to prohibit primary human contact (e.g. swimming) (IEPA, 2010). In Wisconsin, 390 of the 2 683 assessed rivers and streams (which are 16% of total stream miles) are known to be impaired and in Indiana 8 374 of the 12 073 assessed miles (which are 38% of total miles designated) do not support recreational use (Clayton *et al.*, 2010; IDEM, 2008). Some problems arise from the advanced age of many wastewater treatment facilities in the region, in communities lacking funds to upgrade these systems, many of which are nearing the end of their expected operating life (CMAP, 2008). The fact that many wastewater systems in the region combine storm drains and sewer systems puts local waterways at risk for combined sewer overflow (CSO) events, in which high levels of storm runoff flood the wastewater system, causing raw sewage to be released into the waterways. CSO events occurred once every 7.4 days in 2007 in the Metropolitan Water Reclamation District of Greater Chicago (approximately the City of Chicago and the rest of Cook County) (CMAP, 2008). To address this problem, the Metropolitan Water Reclamation District of Greater Chicago has developed a tunnel and reservoir plan (TARP) which captures and stores sewer overflow until it can be pumped into existing treatment facilities prior to release into local waterways (Landis, 2008 in CMAP, 2008). A first part of this project allows for the capture of 2.3 billion gallons (8.7 million m²) of CSOs, and a second part, currently still under construction, captures another 17.5 billion gallons (66.2 million cubic metres), allowing to control a large amount of CSOs in local reservoirs (MWRDGC, 2011).

Water supply to the region has not yet been a critical issue, but growing demand combined with dwindling groundwater availability and increasing restrictions on surface water use will make water management increasingly critical for the region. The annual withdrawal of the region is 1,480.3 millions of gallons per day (2005), from which 69% of the water comes from Lake Michigan, 17% from groundwater sources and 14% from rivers (CMAP, 2010). Water demand is expected to increase by 36% by 2050 under the current trends scenario and by 64% under a more resource intensive scenario. According to CMAP, over the long-term, water availability will become an issue, as under current-use scenarios water demand is expected to increase by at least 36% by 2050, and the water supply from Lake Michigan is expected to suffice only until 2030. Areas in the Metro-Region that draw their water from groundwater and inland surface water sources expect to face shortages earlier (CMAP, 2010c).

Waste and recycling

Per capita solid waste generation in the Chicago Tri-State Metro-Region is high and the GHG emissions at landfills could be reduced through increasing recycling. In 2009, at 10.2 lbs/day (4.6 kg/day), it was double the national *per capita* average of 4.3 lbs/day (2.0 kg/day) (IEPA, 2011; EPA, 2010). While *per capita* solid waste generation has declined from 12.9 lbs/day in 2006, so has the share of recycled waste (down from 41% in 2006 to 36% in 2009) (IEPA, 2006; IEPA, 2011). Currently, only one waste-to-energy facility operates in the Chicago Tri-State Metro-Region, a 45.5 MW_p tire-derived fuel plant in Ford Heights twenty-five miles south of the City of Chicago. While 18 landfill gas-fired power plants are also in operation around the region operating at closed-

landfills, they are small (average output is 6.4 MW_p). Reducing the share of solid waste that goes to landfill can be met by increasing recycling of municipal waste, construction and demolition (C&D) materials and composting. The City of Chicago has approximately 31 recycling and reclamation facilities for various C&D materials and another 40 are located within Cook County. A recent study found a concentration of 'hot spots' for building material reuse in the north-western suburbs of Chicago and confirms a significant potential demand for material reuse, which is still underdeveloped (Weber *et al.*, 2009).

1.5. Conclusion: towards a regional vision for the Chicago Tri-State Metro-Region

As one of the largest and wealthiest Metro-Regions in the OECD, and an economic powerhouse in the US, the Chicago Tri-State Metro-Region boasts a range of assets that includes specialisation in several high value-added sectors in manufacturing and services (in particular, the financial and health-care sectors), along with the presence of a skilled, educated labour force. The region also benefits from emerging new clusters in the green sector, including professional environmental and energy services, and wind power. The Chicago Tri-State Metro-Region generates a high volume of innovative activities. Its unique geographical position as the freight and logistics hub of North America allows the Chicago Tri-State Metro-Region to play a crucial role in the US economy; its future is essential to the nation's national performance and international competitive position.

There is room for concern, however, that these assets are not being fully mobilised, and that the Chicago Tri-State Metro-Region might be losing its global competitive edge. Although still high in absolute terms, GDP and labour productivity growth rates are sluggish – both by US and international standards. The Chicago Tri-State Metro-Region's contribution to national growth has slowed over the past decade and the region does not stand out as a top US knowledge hub. Despite a dynamic and numerically large labour force, the region has experienced virtually no growth in the size of its prime working-age population and displays limited ability to attract and retain talent when compared to its US peers. More worrisome are the persistence of unemployment and the lack of sufficient job creation.

The reasons for the Chicago Tri-State Metro-Region's sluggish socio-economic performance are structural in nature, and linked to the lack of capacity of the region to adapt quickly to meet the imperatives of an economy in transition toward more knowledge-based, innovation-driven sectors needing to compete in a globalising world. A skills mismatch that has simultaneously generated labour shortages and pockets of unemployment across the region is characterised by highly-educated segments of the labour force that cannot find jobs because businesses have not adapted quickly enough to the knowledge economy, and low-skilled segments that are also increasingly excluded from the labour market because of their incapacity to upgrade skills. This mismatch is exacerbated by race-based inequality that is increasingly geographically concentrated in certain neighbourhoods across the region. If not appropriately addressed, the growing importance of the knowledge economy will only serve to highlight the increasing dysfunction of the region's labour market development strategies, to the long-term detriment of the region's economic performance and quality of life.

Another obstacle to growth is the region's ageing transportation infrastructure. Lagging transportation infrastructure investments in the Chicago region threaten the functionality of the logistics hub, one of its main pillars of growth, and the region's

attractiveness, one of its main tools to retain talent and foreign investment. As transit infrastructure investments have not tracked the region's commuting and suburbanisation patterns, most residents in the metro region, unable to reach their jobs through public transit, travel by car, resulting in high rates of road congestion and emissions, and exacerbating the spatial mismatch between where people live and where their jobs are located. Finally, while innovation-based sectors have potential to drive new growth in Chicago, the region has not yet optimised the linkages and innovation networks across the region that could turn them into strong drivers of long-term growth.

These trends generate policy challenges for key public and private stakeholders in the region and raise the issue of the appropriate scale for public interventions. The extension of the functional economic area goes well beyond local and county administrative borders and straddles three states. This requires a region-wide strategy to enhance growth prospects along with the quality of life of its residents over the long term. The fundamental challenge for the political leadership in the Chicago Metro-Region, and more broadly in the Chicago area 21-county region, will be to translate the reality of this functionality into the policy, programmatic and political alignments needed to address workforce development issues and innovation capacity effectively, or when focusing on enhancing the performance the logistics hub or the green-tech sector to drive region-wide growth.

It is within this context that the following chapters will address four challenges to growth that can present policy and governance opportunities for the region:

- How can the Metro-Region better prepare it workforce – both young and old – for the increasingly higher-skilled jobs that will characterise both the traditional and emerging sectors in the region? The chapter on **Workforce Development** will examine the specific demographic labour-market characteristics in the region. The chapter surveys the plethora of programming available across the region, and analyses the twin challenges of the disconnect between business needs and training services and the lack of sufficient public resources to meet region-wide training needs. It provides policy and governance advice on how to address these twin challenges.

- How can the Metro-Region harness its considerable volume of patents and other innovative activities to create the momentum needed to become a top world knowledge hub? The **Innovation** chapter examines the current state of the region as a knowledge and innovation hub, presents evidence of significant under-used innovation potential that challenges the region's long-term growth prospects, and recommends ways to address this challenge.

- What are the unrealised opportunities for capitalising on the region's position as a logistics hub? The chapter on **Transportation and Logistics** presents evidence that the region's transport infrastructure is ageing and that persistent under-investment in key passenger and freight transportation infrastructure threatens the long-term ability of the continent's most important logistics hub to sustain the region as a driver of national economic performance and the country's international competitive position. The chapter examines ways to increase the economic value-added of the hub.

- How can the region's emerging clusters in the green growth sector be supported to compete nationally and internationally? The **Green Growth** chapter presents

evidence that notwithstanding the challenges the region faces in evolving into a knowledge-based innovation hub of international consequence, the region is a leader in certain emerging green business clusters, including water and wind, and that efforts at developing and implementing region-wide climate-change adaptation strategies are working, but could be enhanced.

Any response to these challenges must be considered within the context of the multiple levels of governance in the Metro-Region. A final chapter will therefore address issues of **effective institutional arrangements**. Key policy makers and private stakeholders across the Metro-Region have not yet developed a common understanding of the economic development challenges they face and, most critically, a common approach to addressing them to achieve long-term, coherent multi-sector policy outcomes – in other words there is yet to be articulated a commonly-defined strategic vision for long-term, region-wide growth and prosperity.

Notes

1. The White House directive stated that "place-based policies leverage investments by focusing resources in targeted places and drawing on the compounding effect of well-coordinated action. Effective place-based policies can influence how rural and metropolitan areas develop, how well they function as places to live, work, operate a business, preserve heritage and more. Such policies can also streamline otherwise redundant and disconnected programs" (US White House, 2009).
2. Nowhere did Mr. Burnham actually write this statement down – it is nonetheless attributed to him. See Plan of Chicago, Centennial Edition, Burnham and Bennett, 2009, p. xiii. Work on the plan was financed privately, but it was adopted by the City of Chicago.
3. Ibid p. xiii.
4. The U.S. Office of Management and Budget defines MSAs as "[a] Core Based Statistical Area associated with at least one urbanised area that has a population of at least 50,000. The Metropolitan Statistical Area comprises the central county or counties containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county or counties as measured through commuting" (Office of Management and Budget, 2010).
5. The OECD methodology defining functional metropolitan regions considers population size, population density and commuting flows as indicators of whether an urban area represents a contained labour market. The OECD has developed a methodology to gather and analyse metropolitan data based on three criteria. The first is urban density: the population should exceed a critical value set at 150 people per square kilometre. Second, the region should represent a contained labour market, with a net commuting rate not exceeding 10% of the resident population. Third, the population of the central city must be at least 1 million and that of the whole metropolitan area at least 1.5 million people (OECD, 2006).
6. This includes Milwaukee, Ozaukee, Racine, Washington, and Waukesha counties in south-eastern Wisconsin.
7. Kankakee – Bradley, IL and Michigan City-La Porte, IN are part of the Chicago-Naperville-Michigan City, IL-IN-WI Combined Statistical Area (CSA).
8. The counties in the CMAP study area are: Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will.
9. Regions in OECD Member Countries have been classified according to two territorial levels (TL), to facilitate international comparability. The higher level (Territorial level 2) consists of macro-regions, while the lower level (Territorial level 3) is composed of micro-regions in the 30 OECD member countries. These levels are officially established, relatively stable and are used in most countries as a framework for implementing regional policies. TL2 regions in the US and Canada correspond to the States/Province, while in France and Italy to the Regions and in Japan and Korea to the prefectures. See *http://www.oecd.org/dataoecd/19/29/43428422.pdf.* The

OECD Regional Database provides a unique set of comparable statistics and indicators on about 2000 regions in 30 countries. It currently encompasses yearly time-series for around 40 indicators of demography, economic accounts, labour market, social and innovation themes in the OECD member countries and other economies.

10. Academic Ranking of World Universities is compiled and published by the Center for World-Class Universities and the Institute of Higher Education of Shanghai Jiao Tong University, China. The ranking uses six objective indicators to rank world universities, including the number of alumni and staff winning Nobel Prizes and Fields Medals, number of highly cited researchers selected by Thomson Scientific, number of articles published in journals of Nature and Science, number of articles indexed in Science Citation Index - Expanded and Social Sciences Citation Index, and per capita performance with respect to the size of an institution.

11 . Dey *et al*. (2006) estimate the effects of the use of employment services by manufacturers on measured employment and labour productivity in manufacturing between 1989 and 2004. They show that a growing share of manufacturing work in the United States is being performed by employment agencies. Therefore, if Chicago Tri-State Metro-Region manufacturing employers demonstrate the same behaviour as manufacturers generally, the employment shares for manufacturing may be understated in terms of the workers actually performing manufacturing work.

12 . According to the International Trade Club of Chicago, there are 65 foreign representative offices in and near Chicago (as of 15 November 2011), including those with a national or regional jurisdiction, covering 39 countries. There are also 79 consulates (28 that are honorary) located in the region. Not all foreign agencies and commissions are focused on trade and investment, and many are focused exclusively on attracting new investment to the home region or country.

13. Data for the Metro-Region here covers 16 counties instead of 14.

14. The *Patent Cooperation Treaty* is an international patent law treaty that provides a unified procedure for filing patent applications. OECD regional level data on patents is derived from applications to the European Patent Office based on the Patent Co-operation Treaty applications that are recognised worldwide by countries party to the treaty.

15. Many common innovation indicators are only available at the state level, rather than the metropolitan region level. In this case, Illinois is used as a proxy for the Chicago Tri-State Metro-Region. With respect to patents, for which data is available at the Chicago MSA level, its share of the Illinois total has averaged 87% over the last couple of decades.

16. The number of regions compared varies because not all regions provided data.

17. For instance, from May 2010 to May 2011, the civilian labour force went down from 4 868.5 to 4 828.3 thousand workers, a reduction of 0.8% (Bureau of Labor Statistics 2011).

18. The participation rate is the ratio of labour force to working-age (15-64) population; the employment rate is the ratio of persons actually employed to working-age population (in contrast to the unemployment rate, which uses the labour force rather than the working-age population as the denominator).

19. This is a measure of the comparative cost of more than 200 items in each city. Counted items include housing, transport, food, clothing, household goods and entertainment.

20. Based on cost of business occupancy and cost of living as compared with purchasing power.

21. That said, student work is often a source of funding for higher education, so increasing participation in higher education need not lead to a one-for-one drop in labour-force participation.

22. US Census Bureau (2000); and US Census Bureau (2010b). The source of these statistics is the U.S. Census American Community Survey. Due to data limitations, statistics on persons between the ages of 25-44 are available instead of the more commonly used 25-54 age group

23. See Annex 1.A for a discussion of the data and methods employed.

24. Total factor productivity (TFP) is a variable that represents whatever affects productivity but is not directly observed or quantifiable. If all inputs are accounted for, then TFP can be taken as a measure of technological progress – that is, it reflects the increasing efficiency with which a given mix of inputs are used. If some inputs are omitted from the analysis, then TFP also includes the effect of omitted inputs. In this context, "inputs" may include, in addition to capital and labour, other factors than can affect productivity, such as weather in the case of agricultural production.

25. Labour supply can also be raised by increasing average hours worked, but there is unlikely to be much scope for increase *per capita* output this way.

26. Per interviews with firms, workforce development professionals and other agencies during OECD mission 21-25 March 2011.

27. Per study by the Chicago Workforce Investment Council for the City of Chicago, Q2 2011, based on 234 430 recent postings from internet job boards from 3 April through 1 July 2011 in the following counties: Cook, DuPage, Lake, Will, McHenry, Kane and Kendall.

28. It should be noted that some Metro-Regions, like Philadelphia, experienced a net brain drain over the period.

29. U.S. Bureau of the Census, American Community Survey, selected years.

30. The number of total TL2 Regions varies with the indicator because not all TL2 Regions provided data for all indicators.

31. The State New Economy Index is produced by The Information Technology and Innovation Foundation (ITIF) and The Kauffman Foundation. Because of differences in methodology and indicators measured, changes in ranks between 1999, 2002, 2007, 2008, and 2010 cannot all be attributed to changes in actual economic conditions in the state

32. Agglomeration economies occur when firms enjoy increasing returns to scale (IRS) in a particular place. The presence of IRS also induces other firms to locate there, as people come in search of higher wages, job opportunities and cultural values. This self-reinforcing process contributes to, *inter alia*, the formation of deeper, more efficient factor markets and more active generation and dissemination of knowledge. The result is that urban agglomerations to tend to generate higher levels of productivity and output. For an over view of the many mechanisms involved, see Duranton and Puga (2004).

33. The Chicago IL-IN region here corresponds to the US census definition of urbanised area, which is smaller than the Chicago Metro-Region: *www.fhwa.dot.gov/planning/census_issues/metropolitan_planning/faqa2cdt.cfm#q24*

34. Comparison based on 51 OECD Metro-Regions.

35. RTA serves Cook, DuPage, Kane, Lake, McHenry and Will counties.

36. The Chicago IL-IN region here corresponds to the US census definition of urbanised area, which is smaller than the Chicago Metro-Region: *www.fhwa.dot.gov/planning/census_issues/metropolitan_planning/faqa2cdt.cfm#q24.*

37 . The analysis here includes all GHG emissions from electricity consumed, regardless of whether they occur inside or outside of the region.

38 . The GHG emissions resulting from combustion for heating and industrial use depends on the type of fuel used. The dominant fuel source in Chicago-CMAP is natural gas, as is the case for the other North American city-regions in Figure 1. Only data on natural gas consumption was available for the CNT study, but use of other heating fuels was estimated to be about 4% of total stationary energy use.

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Chapter 2

Matching skills to jobs in the Tri-State Region

This chapter focuses on workforce development issues. It first describes the regional context. The financial crisis has highlighted the skill mismatches hobbling regional growth, and this weakness is exacerbated by its relative incapacity to attract and retain high-skilled labour. The chapter then analyses current workforce development efforts and offers a diagnostic on a possible way forward. Public stakeholders need to engage the private sector more systematically in providing ongoing support – both financial and curriculum-based – for skills upgrading. Workforce boards and agencies need to work across county and state boundaries to streamline processes and programming and improve data-gathering and information-sharing capacity.

Key findings

- *The region benefits from a large and well-educated workforce, but recent job-creation and labour-productivity performance has been sluggish. The financial crisis has highlighted weaknesses in the region's labour market, in particular skill mismatches that in fact pre-date it.*
- *The region is failing to attract and retain high-skilled labour, and low and medium skills training has suffered from a fragmented workforce development infrastructure. For the region's highly educated workers, career opportunities have been insufficient to retain this "creative class", suggesting a need to focus on creating conditions to spur innovation, green growth and entrepreneurism (Chapters 3 and 5).*
- *Compounding the skills mismatch is race: African-Americans in particular are underemployed, face greater barriers in acquiring quality basic education, and achieve lower educational outcomes than their non-African-American neighbours. Many low-skilled African Americans and Latinos live in geographically concentrated areas that are underserved with respect to basic public educational, housing, transit and health services. As a result, key parts of the region's talent pool are being wasted.*
- *The region has, in recent years, launched ambitious and innovative training and workforce-development initiatives; yet monitoring and evaluating their performance against economic development outcomes has been difficult, resulting in lessons learned from successes in neighbourhoods not being scaled to secure greater, region-wide benefits. The huge number of workforce-development players and complexity of the training-service networks suggest that scarce resources are not being maximized.*
- *Funding for workforce development is likely to remain tight. At the same time plugging skill gaps and retraining workers will remain an urgent challenge. Public stakeholders in the region will need to engage the private sector more systematically in providing ongoing support – both financial and curriculum-based – for skills upgrading. With input of the private sector, career advice and pathway mapping can generate realistic career aspirations as well as ensure that the demand for skills from individuals is aligned to the demands for skills from industry.*
- *The region needs to articulate and implement workforce development strategies that respond effectively to the region's business needs at all levels of activity. Workforce boards and agencies need to work across county and state boundaries to streamline processes and programming and improve data-gathering and information-sharing capacity. Public authorities need to build on existing mechanisms to sustain a true region-wide dialogue between business and training service providers so that training services better address skills needs in the region.*

The Chicago Tri-State Metro-Region displays key strengths in its workforce and training capacity. With nearly 5 million workers the region boasts the third largest labour market in the US and draws workers from beyond the metropolitan area's outlying counties. Over 21 000 workers living in the Milwaukee Metropolitan Region (part of the 21-county Tri-State region) commute to work in metropolitan Chicago, around 17% of these workers travel into the City of Chicago. An equal number commute from the Indianapolis Metro-Region (which lies beyond the 21-county region) into the Chicago Metro-Region. The region offers a large, diversified pool of highly qualified workers, with a diverse and rich set of skills and attributes. The Tri-State Region benefits from over 200 postsecondary education and training institutions, both publicly and privately funded, that enrol over 660 000 students each year and graduate 140 000 annually. Their educational attainment is above the national average; indeed, of the 20 most populous Metro-Regions in the United States, the Tri-State Region ranks fourth in educational attainment. Thirty-two percent of the region's workers hold a BA degree or higher.

Despite the advantages of the educated local workforce and the availability of a wide array of professional and leisure amenities, the region has fallen, in recent years, behind several other large US metropolitan areas in attracting and retaining young, educated adults.[1] At the same time, Chicago has under-performed relative to the US economy as a whole, and other US Metro-Regions, in terms of job creation over the last decade. Over this period, the region lost jobs across all major industrial sectors but two – education and health, and leisure and hospitality - and even in these sectors growth in the region did not match that at the national level. This reflects to two factors above all:

- *Demand is limited*. As chapter 1 highlighted, despite the advantages of a highly educated workforce, the Tri-State Region presents lower-than-optimal labour productivity and the competitiveness of the region's businesses generally lags behind that of their counterparts in other Metro-Regions across the country. This means that demand for labour, regardless of skill-levels, is lagging relative to Chicago's metropolitan peers.
- *Demand is mismatched with supply*. Significant restructuring of the region's economy over the past twenty years has transformed the demand for skills, making it more difficult for low-skilled workers to find employment in more knowledge-based, innovation-driven, growing sectors. Despite the higher-than-average levels of educational attainment in the region, chronic low graduation rates from the region's public post-secondary educational institutions, particularly community colleges, slows the upgrading of the region's workforce. If growth in high-skilled occupations significantly outpaces growth in low-skilled occupations, this mismatch of skill supply and demand is likely to worsen.

As highlighted in Chapter 1, given the numbers of high-skilled graduates produced by the region's universities, the evidence of a skill shortage among high-skilled labour may indicate that the Tri-State Region is facing an attraction issue, a mismatch between the nature of the skills being supplied by the region's universities and the nature of the region's demand for high-skilled labour, or both. If high-skilled labour trained in the region is leaving, it is because they cannot find meaningful employment in their field in the region, causing them to migrate to regions that can offer them such employment. If exogenously trained high-skilled labour is not moving into the region in sufficient numbers to fill the labour shortages, the region needs to examine why: is it a cost-of-living issue? Does it have to do with the nature of the employment on offer? Key

stakeholders involved in workforce development in the Tri-State Region should focus on examining the issues associated with *attraction* and *retention* of high-skilled labour in addition to its *formation* in the region.

While high-skilled labour issues are vitally important to understanding what sustains innovation-driven growth, this chapter will focus primarily on low- and medium-skill formation because workers in these occupations represent the bulk of the Tri-State Region's workforce; they face the most severe challenges in finding meaningful work leading to a satisfying career, particularly in manufacturing, and because it is these workers who are likely to be the least mobile – thereby representing a perennial policy challenge to the region's public and private stakeholders. In addition, local responses – in terms of education, training and active labour market policies – are most likely to be efficient in addressing this issue. That said this chapter does address the skills mismatch issue with advice that is applicable at all skills levels.

The chapter begins by providing a picture of the labour market in the Tri-State Metro-Region. It continues, in section 2.2 with an overview of the major programmes, players, and the policy co-ordination among them.[2] Section 2.3 then turns to the supply-demand mismatch. Finally section 2.4 looks at how the co-ordination of workforce development efforts could be improved.

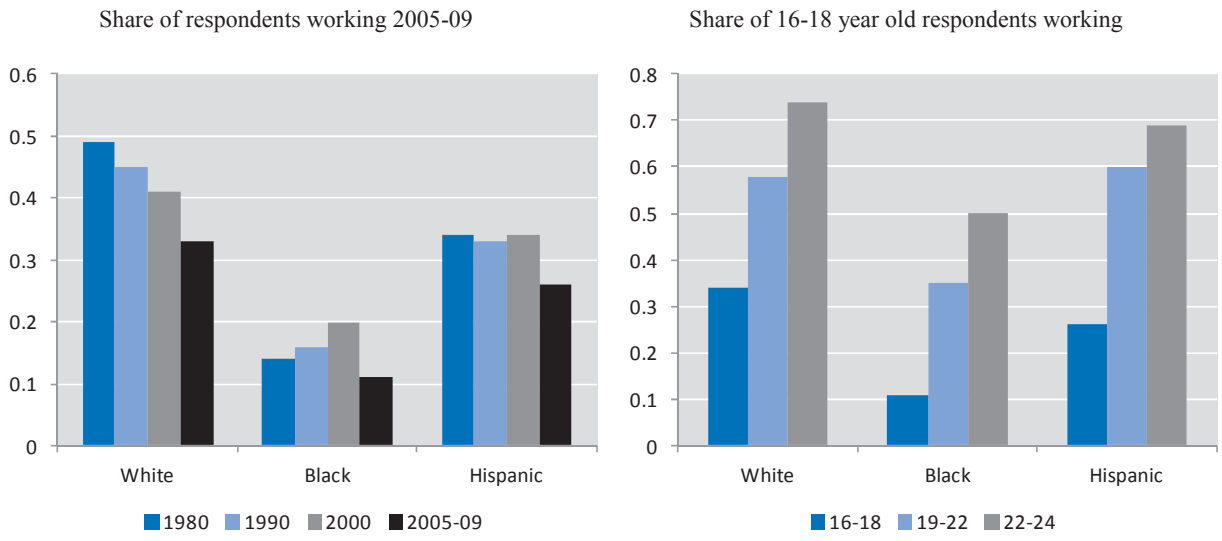
2.1. The region's workforce is ageing and fragmented

Between 2000 and 2010 the Tri-State Region saw a decrease in both its labour force and its employment rate. In 2009, the unemployment rate for the Chicago Tri State metro area, which had been increasing since late 2006 jumped sharply from 4.9% to 10%. During this period, the total number of unemployed rose from 217 350 to 487 453. Unemployment in 2010 rose further to 10.2% and the total number of unemployed increased to 496 036. (Bureau of Labor Statistics). In the seven months following the financial crisis (between October 2008 and May 2009) the unemployment rate in the city of Chicago rose from 7 to 12% – an increase of 70% (Weigensberg, *et al.*, 2011). However, these labour market trends cannot adequately be understood looking at aggregate figures; employment patterns across categories – in terms of age, education and race – are strikingly heterogeneous in the Tri-State Region.

The proportion of young people in work has been falling over the past 30 years. This is, in part, driven by an increase in enrolment in education among this age group. However, the disparate employment trends prior to the crisis, among White, Hispanic, and Black 16-18 year olds (Figure 2.1), suggest that the crisis may also be a driver of falling employment rates among Hispanic and Black youth.

Disparities by race manifest themselves, in the Tri-State Region, in differential labour market experiences. The roots of these different experiences, however, extend far deeper; race, in the Tri-State Metro-Region, is systematically associated with affluence, educational opportunities, and location (Chapter 1). Employment rates among Black males have reached lows of 49.8% and have remained consistently below employment rates among White and Hispanic males. Hispanic males have maintained the highest employment rates, remaining at or above 75% in the 20 years prior to 2009 (Census data, Weigensberg, *et al.*, 2011). Employment rates among women have, on the whole been lower (fluctuating around 50-55%), but exhibit smaller imbalances along race lines.

Figure 2.1. **Chicago employment patterns by age and race**



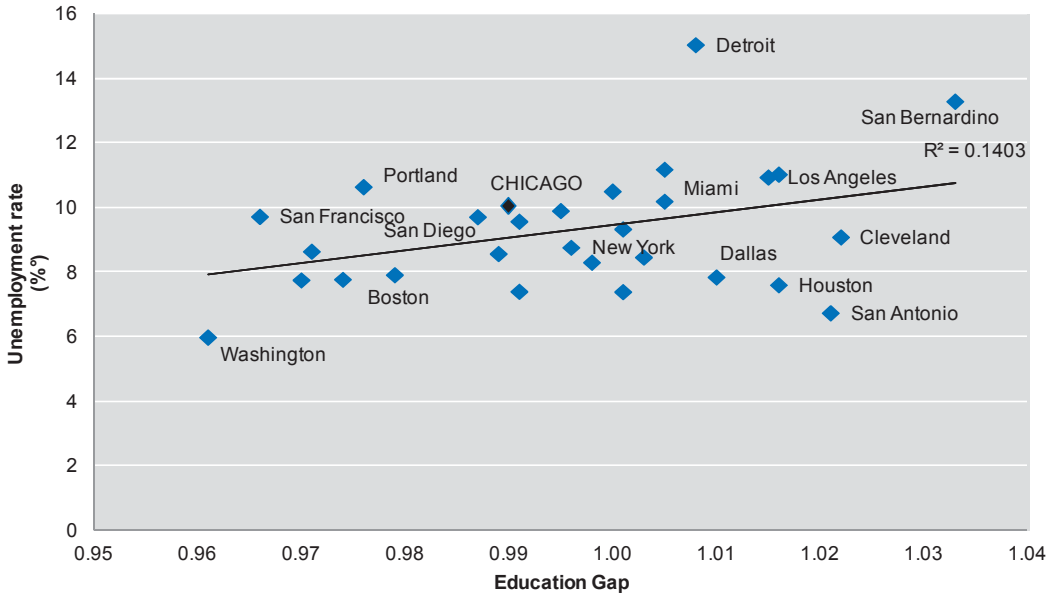
Source: US Census data, Weighted ACS, (1980, 1990, 2000, 2005-2009); (Weigensberg, *et al.*, 2011).

In other words, in the region, ethno-cultural minorities, in particular African-Americans are underemployed; they face greater barriers in acquiring quality basic education, are incarcerated at higher rates, and achieve lower educational attainment than their non-African-American neighbours. In addition, many low-skilled African-Americans find themselves living in geographically concentrated areas of the Tri-State Region that are underserved with respect to basic public educational, housing, transit and health services. As a result, key parts of the region's talent pool are being wasted.

Skills are generally understood to be a combination of formal training and the experience required to perform a job effectively. Referring to the tacit knowledge transferred between individuals or through training mechanisms administered inside firms, the experience component of skills is difficult to measure. As a result, skills mismatch analyses often concentrate on years of formal education and thus refer, in fact, to an education gap, understood as the extent to which demand for certain type of educated workers exceeds the supply of those workers in a particular labour market (Rothwell and Berube, 2011).[3]

As expected, the US metro-areas with larger "education gaps" – shortages of educated workers relative to employer demand – tend to display higher unemployment rates than other metro-areas. The years of education demanded by the average US job grew slowly but steadily from 2005 to 2009 and slightly surpassed growth in educated labour supply during the recession (Rothwell and Berube, 2011). In 2009, Chicago ranked 29th among the 100 largest metropolitan regions in the United States with an educational gap of 0.99. In other words, the typical worker in the Tri-State Region has enough formal education to do the average job in the region. This suggests that the region has, on average, a better labour market balance in terms of supply of skills than other important Metro-Regions such as Los Angeles, New York, Houston, Detroit, or Miami (Figure 2.2).

Figure 2.2. **Unemployment and education gap, 2009**



Note: The education gap is defined as the extent to which demand for educated workers outstrips the supply of those workers in a given regional labour market. This education gap is calculated as the years of education required to do the average job in a metropolitan area divided by the average working-age person in that metropolitan area. Values of the education gap above one signal an insufficient supply of educated workers in the regional labour market relative to demand. Values below one indicate that the average typical worker has enough formal education to do the average job (Rothwell and Berube, 2011:3).

Source: OECD calculations using data from Rothwell J. and A. Berube (2011) "Education, Demand, and Unemployment in Metropolitan America", Brookings Institution, Washington, DC in combination with information from the OECD Metropolitan Regions Database.

However, despite the apparent balance between skills supply and demand for the average job available in the Tri-State Region, such figures mask, to some degree, the realities of the local labour market. The labour market in the Tri-State Region is characterised by a large number of people who have not completed high school and individuals who have had limited access to quality education, who co-exist with a pool of highly skilled, highly educated workers.

2.2 The training system: multiple programmes and players with little policy co-ordination

The workforce development infrastructure in the Tri-State Region is characterised by a wide variety of public and private programmes geared towards preparing youth and adults to enter the workforce or to upgrade their skills. These programmes tend to focus on the provision of the following services: adult or youth education, job readiness and/or job placement, supportive services, vocational training and career-related information. Service recipients vary greatly depending on the programme, and whilst federal policy or state law often establishes participation criteria, there remains flexibility at the local area regarding precise criteria.[4]

A multiplicity of programmes

Federal impact on workforce development is primarily channelled through programmes administered under the Workforce Investment Act (WIA). The WIA, passed in 1998, has decentralised the administration of training programmes (beyond existing decentralisation of its predecessor, the JTPA) so that, following the establishment of broad programme parameters by the Employment and Training Administration (ETA) of the United States Department of Labor (USDOL), the strategy and provision of local services is left to state and local agencies. The WIA programmes target three population groups: disadvantaged adults, dislocated workers and youth offering job search assistance, occupational training, and educational opportunities. These three programmes have performance goals of job attainment, job retention, earnings and educational attainment for youth.

WIA programme funds flow from the federal government through the states to the local Workforce Investment Boards (WIBs) that administer the programmes in their jurisdictions and contract with local organisations to provide services. The 21-county region is served by thirteen WIBs who typically contract with local community colleges, local secondary school districts and private companies to provide training. Additionally, states can enter into contracts with institutions of higher education, such as community colleges, or other eligible training providers to facilitate the training of a group of individuals in high-demand occupations.

The workforce development programming "ecosystem" in the 21-county region is as complex as it is fragmented (Figure 2.3). This creates great challenges for policymakers and those delivering services as well for those who are the intended beneficiaries of the workforce system.[5] While WIA services are structured around the "one-stop" delivery model, not all programmes are delivered in this manner. For example, a recent inventory of workforce development programmes tallied 83 separate programmes for residents of the City of Chicago alone.[6] Of these, the City of Chicago administers 39 – through a combination of 13 city agencies working with counterparts at both state and, in some cases, federal level.[7] A further 41 programmes in Chicago are administered by the state of Illinois – primarily through the state Department of Employment Security and the Department of Human Services (though 8 other state departments are also involved).[8] The remaining three programmes are administered by the USDOL, either directly by federal employees or through contractors.

On top of this complexity in federal, state and local government funded programmes, many distinct private initiatives do not rely on government funds. Many non-profits, relying on foundation funding or direct fundraising add a further element of fragmentation to the workforce development ecosystem. A 2007 study revealed that in southeast Wisconsin alone there are a total of 85 public and non-profit entities providing workforce development and training services (Helen Bader Foundation). In Illinois, the agencies engaged in workforce development (other than education) are the Department of Commerce and Economic Opportunity (Workforce Investment Act and other state-funded job training initiatives), the Department of Employment Security (labour market exchange) and the Department of Human Resources (welfare-related programming). In Wisconsin and Indiana, the lead agencies are each state's Department of Workforce Development. Indiana provides welfare-related services through the Family and Social Services Administration. Wisconsin provides welfare-related services through the Department of Children and Families.

Local contracting, of both private NGOs and companies, can be a necessary part of ensuring that policies are tailored to local needs and access. However, in the absence of clearly defined and delineated roles and responsibilities, the plethora of subcontractors engaged under Federal and Chicago City funding risks further complicating the system and the sheer number of "doors-to-go-to" risks undermining the success of any one initiative. A recent attempt to incorporate local actors into a system-wide programme in which responsibilities are clearly demarcated is currently being rolled out in the UK.

Box 2.1. **UK prime contractor model: a unified view utilising local knowledge**

Support in a single programme: 'The Work Programme', the recently launched initiative by the UK coalition government, is an attempt to bring together a range of employment support services previously provided to unemployed people under several different contracted employment programmes. The policy represents an attempt to develop a single nationwide programme that allows for a locally tailored approach that will enable workforce development to remain flexible to local conditions. It is hoped that by bringing support together into one programme the policy will reduce the confusion stemming from a host of programmes whilst saving money on transaction costs by having a single tendering process.

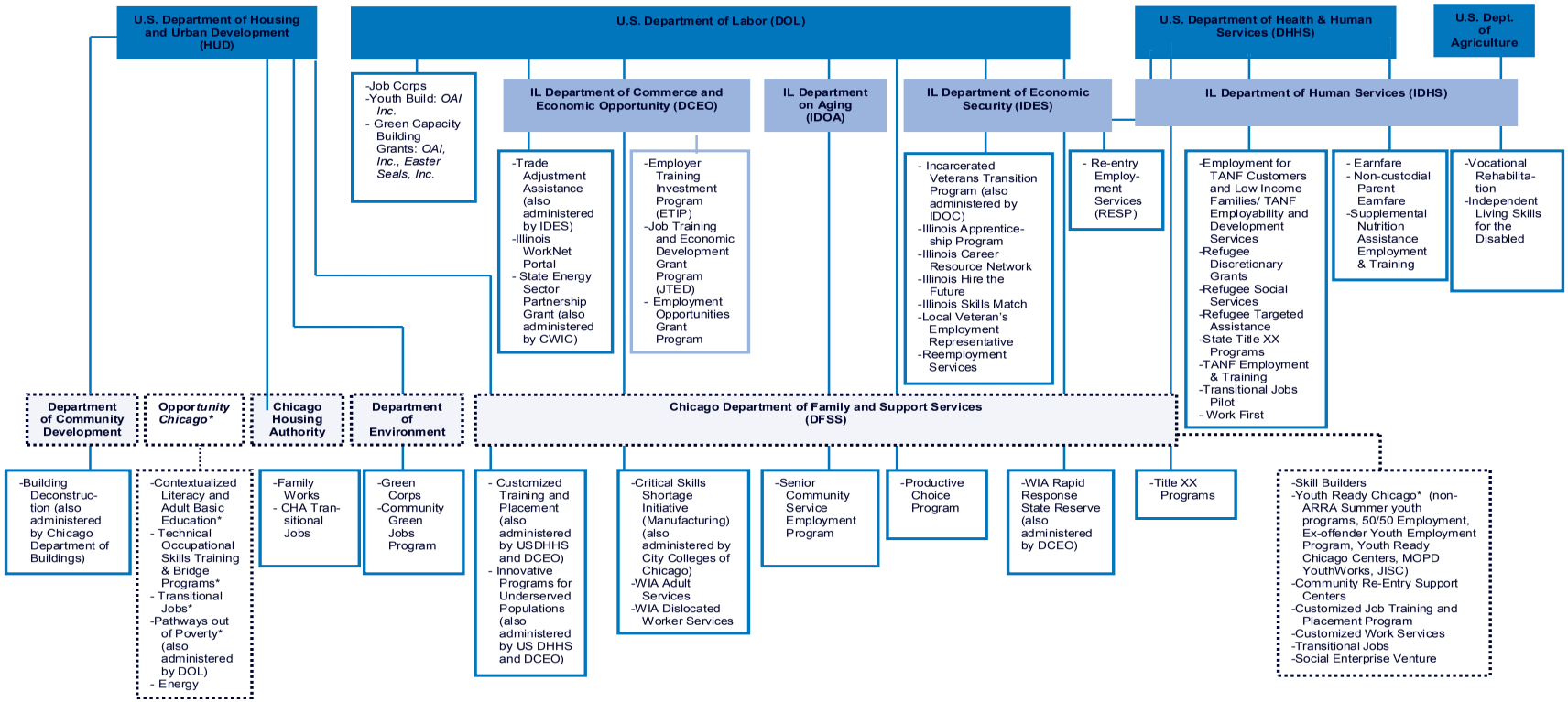
Local Flexibility: The Work Programme has divided the UK in to 18 'package areas'. In each area there are at least two prime providers contracted to deliver services across the locality. Each prime contractor will work with local organisations of all sizes from the public, private and voluntary sectors. By working with local partners, the work programme hopes that prime contractors will be responsive to local circumstances and ensure flexibility and the ability to integrate with local services. To ensure that the level of community involvement is commensurate with the needs of the work programmes customers, details of the delivery partners and subcontractors with whom prime contractors intend to work have been a critical element in the assessment of their initial contract bid.

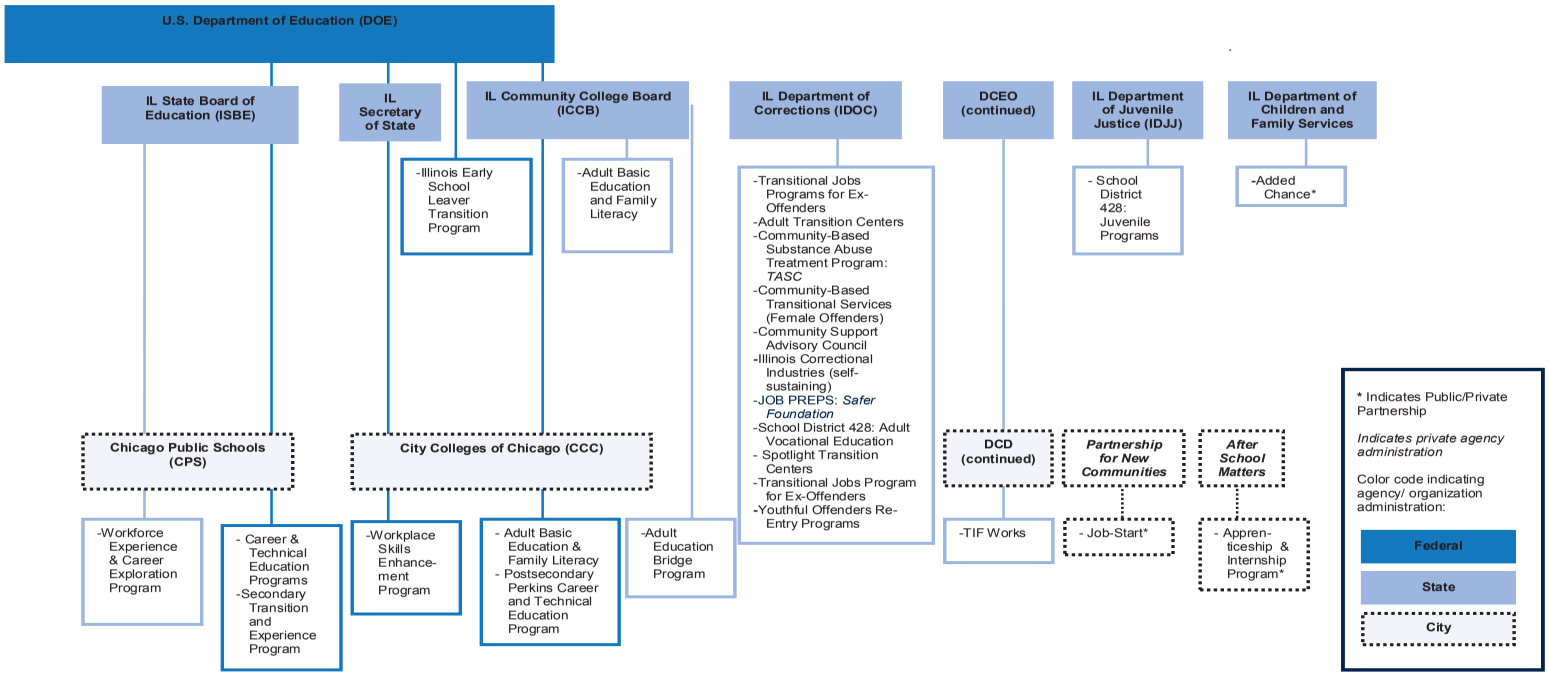
Local costs and competition: The cost of delivering the programme is likely to differ between locations due to differences in local employment conditions, cost of access, distances to travel. The locality specific bidding will enable providers to factor local markets. Furthermore, by providing multiple contracts within a locality 'The Work Programme' aims to avoid local monopolies. By shifting market share to providers that perform best the hope is that, not only will ongoing competition between providers drive up performance and keep costs down but, over time, a larger proportion of individuals will be served by the most effective providers.

Local Knowledge: In the belief that local level providers have more information than the government regarding what is likely to work in their area and given their local clients, the UK Government has adopted a black box approach. That is, they do not specify what providers should deliver; instead they set minimum performance levels and pay contractors according to their results.

The majority of financial support for these workforce development programmes comes from federal and state governments (though some are supported by large public-private-partnerships), and they are currently facing severe budget constraints as fiscal consolidation imperatives force federal funding cuts, while state and local governments do not have the means to make up the difference.[9] The USDOL provides about a third of the federal funds for worker training, while the federal Department of Education funds the rest – primarily through educational reimbursement to individuals.[10] Over the past decade, federal funding from USDOL has been reduced year after year, and the current federal and state fiscal situation ensures that funding will, almost certainly, be reduced even further.[11]

Figure 2.3. **Tri-State Region workforce development system maps**

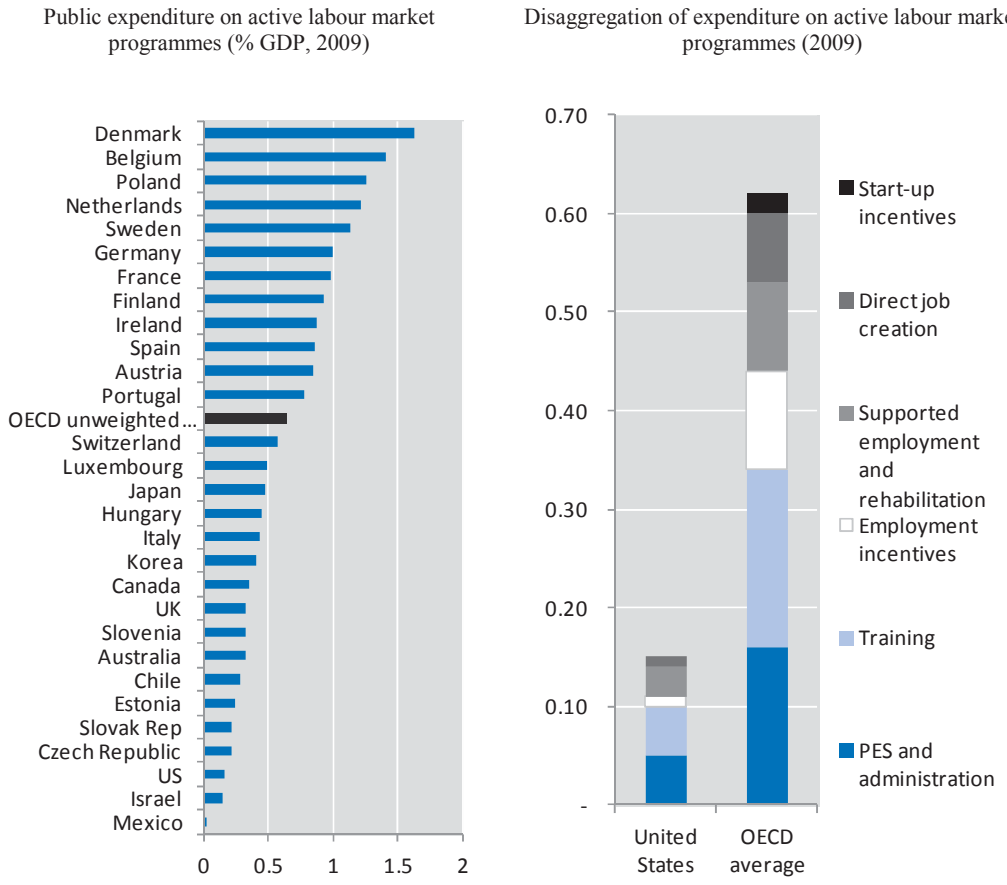




Source: Chapin Hall at the University of Chicago (2010) "Chicago Workforce Development Programs: System Map and Inventory", Chapin Hall at the University of Chicago, Chicago, IL, US, *www.chapinhall.org/sites/default/files/Chicago_Workforce_Programs_Report_091610_print.pdf.*

With public expenditure on labour market programmes at just 1.17% of GDP in 2009-10, the US ranks among the lowest spending in this area of OECD countries (Figure 2.4). In addition the US spends significantly less on employment incentives, start-up incentives and direct job creation than the OECD average, spending only 0.16% of GDP – just over one quarter of the OECD average – on Active Labour Market Programmes (ALMPs) (OECD Employment Outlook, 2011). Whilst this does not take into account private investments in workforce development, it can mean that small, publicly funded, labour market programmes are hard to scale up in response to labour market shocks. Indeed, where the OECD (unweighted) average of public expenditure on ALMPs increased from 0.5% to 0.62% in response to the crisis (between 2008 and 2009), the US response was to increase spending on ALMPs from 0.13% of GDP in 2007-08 to 0.18% in 2008-09.[12]

Figure 2.4. **Expenditure on active labour-market policies**

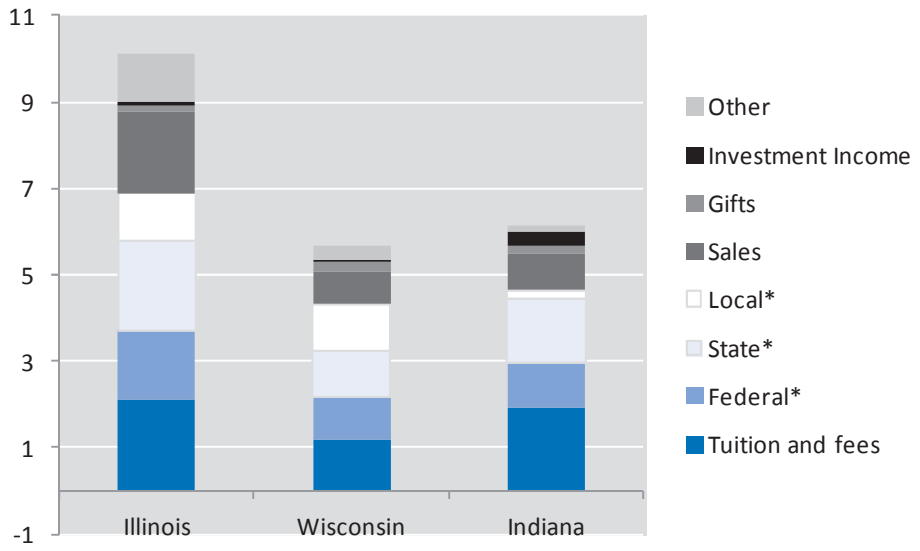


Note: definitions are based upon the OECD statistical database and may differ from country to country. That the US appears to invest no expenditure on start-ups refers to federal level funding, and does not imply that start-ups are not covered as part of other programmes.

Source: OECD (2011), OECD Employment Outlook 2011, OECD Publishing, Paris.

A large part of funding for primary and secondary education comes from local property taxes imposed by local school districts subject to state law and local referenda. Local property taxes also provide much of the non-tuition funding for community colleges in Illinois and technical colleges in Wisconsin. Ivy Tech, the largest state-wide community college system in the US, receives support from the State of Indiana. However, state support varies across the Tri-State Region (see Figure 2.5). Furthermore, the absence of strong state support leads to substantial inequalities in educational funding across the Tri-State Region. The other major funding source for public education is tuition fees (see Figure 2.4 above), in privately funded institutions student contributions make up an even larger proportion of funds (see Figure 2.5 below). Tight budget constraints and varying levels of provision is likely to have an impact on the quality of services and reduce the access by low- and middle-income students as higher tuition fees put higher education out of their reach.

Figure 2.5. **Funding breakdown of publicly funded US colleges and universities, 2010**

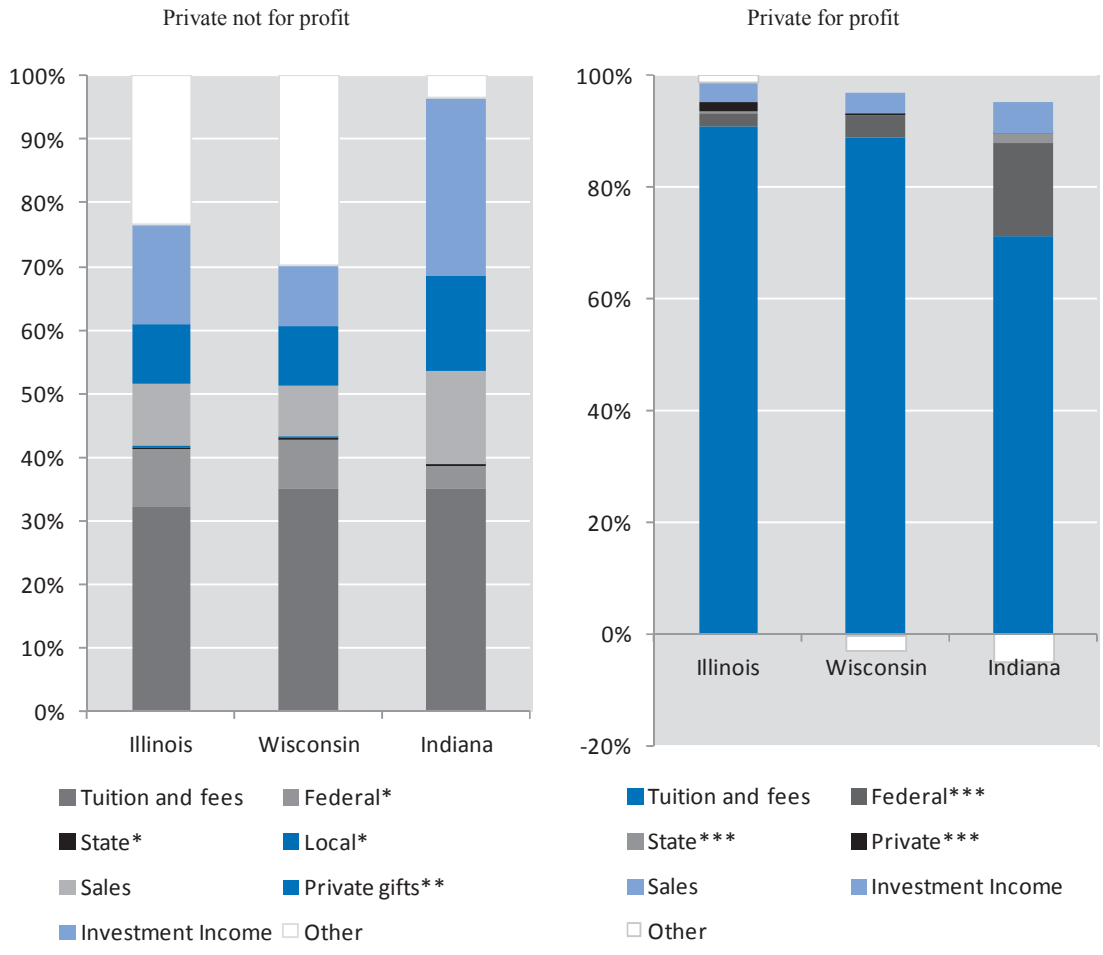


* Operating, non-operating and appropriations

Source: OECD calculations based upon data from Centre for Policy Analysis, American Council for Education.

In a crisis environment, workforce support systems to provide training and job-search assistance are essential. At the same time, budget cutbacks risk reducing the number of people who can receive such assistance. During the first quarter of 2010 only 215 000 individuals *nationwide* received training from USDOL funding,[13] while 440 000 people were unemployed workers in the Tri-State Region alone. Not all unemployed workers will require re-training, but as time passes the unemployed will increasingly need to retool as their skills atrophy while the economy restructures. In the context of tight budgetary realities and this substantial demand for training, it is of upmost importance that workers are flexible enough to take advantage of new opportunities as the economy picks up. In practice this will mean that workers have sound basic and transferable skills to build upon and that a dialogue with business enables training to respond quickly to business requirements as they emerge.

Figure 2.6. **Funding breakdown of private US colleges and universities, billion, 2010**



* Appropriations and grants.

** Private gifts, grants, contracts and contributions.

*** Appropriations, grants and contracts.

Source: OECD calculations based upon data from the Centre for Policy Analysis, American Council for Education.

A multiplicity of actors are involved in a comprehensive skills policy framework (Table 2.1), horizontally – government, academic institutions, and social partners (including industry and community groups) – and vertically – throughout the levels of government, and the various stages of education. Over the fifty years since the USDOL began financing public training programmes in the US, the evolution of delivery has endowed local workforce investment areas with increasing autonomy over the design of the workforce strategy and the delivery of services. As a result regional players are taking on an increasingly determinant role in achieving workforce development outcomes in the regions they serve.

Table 2.1. **Actors involved in skills policies**

	Government	Social Partners	Individuals	Other
Training and Education	Education Ministry (schools) Labour Ministry (VET) Science, Technology and Innovation Ministry (HE) Municipalities Local government	Employer Organisations Trade Unions Firms	Students Apprentices Mentors	Schools Universities Providers
Information Exchange	Education Ministry Labour Ministry	Sector Skills Councils Employer Organisations Trade Unions Firms	Mentors	Career guidance services
Support Services	Social Policy Ministry Family Ministry Labour Ministry			Communities NGOs Career guidance services

Source: OECD (2011), Towards an OECD Skills Strategy.

The decentralisation of workforce development programme delivery in the United States is as positive as it is crucial to achieving policy outcomes effectively. In many OECD countries policy implementation is highly centralised, with decision-making in the fields of employment and skills often managed by the central government. This means that local partnerships and local strategies can be largely meaningless, if participants are not able to influence the implementation of mainstream programmes and policies. In a study of 11 OECD countries, Froy and Giguère (2010) found that policy flexibility is the most important factor influencing local policy integration. However, the achievement of local flexibility does not necessarily imply political decentralisation – indeed flexibility at the local agency level is sometimes higher in centralised systems – but governments allow sufficient latitude when allocating responsibility for designing policies and programmes, managing budgets, setting performance targets, deciding on eligibility, and outsourcing services. Greater flexibility requires that local actors take more responsibility, which may imply a need for capacity-building and the creation of new mechanisms of accountability. Such decentralisation provides an opportunity for strengthened partnerships at the local level to enable the provision of skills at the local level; however, it also risks a degree of complication regarding the number of actors involved in service delivery.

The 21-county region is served by 13 workforce investment boards: eight of the nine workforce investment boards in Illinois, three in southeast Wisconsin, and one workforce investment board in Indiana. The nine boards in Illinois and their administrative staff work together through a consortium, the Workforce Boards of Metropolitan Chicago. Southeast Wisconsin workforce boards have not established a comparable consortium, but they have successfully collaborated in receiving a Workforce Innovation and Regional Economic Development (WIRED) grant through the US Employment and Training Administration. The State of Indiana has been aggressive in aligning local workforce areas with regional economic development areas.

Recent action by the US Congress allows state governors using money from the Workforce Investment Act to set aside a maximum of 5% (previously 15%) of allocated

funding for discretionary purposes and state administrative expenses. The state may use these funds to target incentives towards system innovation and inter-workforce area co-operation as well as target some added resources to areas of acute need. The states also work closely with local workforce agencies in addressing large plant closings and in securing additional funds through national emergency grants to address employment dislocations created by economic and natural disaster emergencies.

Local WIBs are to some extent held accountable through performance measures developed by the USDOL. Indeed local and state workforce agencies are monitored by USDOL through audits of selected programmes. For each programme year, the state negotiates goals for each WIB on such key measures as entered employment rate, retention rate and earnings level. Each state sets these goals for their WIBs after negotiating their own goals with the USDOL. The procedure is to set goals that reflect the prevalent labour market conditions and the qualifications of those looking for work, as well as to factor in a margin of continuous improvement for the system.[14] While not a direct evaluation of the impact of the programmes they administer, the measures do provide a benchmark of performance. For instance, in 2009, the Chicago WIB met or exceeded the six goals for both its adult programmes with almost 73% of their people exiting their programmes finding a job, and over 73% retaining that job. The Dislocated Worker program was also successful in achieving outcomes within the target range of the goals.

Other actors engaged in the workforce development programmes include the delivery agents of a host of programmes; their funders and administrators in numerous agencies from various levels of government and finally post-secondary educational institutions – either through direct enrolment in the colleges and universities, or through providing the training services to those enrolled in workforce programmes. The multitude of actors involved in workforce training and development is driven, in the first place, by the large number of workforce development programmes and concomitantly large number of actors involved in their administration. The fact that the functional region crosses state lines further increases the complexity of the system, as it necessitates the involvement of numerous additional actors.

Limited policy co-ordination; limited region-wide performance indicators

Straddling state boundaries, the Tri-State Region operates in the context of a large number of governmental jurisdictions, many of which pursue distinct, often unco-ordinated economic development initiatives to promote growth. Whilst the success of workforce programmes hinges heavily on co-ordination within the functional region, states typically pursue their own workforce (and economic) development strategies, and there is little co-operation to co-ordinate these efforts (see Chapter 6 on Governance). Indeed, the environment to attract economic development projects is highly competitive between the three states making up the Metropolitan Region.[15] Even within single states, the workforce and economic development systems do not match up seamlessly. In the Milwaukie area, for example, the misalignment of jurisdictions across related functions – such as planning, economic development, workforce development, and higher education – have further hindered the development of a cohesive economic and workforce development strategy.

An important question facing the Tri-State Region is how to connect these players and programmes and create a co-ordinated policy landscape. Improved coherence will be vital if organisations are to communicate and collaborate in order to make their work

more effective and to render the regional labour market more responsive to the needs of business and workers. Although individual local workforce agencies, such as the Chicago Workforce Investment Council, have promoted greater co-ordination in communication and policies among stakeholders, these efforts do not extend to the functional labour market of the Tri-State Region. CWICstats, likewise, is intended to co-ordinate fragmented data across various agencies for assessing performance and for conducting research and evaluation, but it, too, by virtue of its local sponsorship, is limited in scope to a portion of the Tri-State Region. The current lack of co-ordination inhibits the efficiency with which scarce regional resources can tackle the large and growing skills mismatch.

In addition to a lack of policy co-ordination across state lines, data and performance indicators providing a true region-wide snapshot of workforce development issues and the impact of programming on addressing them are virtually non-existent (see Chapter 6). To the extent that policy design and implementation are best based on accurate and reliable data and performance metrics that address the functionality of the region, the key public and private stakeholders across the Tri-State Region – indeed in the 21-county area – should focus on this issue as a top priority (see Chapter 6).

2.3. The result: a mismatch between skills supply and demand

The sheer number of players involved in skill development in the Chicago region makes for a fragmented approach in which co-ordination and communication among educational establishments including secondary school systems, community colleges, technical schools, and public and private universities is highly limited and institutions and programmes often operate independently of one other, despite sharing similar goals. Lacking a co-ordinated counterpart on the supply side, those that demand skills – both potential employees and employers– are unable to gain what they need from the system. This may be one factor behind the significant dropout rates that characterise the higher and tertiary educational establishments. Some steps have been taken in parts of the 21-county region. The Greater Milwaukee Committee has launched the "Milwaukee Talent Dividend." These efforts include business, higher and secondary education, economic and workforce development agencies as well as chambers of commerce and not-for-profit organisations. They will collaborate on talent development initiatives designed to address the known skills gaps in the region and that will close the gap between supply-side talent and demand-side requirements.

Poor quality of mid-level skills

Community colleges (technical colleges in Wisconsin) provide two-year higher and lower-level tertiary education courses, following which some graduating students transfer to four-year universities for two to three years to complete a bachelor's degree. The Illinois portion of the 21-county region is served by 13 independent suburban community colleges and a system of seven community colleges in the City of Chicago under the City Colleges of Chicago. Similar services are provided by a combination of four technical college districts in Wisconsin and the Ivy Tech system (with several campuses) in Indiana. The colleges in each of the states also offer a large number of non-degree certificate programmes that are not taken into consideration in traditional metrics. Illinois also operates its adult education programme through its community colleges, enabling adults to earn their high school equivalency degree. The Wisconsin technical colleges

administer the state's apprenticeship programmes, which were first established in Wisconsin in 1911.

Outcomes for students in Career and Technical Educational (CTE) institutions appear to be slightly more encouraging than outcomes in the Chicago public school system as a whole: across the district CTE course-takers have a slightly higher 4-year graduation rate and lower drop-out rate compared to all Chicago Public Schools (CPS) students (Unpublished analysis of Chicago Public Schools Data on Career and Technical Education, Chapin Hall, 2012). Of the 100 000 high school students served by the CPS, about 20% participate in CTE programmes, which provide them with industry-focused technical instruction and work-readiness preparation. The district currently offers 300+ vocational programmes spread across 70 city schools. Clear and simple qualifications frameworks help employers understand the value and level of a qualification and facilitate the match between employers and potential employees. Conversely a multitude of qualifications and titles complicate the hiring process for employers and have little value for the individual in the labour market. In such cases the plethora of vocational qualifications means little to employers because the value of those qualifications is not transparent (OECD, 2008).

To address the fragmentation of Chicago's CTE programmes, and the concomitant lack of efficiency, a recently announced overhaul will consolidate vocational programmes into 80 higher quality programmes in 35 schools with better trained staff, more focused curricula and more opportunities to earn vocational credentials in addition to a diploma. It is hoped that these changes will prepare graduates to enter those "middle-skill" careers that are currently facing labour shortages. Only 25% of Milwaukee-area high school students enrol in CTE course offerings. While enrolment is depressed principally because of the elective status of CTE courses in the standardised state curriculum, participation has been linked to an increased likelihood of completion, with CTE participants in Milwaukee public schools reporting an 85% graduation rate as compared to 67% district-wide in 2009.

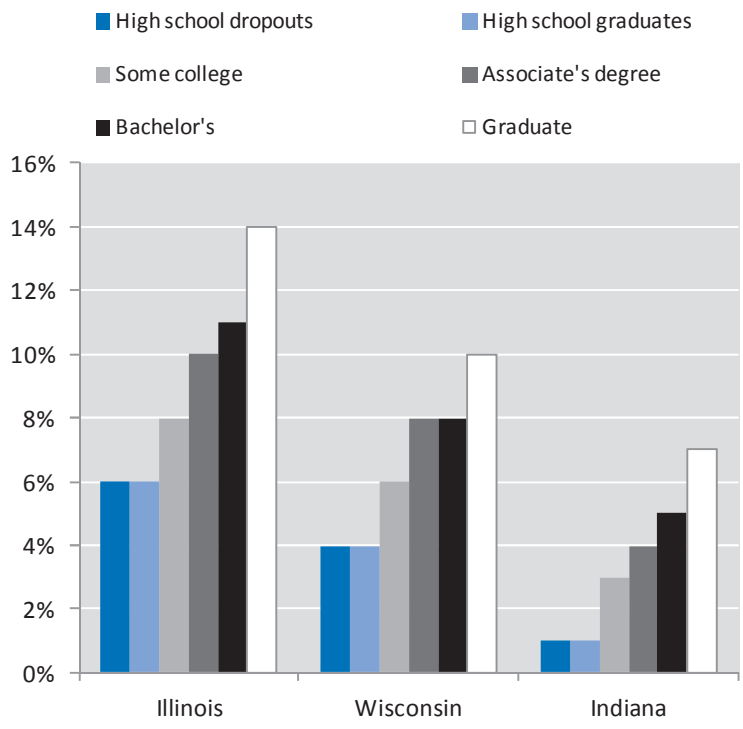
In Illinois, recent efforts at greater co-ordination across educational institutions and between levels of educational institutions may not be leading to a greater streamlining of curriculum offerings that is so badly needed in the region. These efforts are focused horizontally on the Illinois Community College Board (ICCB) and vertically on the P-20 Council, made up representatives from business, teachers, unions, faculty, school boards, parents' groups, private colleges and universities, community colleges, private foundations and state education and workforce agencies in Illinois. The ICCB, established in 1965, is a system of locally initiated and administered comprehensive community colleges. It covers the entire state with 48 colleges, and one multi-community college centre in each of 39 community college districts. The ICCB has the potential to reduce duplication of course offerings among community colleges in Chicago; to fill gaps in instruction and certification programmes; to offer a standard curriculum for various certification programmes; and to work closely with four-year public universities to provide a seamless transfer of credits. There is little evidence, however, that the ICCB has taken on this potential role.[16] Vertical co-ordination efforts within the state are focused on the P-20 Council, established in 2008 to improve the alignment of education systems, from preschool through graduate schools, to ensure that individuals are not left behind by the education system.[17] Equally, little evidence exists to suggest that so far this alignment is producing results. That said the P-20 council was only established in 2008. In Wisconsin, the degree of industry advocacy in vocational/technical education is significant as each programme area is monitored by an industry advisory board, which

reports on industry skills needs and makes recommendations on curricula. This model has been in place at both the state and local levels since 1961.

Skill demand not being met

Currently, only 36% of residents age 25 to 64 in the Metro Chicago Tri-State region hold at least a bachelor's degree (Source: 2006-2010 American Community Survey, 5-Year Estimates, US Census) while a recent study conducted by Georgetown University anticipates that 64% of jobs in Illinois will require a post-secondary degree by 2018 (Figure 2.7). Indeed, growing at 14%, 10% and 7% in Illinois, Wisconsin and Indiana respectively, those jobs requiring a graduate degree are expected to grow the fastest in percentage terms over the coming years (Carnevale and Smith, 2011). According to the Wisconsin Department of Workforce Development, 29% of all southeastern Wisconsin residents hold a college degree, whereas 31.5% of all jobs in Wisconsin will require some post-secondary education in 2018.

Figure 2.7. **Percentage change in educational demand, 2008-18**

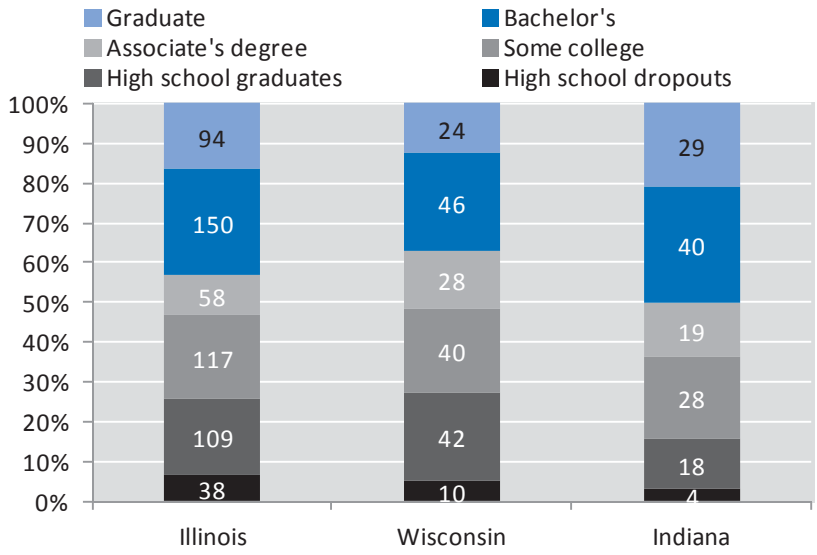


Source: OECD, based upon data from Carnevale and Smith (2011).

However, the small increase in low and medium skilled jobs in percentage terms does not indicate that there will be no jobs demanding such skills in the future. Indeed, jobs which do not require a post secondary degree will account for 26%, 27% and 16% of new jobs in Illinois, Wisconsin, and Indiana, respectively (Figure 2.8). If employees currently in low skilled jobs up-skill and undertake on-the-job training to pursue meaningful career pathways there will still be labour demand at the lower end of the skill spectrum.

Figure 2.8. **Educational demand by new jobs created, 2008-18**

(thousands)



Source: OECD, based upon data from Carnevale and Smith (2011).

In the absence of placement rates, an indication of the mismatch between business needs and college output is provided by a recent summit on the healthcare industry, commissioned by the Workforce Boards of Metropolitan Chicago (WBMC),[18] which identified 32 occupations experiencing skill shortages (Box 2.2). Furthermore, the results of a survey administered among clinics/medical groups, long-term care facilities and acute-care hospitals found that more than 90% of the long-term care facilities and acute-care hospitals cited a "small labour pool" as a major obstacle to recruitment. Similarly, a manufacturing summit two years later found that, despite the declining trend in manufacturing jobs in the region, firms complained of a shortage of skilled workers.[19] Clearly, there are mismatches between the skills that employers need and the focus of education and training programmes. Ironically, this is particularly true in fast-growing industries, because education and workforce development programmes do not adapt quickly enough to changing business needs (CMAP, 2010).

Convening the key stakeholders and comparing business demands with workforce providers' supply, the WBMC has made a useful start towards highlighting the need for a link between skill supply and demand. Yet WBMC summits, whilst useful, lack the necessary scope and continuity for regional policy going forward. The Tri-State Region will require co-ordination across a host of critical industry clusters. Rather than one-time studies which provide a static picture of skill shortages and will periodically require updating, it is important to set up channels through which training institutions and industry can continue a constant dialogue regarding the needs, techniques and equipment necessary for targeted skill upgrading. True region-wide co-operation is crucial: currently, CPS, the Chicago City Colleges, CWIC and the state of Illinois all have business advisory panels that assist public agencies in developing relevant programming and curricula. Rather than duplicating these efforts, true co-ordination between these actors would make much sense.

Box 2.2. **Healthcare worker shortages**

As the population ages and people live longer, the demand for healthcare steadily increases. The US Census projects that between 2000 and 2030, the number of people between the ages of 65 and 84 will more than double, while the population of 20-44 year olds will increase by only 10%. Currently, the Chicago region experiences critical shortages for registered nurses, licensed practical nurses, technicians and technologists, therapists, medical record clerks, and certified nursing assistants. At the same time many other healthcare jobs are low-paying low-skill jobs (this is particularly true in assisted living facilities, nursing homes, and some private practices) and employees working in these positions are often keen to seek training to qualify for the more skilled positions in which the region's experience shortages. This career ladder approach to up-skilling workers with initially little experience or skills can be positive both from the perspective of the employee – who gains access to a more meaningful career – and the employer – who benefits from reduced staff turnover and enhanced employee incentives. However, it requires a pool of entry level workers with the appropriate basic skills that can fill the positions vacated by those moving to higher paid positions.

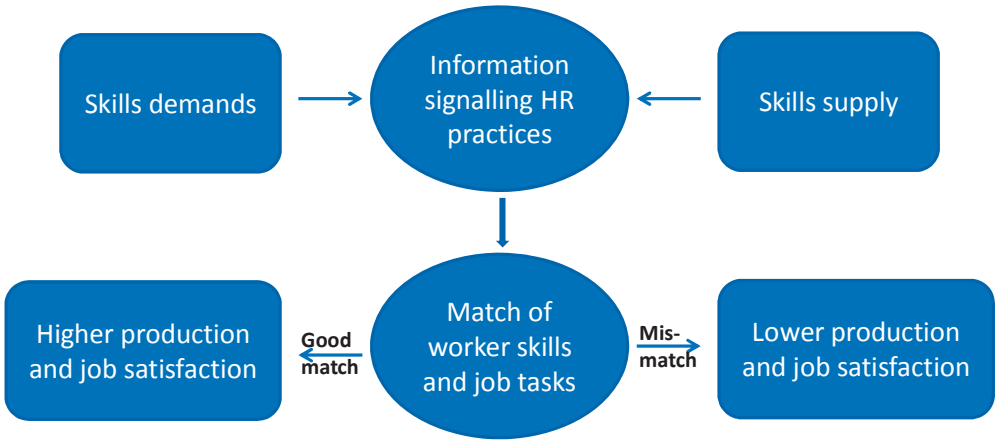
Source : Illinois Critical Skills Shortage Initiative.

Matching supply and demand – initial efforts

In the context of rapidly changing labour market demand and imprecise occupational projections, upgrading training alone is not sufficient to ensure that workers' skills are well suited to job requirements. The key is ensuring that the content of the training accurately reflects business needs across the region at all levels of business activity (Figure 2.9). In Wisconsin, co-ordination of economic and workforce development is accomplished through the Milwaukee 7 regional economic partnership. The Wisconsin governor's Council on Workforce Investment also has actively solicited input from industry leaders, economic developers and other stakeholders in order to better align workforce development efforts around industry growth sectors. A cluster-based strategy has identified four core clusters: advanced manufacturing, healthcare, data centres/distribution, and food processing. The workforce development boards are mandated to promote high-skill, high-wage positions in these clusters. In Illinois, the Northern Illinois Workforce Coalition comprised of fourteen suburban community colleges, the City Colleges of Chicago and nine local workforce boards, was organised to work collaboratively to significantly increase the number of post-secondary degrees and certificates awarded over the decade. The goals are: *i*) to graduate more than 85 thousand students by 2020, a proportionate share of President Obama's goal of 5 million additional graduates by 2020; and, *ii*) to close the skills gap in the regional workforce, including the gap between the skills that will be needed by the area's emerging economy and those of its current workforce.

The City of Chicago has called for improvements in the alignment between the city's workforce development programme and business hiring needs.[20] It hopes to facilitate partnerships to address skill gaps and to overhaul the system of administering Workforce Investment Act funding to ensure that it is maximally leveraged to address these gaps. The Chicago Workforce Investment Council (CWIC) will be charged with tailoring workforce programmes to the needs of Chicago's businesses, whilst at the same time preparing city residents for higher-skilled, high-demand jobs.[21] Although this plan includes only the City, its dominance of the region will hopefully encourage other communities to follow its lead.

Figure 2.9. **Matching skill supply with demand**



Source: OECD (2011), *Towards an OECD Skills Strategy*.

In order to ensure that residents are equipped with the necessary pre-requisites to benefit from business training, CWIC has proposed a strategy targeting two groups. The first "Complete the Degree Chicago" (the official name of the "Back to College" initiative spearheaded by the CWIC) will help individuals, who have earned some college credit to return to college to complete their degree, and the second, "Literacy to Work" will promote literacy and workforce training among the 23% of Chicago residents who dropped out of high school prematurely. Some features that could make the return to learning easier for adults include: *i*) a modular structure allowing learners to take only the parts of a course they need to re-qualify; *ii*) high-quality recognition of non formal and informal learning (RNFIL) systems to provide learning credits for transferable skills; and *iii*) part-time learning opportunities for those wanting to continue working. In addition, Mayor Rahm Emanuel announced in mid-December a new City Colleges of Chicago initiative, "College to Careers", that will be a partnership between City Colleges, corporations and other organisational partners to "drive the creation of jobs in growing fields and help increase the competitiveness of Chicago's companies" (Mayor Rahm Emanuel, 12 December 2011, Official Press Release). The initial focus will be on the health care and transportation and logistics clusters. The partnerships will concentrate on curriculum design and creation of certificate programmes, curriculum delivery, and access to internships, interviews and facilities.

Literacy is, indisputably, an indispensible pre-requisite before the fine-tuning of business-relevant occupation-specific skills becomes appropriate. Alone, however, it remains insufficient. Broad consensus within the academic and policy making community focusing on workforce development has now emerged on the generic competencies that must be developed alongside occupation-specific skills in order to underpin employment preparation for young people. Key skill-sets include: basic or foundation skills, such as literacy and numeracy; higher-level cognitive skills, such as problem-solving and analytic reasoning; interpersonal skills, including communication skills; working in teams and ability to negotiate; ability to use technology, particularly ICTs; and learning skills, essentially knowing how to learn (OECD, 2011). These complementary non-cognitive skills should also be further emphasised in the CWIC strategy, which currently provides contextualised learning and bridging through the above-mentioned programmes.

In the Tri-State Region, lack of access to quality basic education is undermining the ability of the home-grown low- and medium-skilled workforce to benefit fully from current investments in training and skill upgrading because they lack the basic cognitive and behavioural tools required to fully profit from the more advanced training offered by these services. In addition, the advanced training services offered often do not reflect the skills needs of the private sector across the region: in other words, a skills-training mismatch persists. Whilst private-sector involvement may address the skills mismatch – it will only be forthcoming if its training investments efficiently translate into skill formation. This will require the public sector to provide sound and universal basic skills to all in the region.

2.4. A way forward: greater co-ordination and deeper private-public engagement

The co-existence of skill vacancies in the high- and medium-skilled sector with unemployment among the low-skilled presents a serious challenge for labour force policy in the region, and the two aspects of this disequilibrium will require quite different policy responses. In addressing low-skilled unemployment, population groups with little educational achievement due to high dropout rates with poor access, as well as recently arriving immigrants who enter with low skills, require a second chance at education; workers displaced by restructuring will require re-training, and both those students with basic skills in place and incumbent workers need the encouragement to pursue high levels of technical training to meet employers' demands for higher skills.

Addressing these difficulties will require: co-ordination, co-operation and creativity. Co-ordination around coherent goals, and supported by harmonised and transparent indicators of progress; co-operation, to foster a dynamic relationship between academia, government and industry - between the providers of skills training and those that demand its output; and, finally, creativity, to achieve these goals in the context of tightened budgets.

Co-ordination to define goals and indicators of success

The Tri-State Region's various partnerships, vertical – federal, state, and local agencies – and horizontal – educational institutions, business, non-profits and the workforce - represent a system that is complex by necessity. For any co-ordination to be viable, the system requires, at a minimum, a common goal: a vision combined with objective performance indicators, to ensure that stakeholders are united behind that vision and that tangible progress is transparent.

"*GO TO 2040*", the comprehensive regional plan launched in October 2010 by the Chicago Metropolitan Agency for Planning, makes a sound step towards establishing such a goal.[22] Recognising the bi-modal nature of the distribution of human capital in the region the recommended actions of the plan are organised into two areas. The first relates to the improvement of education and workforce development and the second to support for economic innovation. However, policy proposals need to be developed further and could benefit from a more concrete implementation plan.[23]

Similarly, the Plan 2040 for northwest Indiana recommended the following strategies to realise the region's economic objectives:

- Work with the region's stakeholders, continue to seek state and federal funding and create programmes to support job and economic growth

- Work with regional partners and support implementation of regional development priorities
- Enhance economic competitiveness through the co-ordination of business, labour and education
- Support strategies for reinvestment, retention and attraction of jobs and businesses for the Core Communities
- Support existing plans, projects and initiatives
- Promote co-ordination between education (universities), workforce development and economic development leaders
- Promote innovation in emerging technologies and industries
- Support new investments
- Support agri-business and foster planning for local food systems.

The Milwaukee 7 adopted a strategic framework on May 30, 2007 calling for greater co-ordination along three dimensions: assets, export markets and opportunity zones.[24] Among the principal opportunities identified was the development of an experienced workforce to meet the region's growing labour needs. The group has released a series of annual reports including a performance scorecard that tracks a series of metrics related to the framework's objectives.[25]

Whilst a single region-wide institutional arrangement to co-ordinate workforce development activities throughout the region may be overly ambitious in the short-term[26] (see Chapter 6), enhanced clarity, co-ordination and information flows will be an urgent priority if the region is to capitalise and expand on its successes, and stem those projects that are not achieving measurable results. The challenge of consolidation across the Tri-State Region is that while the area functions as an integrated economic region, there are many sub-regional labour markets that require highly targeted services. Combining consolidation with a local flexibility – of design and delivery of specific services within neighbourhoods and communities – will require not only commonly-defined policy objectives, but a robust and transparent reporting regime, based upon common performance indicators and data and transparent information.

As mentioned in the previous section, a performance monitoring system that establishes measurable performance indicators, tracks progress, and enables monitoring and publishing of results can not only improve outcomes by ensuring strategies can be altered if they are not meeting policy objectives, but also give cohesion to a system united by common goal (see Chapter 6). Such a system could build on CWICstats which has already begun the work of integrating data and administrative systems for performance monitoring and evaluation, albeit in Chicago. Establishing integrated data systems across administrative, educational and industry results will be central to ensuring a continuous flow of information, a flow that will be critical to meaningful co-ordination in the context of the region's complex system of governance, actors, and funding mechanisms.[27]

Re-focus training programming and services to meet current business needs

The structural changes characterising the Chicago Metro-Region's labour markets ensure that a static approach to matching skill supply with industry demand cannot hope to provide a long-term solution. An adaptable workforce, able to remain flexible to market needs as they change will require, in the first place, the sound basic skills – both cognitive and non-cognitive – that act as a necessary pre-requisite for the efficient use of further training. However, it will also require a flexible workforce development system of technical and vocational education that remains responsive to the changing climate via an ongoing dialogue with the private sector.

Yet these two aspects of labour force development are not mutually exclusive. Previous OECD work has found that the probability of receiving employer-sponsored training is estimated to be on average 9% points smaller for workers with less than upper secondary education than for individuals with a tertiary qualification (OECD, 2003a). This disadvantageous relation may be due, in part, to the inefficient nature of internalising further training when basic skills are lacking. The provision of basic skills and more advanced technical training must be pursued in tandem. Whilst public provision must remain at the heart of the former, the private sector must play an increasing role in directing the latter.

Interaction between technical and vocational institutions and industry in, updating training content, equipment and facilities, as well as providing career guidance and introducing new programmes and cost effective delivery approaches, has become a key feature of technical and vocational systems across the World (Box 2.3). Such communication enables programme providers to learn what skills are in demand and to train their students for jobs that change on a regular basis, while concurrently giving employers an opportunity to provide input into the curriculum and a recruiting tool to attract appropriately skilled workers. Labour-market outcomes, especially for the first transition from education to the workforce, have been found to be much better in (vocational) education systems that collaborate with employers and include some element of workplace training (OECD, 2010). Furthermore, employers are more likely to provide education and training if they understand the system – a process facilitated by including them, both as individual firms and through related associations, as the system is being designed.

Development of a coherent and accessible database of programme participants – tracking their progress and achievements through educational and workforce development programmes as well as their subsequent employment patterns and wage rates – can provide an indirect channel for industry input, allowing future students to see what skills are valued by the market, and what programmes are most likely to equip them with the skills for job market success. The City of Chicago's CWICStats programme is currently collating statistics along these lines, going forward the region should look at expanding this programme as well as strengthening dispersion of its results.

It is important to recognise that skill formation and skill demand are undergoing long-term changes somewhat independently of one another. Population ageing affects skills supply while globalisation and technological change drive the occupational structure of employment (Handel, 2011). In order to be effective, the policy interventions that govern their matching process must be sensitive to these trends and responsive to their changing requirements.

Box 2.3. **International models to target training to business needs**

The policy systems that govern private sector involvement in training vary widely from country to country.

- The "dual system" of private engagement in technical training, adopted in Germany, Austria and Switzerland, delegates responsibility for curriculum and assessment to a coalition of labour representatives, businesses and educators, business associations then manage the system by monitoring the quality of training provided by firms (Gill & Dar, 2000). However, this dual system relies heavily on ability of business to see it in their best interests to pay for the training of vocational graduates and, the need to lower labour costs to keep with manufacturing intensive countries may undermine the viability of a total reliance on the private sector.
- A second model of private sector involvement relies on a strong network of relationships between educators and employers. Manufacturing labour in Japan has historically come from high schools with a strong network of relationships with hiring managers in industry; in this manner high school staff are able to place their most accomplished students preferentially. This system, however, relies on the ability of high school staff to correctly analyse the skills of their graduates, and their fit with industry needs. Furthermore communication remains unidirectional and does not adequately allow for industry input into curriculums.
- A third model: "Human Resource Development" focuses on encouraging firm level training through government policies. HRD strategies, pursued for example in South Korea, Malaysia and Singapore involve the taxation firms with the resultant revenues available for use within the firm to train workers within their own companies (Gill, Fluitman, and Dar, 2000).
- The Swedish model of the 'Triple Helix' aims to create a dynamic relationship between academia, industry and government. Whilst this tri-partite relation was initially focused on fostering innovation and creativity amongst the high-skilled, its insights (and those of its successor, the "quadruple helix" – which brings civil society into the picture) provide a useful basis for thinking about communication, and potential synergies in the provision of appropriate education and skills, accessible to all.

Public support for universal basic education; private support for advanced training

There is an important rationale for government involvement in providing skills to the labour force and, public funds must continue to play a central role: in overcoming the market failures associated with the externalities of education; in ensuring the availability of information about the quality and benefits of education to enable individuals and businesses to make informed investments of their own; and finally, in ensuring equitable access, by subsidising participation for disadvantaged groups or providing access to credit. However, in the context of tightened budgets, the Tri-State Region must harness market forces encouraging incentives for investments – both financial investments and investments of effort – from those who demand labour market skills: potential employees and potential employers.

In general, small and medium-sized enterprises (SMEs) have a particularly difficult time accessing education and skills development programmes. The reasons include: *i*) lack of time, workload pressures, resources and cost; *ii*) complicated paperwork/red tape; *iii*) lack of enterprise/managers skills, experience, data and support; *iv*) operational culture does not include training; *v*) learning preferences differ from what is offered; *vi*) different training needs; *vii*) lack of awareness; *viii*) market position (Martinez-Fernandez, 2008). More recent analysis in selected OECD countries shows that one of the most important obstacles for SMEs to participate in skills and training activities is the lack of customised training (Martinez-Fernandez and Sharpe, 2010). Firms indicate that available training is often generic, and the more sophisticated management and technical training they require is either not available or too expensive (Kubitz, 2011). Public support for apprenticeship programmes in small firms can address this challenge (Box 2.4). The UK Work Programme launched in June 2011, represents an innovative attempt to bring together a range of private, public and voluntary sector providers to match labour supply with employer demand (Box 2.5 and Figure 2.10). The aim is to deliver a more coherent and flexible system heavily reliant on the use of output-based-financing to align provider incentives with long-term labour force goals.

Box 2.4. **Examples of apprenticeship/mentoring services**

The use of apprenticeships, in easing the transition of young people from education to the labour market, at the same time as ensuring that their vocational training is highly focused on the skills required by employers is now widespread in many OECD countries. In some, such as Austria, Germany and Switzerland, apprenticeships represent the main vocational route to an upper secondary qualification.

On-the-job training is usually combined with at least one day a week (less in England and Australia) of off-the-job training, providing core skills and underpinning knowledge in publicly-administered vocational colleges. In France, however, off-the-job training centres are run by employer organisations, in England and Australia, providers of such training can be private or public, and in Ireland skill training is shared between employers and the technical colleges.

Career guidance provided by publicly funded careers offices and employer organisations is necessary to inform potential applicants of the factors to be considered in making a choice of occupation. Whilst Austria, Germany and Switzerland have a strong record of providing such advice, both France and England suffer from indifference (at best) towards work-based training in schools, this attitude is reflected in the paucity of advice.

Funding for on-the-job training provided by employers is often shouldered by the employer, though off-the-job training funds - paid directly to vocational colleges – are often publicly funded. Employers' paperwork is kept to a minimum and, whilst on average employers in Austria and Germany incur some net costs, government payments to employers are available in all apprentice countries – except England – to encourage demand.

Employer demand varies with the burden of training that must be covered by the employed but, in most cases, remains inadequate to cover demand for apprenticeships. And in Austria, Germany and Switzerland in addition to a longer apprenticeship period (of 3 to 4 years), an apprentice wage, calculated as a fraction of the wage for a skilled employee, enables employers to recoup some of the training costs they incur. As a result, while in Austria, Germany and Switzerland around a quarter of firms offer apprenticeships and this figure rises to 30% in Australia, in England only 8% of employers offered apprenticeships in 2009.

Source: "The State of Apprenticeship in 2010", LSE Centre for Economic Performance, London.

Box 2.5. **The UK Work Programme for the long-term unemployed**

The Work Programme is an attempt to help 2.4 million of Britain's long-term unemployed people find work over the next seven years. Under this ambitious scheme, private and not-for-profit providers will be paid for each jobseeker they get back into work. The aim of the scheme is to tap into provider incentives in order to make the most efficient use of limited public funds in a time of tight budgets.

Coherent? In contrast with previous UK welfare programmes, designed for specific groups, the "Work Programme" aims at creating a single programme under which different groups – including those at risk of long-term unemployment, younger and older unemployed people, those with limited work capabilities and lone parents – will access the programme in different ways.

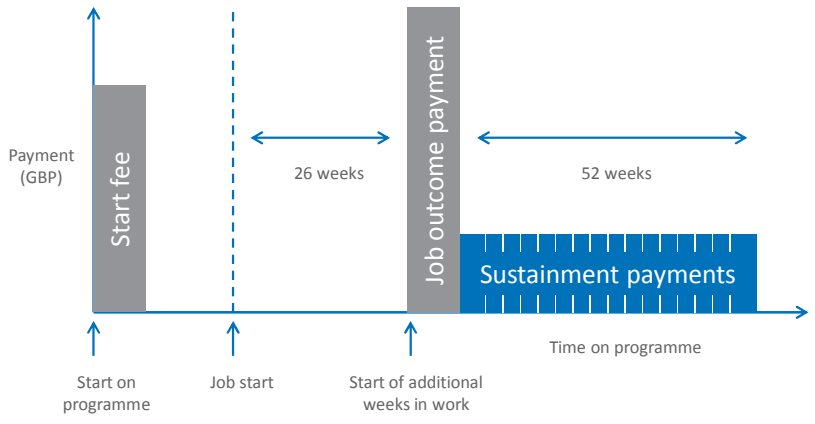
Long term? The scheme will be based on an output-based-financing model, with only 10% of contract money paid up front (Figure 2.5). The aim is to engender long-term horizons among service providers. Previous incentive mechanisms utilised under the Job Training Partnership Act were criticised on the basis that the short-run measures used to monitor performance were only weakly, and sometimes perversely, related to long-run impacts (Heckman, Heinrich and Smith, 2002)

Flexible? It is hoped that payment-by-results will enable a black box approach, endowing suppliers with flexibility regarding what kind of support they to give. Following the second year of the contract, market share of each of each provider will be shifted each year by 5% from low-performing to high-performing providers thereby rewarding success and allowing more participants to access the services of successful providers.

Cream-skimming? Cream-skimming – whereby providers target their services towards the lowest hanging fruit – is always a risk with output-based financing. The "Work Programme" attempts to surmount this potential hazard by randomly assigning participants to a provider in their area.[28] However, concerns have emerged regarding the potential for cream-skimming on a geographic basis: The government has set national performance expectations, and a national payment structure that takes no account of local and regional variations in labour demand. Whether contractors invest enough in the tough areas, where they know there will be fewer job outcomes, remains to be seen.

Source: UK Department of Work and Pensions (2011).

Figure 2.10. **Incentives for sustained work under the UK Work Programme**



Source: Department for Work and Pensions (DWP) (2011), The Work Programme, Department for Work and Pensions, *www.dwp.gov.uk.*

Harnessing worker incentives will also be central in making the most efficient use of limited funds. Career pathways programming provides a system of connected education and training programmes and student support services aimed at enabling individuals to secure a job or advance in an industry. By making explicit the routes and potential rewards associated with moves up the career ladder, the articulation of career pathways can engender enhanced aspirations, ensuring, not only that workers are motivated to make the most of their training, but also that they are able to choose the most appropriate path to achieve these aspirations (Box 2.6).

Box 2.6. **Examples of career guidance across the OECD**

The extent to which OECD member states use labour-market information to inform students, parents, workers and firms about skills supply and demand issues, and to guide policy, varies across the OECD. A review of career-guidance policies in OECD countries concludes that, at present, services are available only to limited numbers of groups, at fixed points in life, and are focused upon immediate decisions (OECD, 2004). Conversely, systematic career guidance from competent personnel and informed by up-to-date labour-market information, possibly combined with brief workplace experience, help reduce the incidence of dropout from post-compulsory education and later mismatch.

Some OECD countries have launched initiatives, in collaboration with industry bodies, to map job profiles more precisely across sectors and clusters, while encouraging those who provide training to offer modular, flexible training that will allow individuals to increase their mobility within and between sectors over their lifetimes (Froy and Giguère, 2010). This can help support school-to-work transitions and foster lifelong learning. In some countries, brokerage agencies support skills-policy development by linking information from external research agencies to the administration (OECD/PSD, forthcoming).

Source: OECD (2011), "Towards an OECD Skills Strategy".

The region needs to inject a greater degree of coherence into the various career pathway initiatives operating in the Tri-State Region (Box 2.7). Currently, they are, on the whole, independent ventures, each with its own organisation, board of directors, and need for funding. Whilst they provide on-the-ground evidence that co-operation and co-ordination can and do work to achieve commonly-defined workforce development objectives, there is often little communication among the various organisations, and information does not flow freely throughout their loosely knit networks. Their limited scale, along with this lack of co-ordination, means that there remain many who do not benefit from their success. A greater degree of co-ordination region-wide might be a useful first step in addressing this challenge.

Box 2.7. **Examples of career pathway initiatives in the Tri-State Region**

The Workforce Boards of Metropolitan Chicago (WBMC) has begun attempts to identify common competencies of workers within key sectors (for example the finance and insurance sector), mapping career pathways to show how workers can potentially move across industries within broad sectors.[29] The University of Illinois has similarly developed career pathways for several sectors of the regional economy, including advanced manufacturing. And, whilst limited in scale the small geographical area around the University of Chicago which it covers is one of the poorest areas in the city.

Box 2.7. **Examples of career pathway initiatives in the Tri-State Region** *(cont.)*

Other initiatives include "The Career Pathways Initiative" which helps residents of the poorer neighbourhoods around the University of Chicago find jobs at the University and its medical centre training employees with the aim that they can be promoted one or two positions above entry level. The Initiative is a partnership between the University, the City of Chicago's Department of Community Development, Worknet Chicago, Illinois Worknet, and the Cara Program. Of the more than 500 candidates admitted to the programme, the Initiative has placed 280 in jobs with a 70% retention rate at the end of one year. Initiatives aimed at particular industries include: *Carreras en Salud* at the *Instituto del Progreso Latino* which, operating with seed money from the State's Critical Skills Shortage Initiative, has served more than a thousand participants with a cumulative completion rate of 94%. Its nursing programme has graduated 350 Licensed Practical Nurses (LPN) and Certified Nursing Assistant (CNA), with a graduation rate of 95% and a placement rate of 100%; and the Jane Addams Resource Corporation (JARC) which focuses on local manufacturing providing technical assistance to manufacturers and job training to incumbent workers.

The Institute of Health Science Careers Academy (IHSCA), opened in September 2010, represents a further attempt at the promotion of career pathways in the healthcare. The IHSCA currently serves 346 youths with places allocated by lottery. The IHSCA offers a college preparatory and health sciences curriculum the dual aims of *i*) enabling students to succeed in competitive colleges and universities, and *ii*) providing job readiness certifications for entry-level positions with higher. In order to remain relevant to the demand for healthcare workers the IHSCA reaches out to partners to participate in the curriculum development, to teach in the school, to donate equipment and to provide mentoring, internship opportunities (paid or unpaid) and job shadowing. Through the creation of partnerships that integrate industry needs with the educational aspirations of urban youth, IHSCA hopes to widen access for youth to begin careers as doctors, nurses, informatics professionals and bio-technicians. The IHSCA has recently moved to new premises from where it hopes to serve 600 students, however, the initiative is focused on Latino youth and remains limited in scale.

The Milwaukee Talent Dividend initiative is founded upon the belief that identifying and directing students and parents to career pathways is paramount to building a strong regional workforce. The Wisconsin Department of Workforce Development has recently instituted several programmes which are designed to enhance youth apprenticeship opportunities and career readiness training. Historically, The Youth Apprenticeship (YA) programmes were designed to integrate in-school learning with work-based learning at employer worksites for high school juniors and seniors in skilled trades, over two years, in preparation for hiring directly into the workforce. Now students can enter into one OR two year YA programmes and use that training to go to work, into the military, and/or into any type of certification, adult apprenticeship, or technical/university college programme. Students still acquire entry-level, career ready skills in employability and in technical occupations of their choice, but the choices now range from auto mechanics, collision repair, manufacturing machining and hospitality to engineering design, biotechnology, and IT. Key elements of the YA programme include: local consortium management, skills developed with industry and educational partnership, skilled mentors to train the students, related classroom instruction concurrent with work-based learning, and performance-based assessment of the skills at the worksite by the employer. As of October 2010, almost 15 000 YA students have graduated the programme working in 22 different programmes with a majority continuing to work in Wisconsin in a field related to their YA programme. Since 2006, the YA programme has updated, and expanded its occupational offerings to 39 different career options aligned with current national occupational standards. Wisconsin's YA programme was identified as an exemplar of employer engagement in the February 2011 Harvard Graduate School of Education "Pathways to Prosperity" Project.

Incumbent worker training can enable a similar sense of career ownership and progress for those who undertake their training on-the-job. It can also provide a route through which low skilled workers, who have demonstrated their reliability, can be channelled towards plugging the skill gaps created by the shortage of workers with mid-level skills. In combination with career pathways programming, the benefits of incumbent worker training need not be confined to the static equity benefits of improved standards of living for the worker, or the static efficiency benefits of providing qualified workers for businesses.[30]

Private funding will need to remain as the cornerstone of incumbent training. However, given the externalities associated with an increasingly efficient work force the concomitant implications for business location decisions it is clear that, in some form, a role for public funding remains. With the USD 1.6 million received by the Tri-State Region under the *Recovery Act* stimulus programme over the two-year period ending January 2010, the region was able to train 3 400 incumbent workers - 420 of whom were in the healthcare sector with a further 2 000 in manufacturing. These workers came from 16 health care companies and 68 manufacturing firms, an average of 28 employers trained per participating business.[31] However, as *Recovery Act* funding comes to an end, the volume of funds for incumbent worker training, and training overall, will be cut in half.

In the long run, in order to ensure the match of local skill supply with local skill demand – and hence secure the region's resilience to external trends and shocks – the Tri-State Region will need to train a labour force that is adaptable to the changing needs of the market, and build skill-supply systems that are responsive to the changing needs of business. Engendering this adaptability will require a dual approach:

- First, by ensuring that basic educational establishments are of sufficient quality to guarantee that the labour force – both skilled and unskilled – can leave school with a high level of basic skills, both cognitive (literacy and numeracy) and non-cognitive (the ability to analyse, problem-solve, communicate).
- Secondly, workforce adaptability will require an ongoing dialogue with the private sector. Both priorities will require supply co-ordination; vertically – in order to ensure that individuals are not left behind, falling through the cracks between educational progression and job market entry, and horizontally – in order to ensure that the private sector is able to interact with the disparate training and education service providers – both public and private – to ensure that their skills needs are being met on an ongoing basis.

Most organisations across the Tri-State Region are in fact well versed in the various practices and methods that can bring about success in meeting its workforce needs. Indeed, in its world-class educational institutions, businesses, and non-profit sector, the region has the resources to provide the necessary expertise, and it has launched many innovative initiatives to promote collaboration and co-ordination. It is not a single, region-wide institution that will be best suited to pursue these objectives, but a network of partnerships, each focused on achieving practical, integrated policy objectives for its specific cluster of customers.

Create region-wide capacity to match skills supply with demand

Recent experience in Toronto might be instructive for key public and private actors in the Tri-State Region wishing to broaden and deepen ongoing dialogue aimed at matching skills supply and demand effectively. The Toronto Region Immigrant Employment Council (TRIEC) was set up in 2003 by the private sector – the Metropolitan Toronto Board of Trade (the equivalent of the Chicagoland Chamber of Commerce) – to address a critical need in the metropolitan labour market: how to recognise the skills and credentials of immigrants – who represent a significant and increasing proportion of the working-age population in the Metropolitan Region - in a way that allows them to obtain long-term employment in occupations for which they have been trained. The issue of credential recognition is a key stumbling block in semi- and high-skilled workers' efforts to obtain initial Canadian work experience. Having been trained outside Canada, employers are either ignorant of the value of - or reluctant to recognise - credentials from abroad and therefore tend not to hire immigrants in semi- or high-skilled occupations. Without Canadian work experience, it becomes that much more difficult for an immigrant to enter the Toronto labour force in his or her chosen field.

TRIEC was established to link together employers, training institutions and service providers, unions and community groups representing immigrants. The Board of Trade established a "table" around which these key stakeholders discuss business needs and skills availability in targeted immigrant population groups across metropolitan Toronto. The focus is on getting individual companies either to hire or, more critically, provide apprenticeship and mentoring opportunities for immigrants in the occupational field for which they have been trained abroad so that they gain their first – critical – Canadian work experience (Box 2.8).

Box 2.8. **Toronto Region Immigrant Employment Council, 2003**

Toronto Region Immigrant Employment Council (TRIEC) has, since 2003, been bringing together multiple stakeholders – employers, regulatory bodies, professional associations, educators, labour, community groups, government and immigrants – to build understanding and develop local and practical solutions to integrate Toronto's immigrant community into the labour force.

Objectives: TRIEC's work is focused on three objectives:

1. To increase access and availability of services and programmes that help skilled immigrants effectively enter the local labour market

2. To work with key stakeholders, particularly employers, to build their capacity to work better with skilled immigrants

3. To work with all levels of government to increase local co-ordination of public policy and programming

Whilst TRIEC's goals are focused on integrating immigrants, their methods are widely applicable to the broader objective of re-integrating those who have become isolated from the labour market.

Box 2.8. **Toronto Region Immigrant Employment Council, 2003** *(cont.)*

Mutual Benefits: The forum for dialogue is beneficial to all stakeholders: Employers benefit from improved recruitment channels, and access to new distribution; potential employees benefit through building their professional connections and experience through mentoring; educational institutions benefit from help with the development and distribution of learning tools and the curriculum, and finally government benefits through increased support from the private sector and independent interaction between those that supply and those that demand labour force skills.

Harnessing Networks: TRIEC relies heavily on the support of mentors within the business community, this can include immigrants who have successfully integrated with the labour force and former *'mentees'* – graduates of TRIEC's mentorship programme. These mentoring schemes fulfil the dual role of enhancing the networks of new immigrants, whilst at the same time providing them with role models to focus their aspirations.

Data: Through the Workplace and Employee Survey (WES) – panel data covering 24 197 employees within 6 693 workplaces annually since 1999 – TRIEC is able to supplement its qualitative 'histories' of the successful trajectories of its participants with data matching detailed employee characteristics with search methods and labour market outcomes. In this manner TRIEC is able to provide tangible evidence of what works as well as identifying industries in which employee skill levels are best (and worst) matched to the requirements of the position.

The issue in the Tri-State Region is not so much foreign credential recognition but the dual challenge associated with ensuring that the supply of training services accurately reflects current and projected business needs across the region and effectively matching skills supply and demand in the region at all levels of business activity. Yet the principle of a private-sector led initiative to establish a forum for this type of mapping exercise on an ongoing basis, like the one in Toronto, could be adapted to meet the specific challenges in the Tri-State Region.

That said it is not even necessary to look beyond the Tri-State Region to find examples of this type of initiative that has worked successfully: the Jane Addams Resource Corporation and the *Carreras en Salud* initiatives mentioned earlier can equally serve as home-grown, neighbourhood-focused examples on which to build lasting, more region-wide arrangements. With this in mind, this Review suggests the following:

- The region's key stakeholders – from the chambers of commerce to the sector business associations, the WIBs and the academic institutions focusing on workforce development – should lead a joint effort to define a common, region-wide strategic approach to workforce development that focuses on issues of common, region-wide concern (see Chapter 6) by priority business cluster. Core issues have already been identified in *Goto2040* and other work; discussion could centre around broadening and deepening the scope of the analysis to cover the Tri-State or 21-county region where this makes sense. The approach should seek to address the skills needs in key future-oriented business clusters as well as in the region's major legacy clusters. The approach should articulate a set of policy outcomes for the region along with the strategies and plans aimed at achieving them.
- Together, they should approach the state governments to work together to increase region-wide planning in a way that ensures that education and training

service providers are reflecting the actual needs of businesses across the region by business cluster in the curricula they dispense.

- Key public and private stakeholders should seek resources (including from foundations and the private sector) to set up arrangements that will sustain this dialogue between business and training service providers along with institutionalising region-wide skills-mapping capacity in established and emerging business sectors of strategic importance to the region.
- This approach should also focus on how best to ensure data and performance indicator development to inform policy design and implementation on an on-going basis. Stakeholders should therefore underline to the state and federal governments, particularly USDOL, the crucial importance of region-wide performance measurement data for effective strategic planning and implementation, and argue that all due efforts be made to ensure that region-wide data sets and performance indicators are collected and shared with all stakeholders on an ongoing basis. As chapter 6 suggests, this function might best be served by a university centre located in the Tri-State Region dedicated to this task as well as to advising key regional public and private stakeholders regularly on policy design and implementation in a manner that truly reflects the Tri-State Region's workforce and economic development challenges.

This advice mirrors that contained at the end of the next chapter on Innovation (see section 3.4). As is the case for innovation policy, and as the final chapter on governance points out, at issue in the Tri-State Metropolitan Region is not the *what* or even the *why* of workforce development (or indeed of any of the policy issues covered in this Review), it is the *how*. Key public and private stakeholders across the 21 counties know what is to be done to enhance workforce performance, and they know why it needs to be done. What is needed is the will to engage key actors at the federal, state and metropolitan levels to work together on common, region-wide workforce-development issues. As in the past, in the Tri-State Region, it might be the private sector and non-governmental actors that are best positioned to lead this effort and to convince public authorities to act for the common good of the Tri-State Region as a whole.

Notes

1. Such as Boston, Los Angeles, San Francisco and Houston (see Chapter 1).
2. In preparing this Review, research was conducted with regional banks, insurance companies, security firms and trade organisations, along with private employment service providers, educational and training institutions and workforce development agencies, to profile major employment groupings, recruitment and advancement practices, existing and potential career pathways, employment challenges for employers and individuals, and the potential for using career pathways to strengthen the supply of highly skilled employees and increase access to employment and careers.
3. In practice, some recent research casts doubt on the degree to which recent rises in unemployment can really be said to be the product of such mismatches (Şahin et al, 2011)
4. For example, Federal requirements for participation in WIA funded 'youth programs require the participant to be aged between 14-21; Illinois Hire the Future program further restricts this to individuals aged 16-21 who attend school and meet minimum academic criteria.
5. For example, in addressing the needs of consumers, Chapin Hall at the University of Chicago worked with the Chicago Department of Family and Support Services to develop a website to inform consumers about making an informed decision about training programs. The site includes details on the training programs as well as completion and employment outcomes (*www.ChicagolandWIAtraining.com*)
6. Chapin Hall at the University of Chicago, Chicago Workforce Development Programs: System Map and Inventory 2010.
7. Primarily through the Chicago Department of Family and Support Services, though other agencies include: City Colleges of Chicago, Chicago Housing Authority, Chicago Public Schools, Chicago Workforce Investment Council, Chicago Department for Community Development, After School Matters, Partnership for New Communities, Opportunity Chicago, the Department of Buildings, the Department of streets and Sanitation and the Department of the Environment.
8. The Department of Employment Security operates the unemployment insurance system and the labour market information system. Human Services provides welfare assistance and other support services. The state workforce development agency responsible for the Workforce Investment Act is the Department of Commerce and Economic Opportunity which also operates other training related initiatives in addition.
9. The States of Illinois, Indiana and Wisconsin provide some additional funding for workforce services; however, they allocate significantly greater resources to education.

10. Mikelson, Kelly S. And Demetra Smith Nightingale, *Estimating Public and Private Expenditures on Occupational Training in the United States*. ETA Occasional Paper 2006-01. Washington, DC: US Department of Labor, Employment and Training Administration, 2006.

11. Since federal funding for workforce development is distributed mostly on a formula basis, local workforce boards can do little to increase the inflow of federal funds. A small portion of federal funds is available through competitive bidding; however, pursuing these funds, which local workforce boards do, would not add much to the total federal inflow into the region.

12. A relatively larger increase in percentage terms, but necessarily small, given the initial spending levels.

13. WIASRD Summary Reports, Employment and Training Administration, US Department of Labor.

14. Adjusting the targets for factors outside the control of administrators offers a crude measure of the value added of the local workforce boards. In the case of the Chicago Workforce Investment Board, such adjustments would lower their targets, since the personal characteristics of those exiting the program and the local economic conditions are less favourable to finding and retaining a job than the national average.

15. For example, in an effort to lure Illinois businesses to resettle in Indiana, the state of Indiana sponsored billboards alone the major freeways going into the Chicago area that asked: "Illinnoyed by Higher Taxes?" The billboard offers a website *www.solutionindiana.com,* which is sponsored by the Indiana Economic Development Corporation, the state economic development agency. Meanwhile in Wisconsin, at a press event which highlighted a company moving from Illinois to Wisconsin, Wisconsin's Governor was reported to say "We really are a place that is open for business. Contrast that to Illinois, where they're not only raising taxes, but where they've got a pension system that's less than half-funded. We've got a fully funded pension system. We've got long-term stability."(*http://abclocal.go.com/wls/story?section=news/local/wisconsin&id=8018703*). Illinois Governor Quinn, in a March 11, 2011 interview on WBEZ radio in Chicago, criticised Wisconsin Governor Walker for legislation limiting collective bargaining rights of public employees in Wisconsin: He said, "When somebody tries to take away your right to band together and organise, that's not healthy," Quinn said. "And it's very bad. And I think what went on in Wisconsin yesterday is something that the governor there, really, should be ashamed of himself." (*http://www.wbez.org/story/democrats/quinn-wisconsin-governor-should-be-ashamed*).

16. For more information see *http://www.iccb.org/index.html*.

17. The Illinois P-20 Council released the following 10 recommendations for a state-wide education system: (i) Align student learning standards and assessments (ii) develop a system of assessment of student learning that fulfils two purposes: accountability and to guide and inform teachers (iii) develop an integrated accountability system (iv) coordinate education data systems and workforce data systems to improve career counselling (v) channel high quality candidates into teacher (vi) improve training and certification for teachers (vii) improve teacher evaluation and professional development (viii) improve retention, intervention, and re-engagement (ix) increase public engagement (x) track and report progress toward the goal: to increase the proportion of Illinoisans with high-quality degrees and credentials to 60% by the year 2025.

18. A voluntary association of Chicago local workforce investment boards

19. In a follow up study employers complained of a lack of basic and technical skills when hiring: *www.workforceboardsmetrochicago.org/upload/MFGemployers-final6-27-04.pdf.*

20. Rahm Emanuel, Chicago 2011Transition Plan, City of Chicago

21. The recent announcement by the City and Cook County that the WIBs serving the City of Chicago and Cook County will be merging with the CWIC to create a single operator is a step in the right direction. The first step has been accomplished with the appointment of a single Executive Director for both boards.

22 . Workforce Development Report, Chicago Metropolis Strategies, 2009. On October 13, 2010, the governing board of the Chicago Metropolitan Agency for Planning unanimously adopted *GO TO 2040*. The aim of CMAP and its partners is to remove barriers to cooperation across geographical boundaries and subject areas such as land use, transportation, natural resources, housing, and economic development.

23. Education and Workforce Development: (i) improve data and administration systems, (ii) improve workforce services, (iii) co-ordinate education with employers. Innovation Support: (i) improve data and administration systems, (ii) nurture regional industry clusters, (iii) create a culture of innovation.

24. For more information see *http://www.choosemilwaukee.com.*

25. For more information see *http://www.choosemilwaukee.com/upload/documents/Performance%20Scorecard%20May%202%202011.pdf.*

26. The announced merger between the 3 city WIBs and the CWIC is a good step forward.

27. The region missed a great opportunity to jump start this process when the state did not succeed in its application for federal funds that were available under the Data Quality Initiative to integrate education and workforce data.

28. Random assignment will also facilitate performance comparisons

29. Finance and Insurance Career Pathways, The Workforce Boards of Metropolitan Chicago, prepared by Judith Kossy, Policy Planning Partners, Greg Schrock, UIC Center for Urban Economic Development, January 2009.

30. The federal government, through Workforce Investment Act funding, has allowed local workforce boards to use part of their funds for incumbent worker training, however, recent federal government directives have called for more restrictive use of these funds.

31. The Workforce Boards of Metropolitan Chicago, Workforce Indicator Report 08, May 2010.

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ANNEX 2A.1

Workforce Development Programmes in the 11-county Chicago Region of the Workforce Boards of Metropolitan Chicago

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Added Chance Career Education and Development	State - Department of Children and Family Services	Department of Children and Family Services	Job Readiness/Placement	Youth	Prepares youth for work by providing employment preparation workshops and job placement services.
Adult Basic Education/GED	State - State General Revenue Fund & Public Grants	Illinois Department of Corrections	Adult Education/Literacy	People with Criminal Records	Provides basic education and GED preparation to inmates.
Adult Education and Family Literacy (WIA Title II)	Federal & State - Department of Education, Office of Vocational and Adult Education and State General Revenue	Illinois Community College Board	Adult Education/Literacy	Low-Literacy	Provides educational services to persons needing to enhance their basic literacy skills, improve English language proficiencies, or prepare for the GED examination.
Adult Vocational Education	State - State General Revenue Fund & Public Grants	Illinois Department of Corrections	Occupational Training	People with Criminal Records	Provides vocational education to adult inmates.
Carl D. Perkins Career & Technical Education (Postsecondary)	Federal - US Department of Education	Illinois Community College Board	Occupational Training	Other (Adults in Ed. Institutions)	Provides an increased focus on the academic achievement of career and technical education students at postsecondary institutions.
Carl D. Perkins Career & Technical Education (Secondary)	Federal - US Department of Education	Illinois State Board of Education	Occupational Training	Youth	Provides an increased focus on the academic achievement of career and technical education students within secondary institutions.
City Ex-Offender Programs*	Local - City of Chicago - Corporate	Chicago Department of Family & Support Services	Job Readiness/Placement - Occupational Training	People with Criminal Records	Programmes here include customised work services, a transitional jobs pilot programme, customised job training, and community re-entry support centres. These programmes provide a range of training and placement services to people with criminal records.
Community Development Block Grant (CDBG)	Federal - US Department of Housing and Urban Development	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement	Low-Income Adults	The Community Development Block Grant (CDBG) programme is a flexible programme that provides communities with resources to address a wide range of unique community development needs. Communities differ in the amount of funding directed toward workforce development activities.

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Community Services Block Grant (CSBG)	Federal - US Department of Health & Human Services - Administration for Children & Families	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement	Low-Income Adults	The CSBG programme is designed to provide a range of services which assist low-income people to attain skills, knowledge and motivation necessary to achieve self-sufficiency. The programme also may provide low-income people immediate life necessities such as food, shelter, medicine, etc.
Delancey Social Enterprise Model (at a Safe Haven Found.)	State - State General Revenue Fund	Illinois Department of Corrections	Job Readiness/Placement	People with Criminal Records	Dedicated to working with parolees that have a history of substance abuse and/or have currently relapsed and begun using drugs again. The programme provides a combination of services that include soft skills training, job training and in house job placement leading to job placement in the community.
Disabled Veterans' Outreach Program	Federal - US Department of Labor - Veterans Employment and Training Service	Illinois Department of Employment Security	Job Readiness/Placement	Veterans	Provides direct services to veterans to help them to compete in the labour market.
Earnfare	State - State General Revenue Fund	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	Provides adult Food Stamp recipients the opportunity to gain work experience and earn cash assistance at Earnfare work assignments.
Employer Training Investment Program (ETIP)	State - State General Revenue Fund	Illinois Department of Commerce & Economic Opportunity	Occupational Training	Incumbent Workers	Funds companies to train incumbent workers to help them keep pace with new technologies and business practices.
Employment Opportunity Grant Program (EOGP)	State - State General Revenue Fund	Illinois Department of Commerce & Economic Opportunity	Occupational Training	Other (African-Americans, Hispanics, females, African-American & Hispanic youth)	Prepares participants for placement in high wage union construction jobs and access to public as well as private construction jobs throughout the State.
Family Literacy Project	State - Secretary of State Literacy Office	Secretary of State's Office – Illinois State Library	Adult Education/Literacy	Low-Literacy	Provides instructional services to parents and children to enhance their basic reading, math, writing or language skills together and separately. Participation by the entire family increases the benefits of the instruction. Projects must partner with an adult literacy provider, a child-at-risk organisation and a library.
FamilyWorks	Federal - US Department of Housing and Urban Development	Chicago Housing Authority	Job Readiness/Placement	Public Housing Residents	A case management programme that provides Chicago Housing Authority residents with employment services including career preparation & placement. Participants develop employment goals with the help of their case manager.
Greencorps	Local - City of Chicago - Corporate	Chicago Department of Environment	Occupational Training	Low-Income Adults	Provides field and classroom experience in five technical areas: landscaping and horticulture, tree care training, environmental health and safety, warehousing and electronics recycling, and weatherisation. Professional development along with life and academic skills are integrated into the training season over the nearly year-long training program.

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Hispanic-Serving Institutions Assisting Communities	Federal - US Department of Housing and Urban Development	United States Department of Housing & Urban Development	Occupational Training	Low-Income Adults	Given to institutions of higher education serving Hispanic individuals in order to focus on critical social and economic issues such as poverty, education, housing, and employment. Illinois' grantee focuses solely on employment.
Homeless Veterans' Reintegration Project	Federal - US Department of Labor - Veterans Employment Training Service	US Department of Labor	Job Readiness/Placement	Veterans	Provides employment assistance to homeless veterans.
Job Corps	Federal - US Department of Labor	US Department of Labor	Job Readiness/Placement - Occupational Training	Youth	Provides integrated academic, vocational, and social skills training to help youth gain independence and get quality, long-term jobs or further their education.
Job Preparedness Program	State - State General Revenue Fund	Illinois Department of Corrections	Job Readiness/Placement	People with Criminal Records	Aims to provide treatment, re-entry services, and employment assistance to incarcerated men with substance abuse addictions.
Job Training & Economic Development	State & Federal Funding - State General Revenue Fund (80%) and WIA Discretionary Funding (~20%)	Illinois Department of Commerce & Economic Opportunity	Occupational Training	Low-Income Adults	Community-based providers work in partnership with local businesses to provide training and act as a connection between local employers and low wage/low skill workers.
Life Skills Services	State & Federal - State General Revenue Fund & State Grant and Federal Grant (33%)	Illinois Department of Corrections	Job Readiness/Placement	People with Criminal Records	Individuals receive many services including job referrals and individual counselling.
Local Veterans' Employment Representative Program	Federal - US Department of Labor - Veterans Employment & Training Service	Illinois Department of Employment Security	Job Readiness/Placement	Veterans	Provides funding to support dedicated staff positions to provide job development, placement, and support services directly to qualified veterans.
Non-custodial Parent Earnfare	State - State General Revenue Fund	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	Provides court ordered, unemployed non-custodial parents receiving TANF the opportunity to gain work experience and earn cash assistance while meeting a portion of their child support obligation.
Partnerships for College & Career Success (Formerly TechPrep)	Federal - US Dept of Education	Illinois Educational Institution Board	Occupational Training	Youth	Provide CTE Pathway models for individuals who are members of special populations, ensuring they have the opportunity to access a career and succeed in it.
Productive Choice	Federal - US Department of Labor	Chicago Department of Family & Support Services	Job Readiness/Placement	People with Criminal Records	The programme provides job placement assistance and services such as mentoring, job-training, bus passes and financial literacy for ex-offenders between the ages of 18-29 recently released from State or Federal prison.
Projects with Industry	Federal - US Department of Education	US Department of Education	Job Readiness/Placement - Occupational Training	People with Disabilities	Provides job development, job placement, career advancement, and training services for programme participants, many of whom are individuals with significant disabilities.
Refugee Services*	Federal - Office of Refugee Resettlement	Illinois Department of Human Services	Job Readiness/Placement	Refugees	Provides case management, ESL training, and employment services
Reintegration of Ex-Offenders (RExO)	Federal - US Department of Labor	US Department of Labor	Job Readiness/Placement - Occupational Training	People with Criminal Records	Employment-centred programme that incorporates mentoring, job training, and other comprehensive transitional services in order to reduce recidivism for former inmates returning to their communities.

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Second Chance Act Prisoner Re-entry Initiative	Federal - US Department of Justice	Cook County Sheriff's Office	Job Readiness/Placement	People with Criminal Records	Serves approximately 300 individuals a year, and provides 30 jobs to formerly incarcerated individuals.
Secondary Transitional Experience Program	Federal - US Department of Labor - Employment & Training Administration (WIA Title IV)	Illinois Department of Human Services - Division of Rehabilitative Services	Job Readiness/Placement	People with Disabilities	Helps high school students who have disabilities plan for their futures after high school graduation.
Senior Community Service Employment Program (SCSEP)	Federal - US Department of Labor - Employment & Training Administration	Illinois Department on Aging	Job Readiness/Placement	Seniors	Program transitions seniors into unsubsidised jobs, beginning by placing them in community service agencies to work 20 hours per week.
Supplemental Nutrition Assistance Program (SNAP) - Employment and Training	Federal & State - US Department of Agriculture - Food & Nutrition Service (80%) and State General Revenue Fund (20%)	Illinois Department of Human Services	Occupational Training – Job Readiness/Placement	TANF and/or SNAP Recipients	Provides special target populations of Food Stamp recipients with intensive education, job skills training, pre-employment services, and unsubsidised job placement.
Temporary Assistance for Needy Families (TANF) Job Placement	Federal & State - US Department of Health & Human Services (80%) and State General Revenue Fund (20%)	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	Provides targeted employment services designed to address the needs of TANF recipients with significant employment barriers.
TIFWorks	Local - TIF - City of Chicago	Chicago Department of Housing & Economic Development	Occupational Training	Incumbent Workers	Provides businesses in TIF districts with funding to train incumbent workers.
Title XX - Social Services Block Grant	Federal - US Dept of Health & Human Services	Illinois Department of Human Services	Job Readiness/Placement	Low-Income Adults	Funds used to assists individuals in achieving economic self support. Some funds used for youth development programmes.
Trade & Globalisation Adjustment Assistance	Federal - US Department of Labor	Illinois Department of Commerce & Economic Opportunity	Occupational Training – Job Readiness/Placement	Dislocated Workers	Provides services, including training scholarships, to dislocated workers who have been found to be adversely impacted by increased imports or by a shift of production to another country.
Trade Adjustment Assistance	Federal - US Department of Labor	Illinois Department of Commerce & Economic Opportunity	Occupational Training – Job Readiness/Placement	Dislocated Workers	Provides benefits and services to workers who become unemployed due to the impact of international trade.
Training for Tomorrow	State - State General Revenue Fund	Illinois Department of Commerce & Economic Opportunity	Occupational Training	Low-Income Adults	Provides employment and training opportunities that meet the specific skill needs of local employers and residents.
Transitional Jobs (CHA)	Federal - US Department of Housing & Urban Development	Chicago Housing Authority	Job Readiness/Placement	Public Housing Residents	Provides disadvantaged job seekers with time-limited, wage-paying jobs and combines real work, skill development, and supportive services to transition participants successfully into the labour market.
Transitional Jobs (IDOC)	State - State General Revenue Fund	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	See above
Transitional Jobs (TANF)	State - State General Revenue Fund	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	See above
Vocational Rehabilitation	Federal & State - US Department of Ed, Office of Special Education & Rehabilitative Services and 20% match from State General Revnue Fund	Illinois Department of Human Services - Division of Rehabilitative Services	Job Readiness/Placement	People with Disabilities	Assists people with disabilities in preparing for and finding quality employment.

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Wagner-Peyser/Employment Services (7A)	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Employment Security	Job Readiness/Placement	Dislocated Workers	Provides a variety of job search assistance and information services without charge to job seekers.
Wagner-Peyser/Employment Services (7B)	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Employment Security	Job Readiness/Placement	Youth	Assists high school students in their transition to the workplace, providing exposure to the workplace environment and an understanding of the education and skills needed to succeed.
WIA Discretionary - 15% Set Aside	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement - Occupational Training	Low-Income Adults, Dislocated Workers, or Youth	States may reserve up to 15% of each of their separate adult, youth, and dislocated worker WIA allotments to 'carry out statewide employment and training activities.' - Department of Labor
WIA Title I - Adult	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement - Occupational Training	Low-Income Adults	Provides core, intensive, and training services to adults through the One-Stop Centers and affiliated sites.
WIA Title I - Dislocated Workers	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement - Occupational Training	Dislocated Workers	Provides core, intensive, and training services to dislocated workers through the One-Stop Centers and affiliated sites.
WIA Title I - Youth	Federal - U.S Dept of Labor - Employment & Training Administration	Illinois Department of Commerce & Economic Opportunity	Job Readiness/Placement	Youth	Provides core, intensive, and training services to youth through the One-Stop Centers and affiliated sites.
Women in Apprenticeship & Non-Traditional Occupations (WANTO)	Federal - US Department of Labor	US Department of Labor	Job Readiness/Placement - Occupational Training	Other (Women)	Assisting employers and labour management organisations in the placement and retention of women in apprenticeship and non-traditional occupations.
Work Experience and Career Exploration Program	State - State General Revenue Fund	Illinois State Board of Education	Occupational Training	Youth	A one to two year school-to-work transition programme that provides intensive intervention strategies to encourage at-risk students to improve their academic class and develop a career plan that guides them toward work.
Work First	State & Federal - State General Revenue Fund (90%) and US Department of Health & Human Services (10%)	Illinois Department of Human Services	Job Readiness/Placement	TANF and/or SNAP Recipients	Pay-after-performance programme for TANF recipients, which includes activities such as work experience, community service, vocational training, basic education, job skills, and treatment programmes.
Work Incentives Planning & Assistance	Federal - Social Security Administration	Illinois Department of Human Services - Division of Rehabilitative Services	Job Readiness/Placement	People with Disabilities	One-on-one consultation provided to jobseekers with disabilities meant to ensure a beneficiary's success in regards to employment. Services include general work to outline employment options and the development of long-term supports.
Workplace Skills Enhancement Program	State - Secretary of State Literacy Office	Secretary of State's Office – Illinois State Library	Adult Education/Literacy	Low-Literacy	Provides on-site instructional services to employees of Illinois businesses to enable them to increase their basic reading, math, writing, or language skills, maintain their employment and increase their eligibility for promotion. Eligible employees read at or below the 9th grade level. The fiscal agent and submitting agency may be either the educational partner or the business partner.

Programme	Funding Source	Administering Agency	Primary Focus of Services	Primary Target Population (Stated)	Programme Description
Youth Build	Federal - US Department of Labor	US Department of Labor	Occupational Training	Youth	Empowers teens and young adults by focusing on academic goals while also helping youth to develop job skills by building homes for low-income families.
Youth Ready Chicago - Career Development Centers	Local - City of Chicago - Corporate	Chicago Department of Family & Support Services	Job Readiness/Placement	Youth	Connects young people, ages 14 - 21, with internships, apprenticeships and jobs within Chicago's public and private business sectors. Each opportunity offers youth hands-on experience and an opportunity to gain marketable skills.
Youth Ready Chicago - CHA Earn & Learn Program	Federal - Department of Housing and Urban Development	Chicago Department of Family & Support Services	Job Readiness/Placement	Youth	Provides CHA youth aged 13 to 15 with academic enrichment, experiential learning focused on career exploration, and field trips that complement class activities.
Youth Ready Chicago - Head Start Youth Initiative	Federal - US Department of Health & Human Services - Admin. for Children & Families	Chicago Department of Family & Support Services	Job Readiness/Placement	Youth	Provides teens, primarily CHA residents, with meaningful and valued work experience.
Youth Ready Chicago - Summer Jobs Program	Local - After School Matters Operating Budget	After School Matters	Job Readiness/Placement	Youth	Provides students with summer internships with a number of city departments, thus offering, meaningful, challenging and rewarding work experience.
Youth Ready Chicago - Summer Mini-Grants	Local - City of Chicago - Corporate	Chicago Department of Family & Support Services	Job Readiness/Placement	Youth	Offers youth (10-18) a chance to explore vocational, recreational, and educational opportunities.

Source: Chicago Jobs Council (unpublished) for the Workforce Boards of Metropolitan Chicago, 2010 data.

Chapter 3

Innovation and entrepreneurship in the Tri-State Region

This chapter focuses on the region's innovation and entrepreneurship capacity. Human capital lies at the core of any innovation ecosystem, and while the region is a magnet for Midwest talent, the segment of the population with low skills along with shortages in particular skills, such as computer science, mathematics and business administration, constitute bottlenecks that need to be fixed. The private and non-profit sectors are more advanced than are the federal, state and local authorities in articulating, promoting and pursuing a true, region-wide vision for innovation-led growth. The chapter underscores the need for a public-sector change in attitude to ensure a reduction in the "race-to-the-bottom" style of competition among local and state authorities and a more strategic focus that orients investments toward supporting the region's innovation drivers through greater collaboration and pooling of scarce resources.

Key Findings

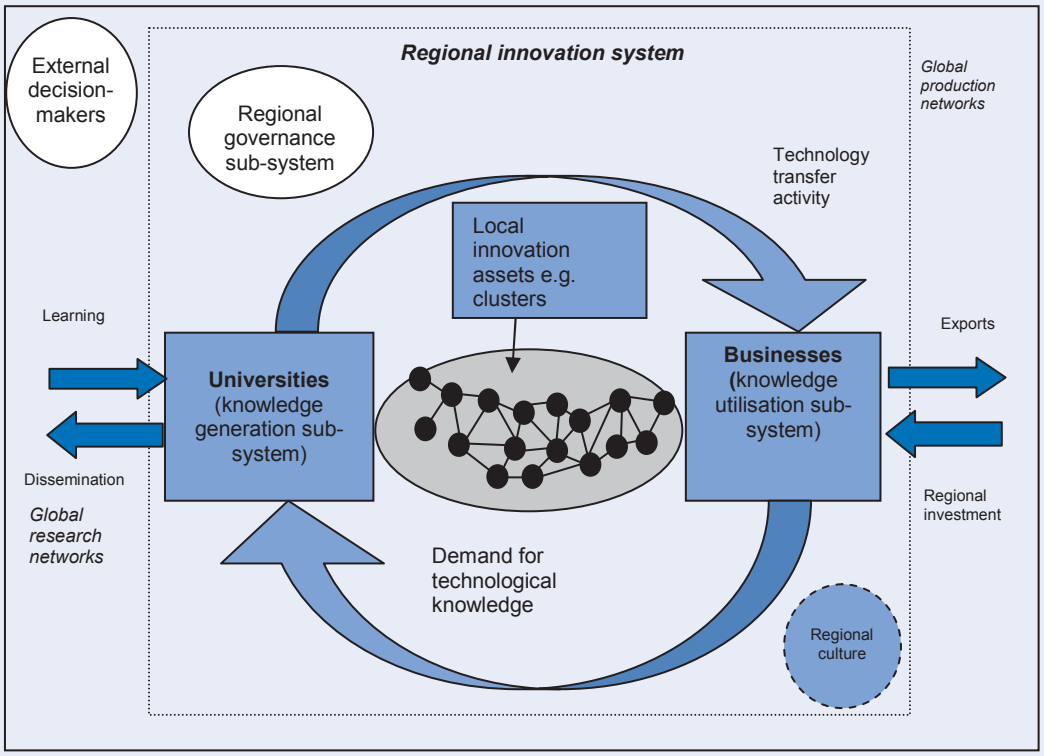
- *The region has generated important technology-based innovation assets; indicators for volume of R&D investment and patenting point to its large size. That said the region needs to use these assets more efficiently to improve its productivity growth and meet regional aspirations of being a global knowledge and technology hub.*
- *Human capital lies at the core of any innovation ecosystem, and while the region is a magnet for Midwest talent, the segment of the population with low skills along with shortages in particular skills, such as in computer science, mathematics and business administration, constitute bottlenecks that need to be fixed if the region is to optimise its innovation potential.*
- *The region's stakeholders need to identify clusters that represent potential for innovation-driven growth and make concerted efforts to capitalise on these clusters' attributes by developing and implementing cluster-specific growth strategies.*
- *The economic development approaches at the state and municipal level in the region, focused on tax breaks for large firms, are ill-adapted to a knowledge economy. Different factors to support entrepreneurship, especially related to start-ups, financing (including venture capital), and the expansion of existing small firms, are integral to the ecosystem and could be more systematically tracked with data and performance indicators that would facilitate enhanced policy support .*
- *Innovation support in the region should recognise that innovation goes beyond fundamental scientific R&D: policy support should also focus on other aspects of value creation, such as in business and financial services, architectural design (for which Chicago is world renowned), or in improving public service delivery to address social challenges. Innovation in these areas can sometimes lead to the successful pursuit of extra-regional or export-oriented market opportunities.*
- *The private and non-profit sectors are more advanced than are the federal, state and local authorities in articulating, promoting and pursuing a true, region-wide vision for innovation-led growth. Developing a common understanding of the region's innovation ecosystem, the key challenges it faces and some common goals for action, supported by more relevant regional data and performance indicators, can help guide efforts at enhancing the region's performance in innovation-driven business clusters.*
- *A public-sector culture change is required to ensure at a minimum a reduction in the "race-to-the-bottom" style of competition among local and state authorities and a more strategic focus that orients investments toward supporting the region's innovation growth drivers through greater collaboration and pooling of scarce public resources.*

The term innovation[1] is used to describe many different phenomena, from scientific discoveries to simply "thinking outside the box" through creativity and design. The OECD identifies four types of innovation in firms: the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. Such innovations are technological (product or process), as well as non-technological (marketing and organisational). Note that an innovation may have different degrees of novelty. It does not have to be new to the world; it may be new to a market/sector or simply new to the firm/institution. The OECD is considering extending guidelines for innovation measurement to public sector innovation and innovation for social goals.

The latest OECD analyses on innovation[2] reveal several trends that the Tri-State Region could bear in mind for policy action:

- ***Intangible assets and innovation beyond R&D:*** innovation results from a range of complementary assets beyond R&D, such as software, human capital and new organisational structures. Investments in these intangible assets is rising and overtaking investment in physical capital (machinery and equipment) in Finland, Sweden and the United States for example.
- ***Mixed modes of innovation:*** firm-level innovation data reveal complementary strategies. Most innovative firms introduce both product and process innovations, as well as marketing or organisational innovations. This is true for firms in both manufacturing and services. There are, of course, differences by sector and firm size. For instance, a larger share of firms in services compared to manufacturing tends to introduce marketing or organisational innovation only.
- ***Collaboration and networks are essential:*** firms that collaborate on innovation spend more on innovation than those that do not. This suggests that collaboration is likely to be undertaken to extend the scope of a project or to complement firms' competences more than to save on costs. Collaboration is used in innovation processes whether firms perform a lot, a little or no R&D. In this respect, policies that stimulate collaboration and network initiatives will have an impact on the entire spectrum of innovative firms. Higher rates of collaboration are also observed in the sciences. Production of scientific knowledge is increasingly shifting from individuals to groups, from single to multiple institutions, and from national to international arenas.
- ***Convergence of scientific fields and multi-disciplinary/interdisciplinary research:*** there is evidence that increasingly innovations are achieved through the convergence of scientific fields and technologies. For example, nano-science research has arisen from the interaction of physics and chemistry and is interdisciplinary in character. Environmental research is one example of multi-disciplinary research. This convergence requires spaces for interaction and cross-fertilisation of different knowledge domains. The concept of an *innovation ecosystem* is important: innovation is a product of the interaction between a series of public and private actors, both individual (entrepreneurs) and institutional (universities, research centres, big firms, small start-ups, governments) in a given geographic space; *innovation networks* usually sustain these linkages and extend them to related actors in other ecosystems beyond the boundary of the given geographic space (Box 3.1).

Box 3.1. **Regional Innovation Ecosystems**



Source: Benneworth, P. and A. Dassen (2011), "Strengthening Global-Local Connectivity in Regional Innovation Strategies: Implications for Regional Innovation Policy", OECD Regional Development Working Papers, 2011/01, OECD Publishing, based on Cooke, P (2005), "Regionally Asymmetric Knowledge Capabilities and Open Innovation: Exploring „Globalisation 2" – A New Model of Industry Organisation", Research Policy, Vol. 34.

The Tri-State Region's lagging growth calls for more innovation in the economy to remain globally competitive (Chapter 1). The data reveals that the Chicago Tri-State Metro-Region, like many US Metro-Regions, has higher wealth (GDP *per capita*) levels than other OECD Metro-Regions; its growth has been lagging behind both European and many US Metro-Regions pre-crisis. The same is true for labour productivity (GDP per worker) growth. And with the crisis, the regional unemployment situation has worsened in both absolute and relative terms, with the Chicago region's rate changing from below the 2009 OECD Metro-Region average to above. In the long term, for advanced-economy Metro-Regions like the Chicago Tri-State area, the most sustainable factors of growth are those that contribute to a strong knowledge economy with innovating firms.

The Tri-State Region has a number of assets to support innovation in firms but has not prioritised innovation-driven growth drivers in its policy approaches. It also is keenly aware of "recipes" that encourage innovation in the region successfully (see Box 3.2). As developed in Chapter 1, Illinois ranks well on many indicators due to its large size relative to the scale of other OECD regions, but ranks lower when considering the efficiency of those assets relative to the region's size. The region has ambitions to rival coastal regions like the Boston and San Francisco Metro-Regions for a more high-tech and entrepreneurial innovation ecosystem. But it is lagging relative to its enormous potential for a stronger knowledge economy. Global innovation dynamics are changing,

making the process more interactive and requiring new orientations for innovation support in a broad sense, and the Chicago region needs to keep up with these trends.

Box 3.2. **InnovateNow: Chicago's collaborative model to encourage innovation**

The **InnovateNow** initiative is premised on the assumption that purposeful action designed to create a culture of collaboration, build strategic alliances and fully leverage regional innovation assets will result in a competitive advantage in the twenty-first century global economy. It further assumes that firms embracing collaboration and placing value on tapping into and exploiting internal as well as external ideas, resources and channels will be more successful than those firms that do not. It recognises that the traditional inward-focused vertical integration business model is no longer sufficient to compete and win. InnovateNow further recognises that public policy and NGOs can play a role in promoting and providing incentives to encourage collaboration and overcome the limitations of traditional approaches and roles. Fostering such collaboration between public agencies, academia, nonprofits and industry is a key goal for InnovateNow, as indicated in the examples below.

The Innovation Summit: This unique collaboration among business, academia and the public and non-profit sectors was created in 2005 to create a new model for economic development in the new global economy. The Innovation Summit is held annually and convenes the world's best innovation and entrepreneurial experts to highlight best practices and the role innovation can play in transforming Chicagoland into a globally recognised centre of innovation, entrepreneurism and creativity. Presenting partners of the Innovation Summit include an array of public/private organisations drawn from three states and the District of Columbia. **Illinois Innovation Talent Pilot:** This collaborative effort seeks to prepare students to become leaders in the global economy by promoting multidisciplinary problem-solving. InnovateNow, in partnership with the Illinois Department of Commerce and Economic Opportunity, assembled a public-private coalition to work with Illinois high schools to promote innovation-centred, problem-based learning. Through this partnership, teams of Illinois high schools are connected with industry, government and community partners to critically examine and solve complex problems as members of diverse, multi-disciplinary teams using leading-edge information technology. The pilot programme included 23 high school teams partnered with 29 professional organisations, including universities and community colleges from across the state.

Illinois Coalition for Manufacturing Innovation: InnovateNow, in partnership with the Illinois Institute of Technology (IIT) and Argonne National Laboratory, launched the Illinois Coalition for Manufacturing Innovation initiative to facilitate better collaboration around innovation and technology between the research and talent in universities and national laboratories and small and medium-sized enterprises. The objective of the initiative is to create and disseminate new models for engagement and collaboration to help small and medium-sized manufacturers more easily access the brainpower and innovation resources of research institutions.

Crowd sourcing and open innovation: To demonstrate the value of open innovation, InnovateNow posted a "challenge" on InnoCentive, a leading crowd-sourcing platform, to solicit ideas to help reduce greenhouse gas emissions from automobiles by increasing ridership on public transport. Through this platform, InnovateNow was able to tap into the unlimited resources and brainpower of over 170 000 minds from around the world on an issue of great significance to Chicagoland. Individuals as far away as Kenya, Australia and Japan had opinions and useful ideas about how Chicago could decrease automobile use and greenhouse gas emissions by boosting public transportation ridership. InnovateNow was the first organisation from a major metropolitan area in the United States to post a public policy-related challenge on InnoCentive.

Source: Chicagoland Chamber of Commerce (2009), *www.chicagolandchamber.org*.

The Tri-State Region may be reaching a tipping point with respect to a failure to recognise the importance of science, technology and innovation (STI) to boosting the region's economic performance. The region has not sufficiently promoted its science, technology and innovation assets either internally or externally, notwithstanding longstanding efforts by a limited number of regional STI professionals and such recent initiatives such as the creation of the Illinois Innovation Council. But a successful innovation ecosystem has to have many strong parts that work together.

To make this ecosystem more productive there are several axes for public and private action to address. The US in general has basic framework conditions conducive to innovation and specific actions can be taken in the Tri-State Region to build on its unique combination of resources. However, the Tri-State Region includes many municipalities and crosses state borders, preventing a more concerted effort to address the factors that could drive innovation and thus productivity increases. While formal regional innovation strategies are less common in the US than in European regions, the question remains as to how much more effective the region could be with some agreed principles to align interests across different private and public (federal, state and local) actors. Such actions concern:

- Fostering human capital, the base of a strong knowledge economy;
- Building on strong research assets and promoting their access to risk-capital for regional economic benefit;
- Mobilising regional clusters of expertise to develop more strategic approaches;
- Promoting entrepreneurship from start-ups to high growth;
- Reinforcing private financing of innovation and promoting access by entrepreneurs to risk-capital; and
- Taking a broader approach to innovation: beyond science and technology.

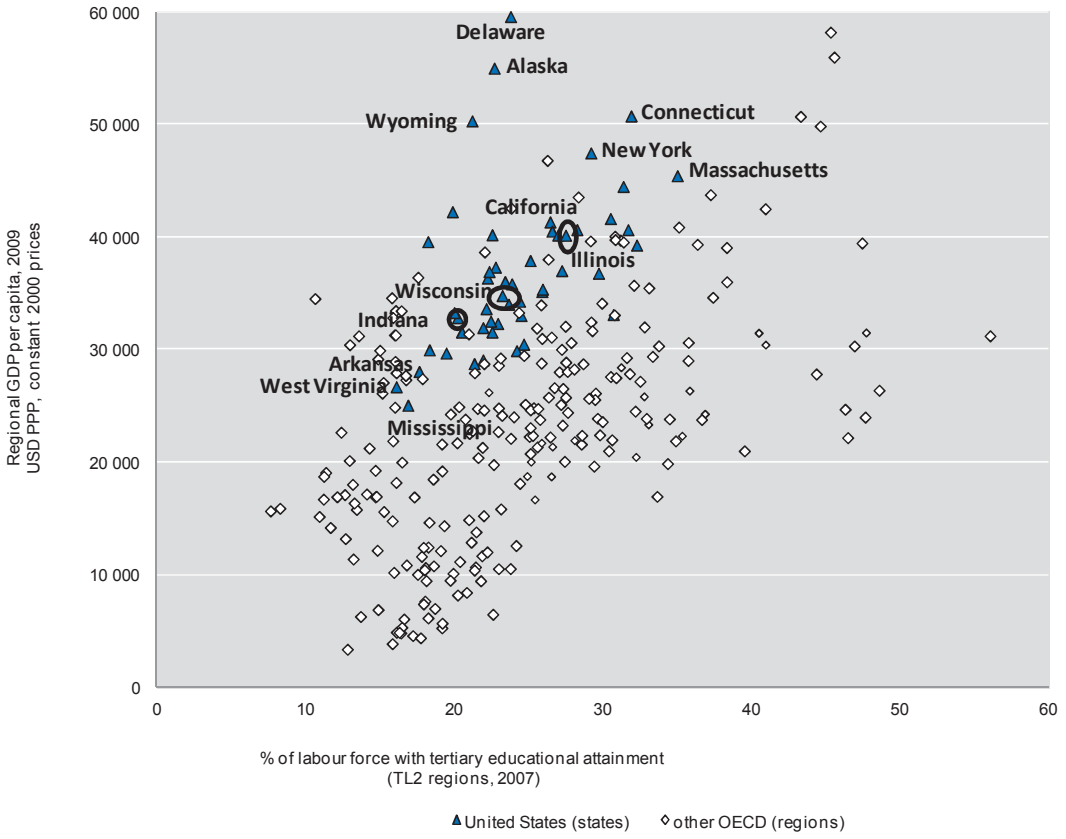
3.1. The Tri-State Region's innovation ecosystem and policies

Human capital: the basis of a strong knowledge economy

Skilled people are at the core of any innovation ecosystem, and the Tri-State Region's ecosystem does not rank among the top in the OECD. OECD analyses of regional growth illustrate that key public investments are ineffective without the presence of skilled human capital (OECD, 2009a), an issue that was also identified in the previous chapter on Workforce Development. Wealth levels of OECD regions are generally associated with a highly skilled labour force (Figure 3.1). While Illinois is performing above most OECD regions and many US states, in terms of educational attainment, it is not among the top. The share of the labour force with tertiary education (27%) places the region at only 105 out of 297 OECD regions with data (14th among US states), behind Canadian provinces such as Ontario and Quebec as well as Massachusetts, Maryland, Colorado, Vermont and Virginia among others. The other two states in the region do not perform as well: Wisconsin is ranked 126th (23.3%) and Indiana 205th (20.3%). There is a notable segment of the labour force with low-skills. In manufacturing, firms are reporting problematic skills shortages in basic math skills as the sector has grown more advanced.[3] In terms of current job ads in the region, the top positions in demand are computer and mathematical (17%), ranging from systems analysts and engineers to web developers and database managers. Other areas in high demand include Management (13% of openings), Sales

(12%), Office and Administrative Support (10%), Business and Financial (8%) and Healthcare Practitioners (7%). Among these jobs, a significant share requires some form of post-secondary education.[4]

Figure 3.1. **Virtuous relationship: wealth levels and human capital**



Note: Washington, D.C. is excluded from this graphic given its outlier status for GDP *per capita* due to commuting.

Source: Calculations based on the OECD Regional Database.

The Tri-State Region needs to be prepared with the skills for the future of advanced knowledge regional economies. The quality of education in the Tri-State Region should be a priority, a perennial challenge being the effective dispensation of basic literacy and numeracy skills through the public education system across the region. There are also gaps in STEM skills (science, technology, engineering and math), a problem for the US generally. For example, the 2009 OECD PISA results measuring the skills of 15-year-olds revealed that the US ranked rather poorly for an advanced economy, with math skills statistically significantly below the OECD average and science around the OECD average. The share of 15 year olds with math proficiency for Illinois was 31%, ranking it 31st of US states, Wisconsin with a higher share at 37% and Indiana at 35% (OECD, 2009b). And the skills for an advanced knowledge economy include thinking in new ways, such as with "decidedly different minds", even for training in STEM skills (Pace Marshall, 2011).

Building on strong research assets to generate region-wide benefits

Partnerships between universities and public labs

The Tri-State Region contains several strong research assets that can contribute to its innovation ecosystem (Table 3.1). Two private, not-for-profit universities – Northwestern University and the University of Chicago – are recognised as leading research universities, while the international conglomerate Arcelor-Mittal has located its world research headquarters in the region. A world ranking places the University of Chicago 9th and Northwestern University 29th.[5] For economics and business they are ranked 2nd and 11th in the world respectively and Northwestern is ranked 12th in engineering. Argonne National Laboratory and Fermi National Accelerator Laboratory combined accounted for approximately 6% of the US Federally Funded Research and Development Centres R&D expenditure in 2008, or around USD 825 million.[6] Argonne National Laboratory, Northwestern University and the University of Chicago accounted for 6% of patents among the top 30 patenting organisations in the Chicago Metro-Region and are therefore active in developing potential innovations.[7]

It is not clear that the Tri-State Region sufficiently promotes its different areas of technology and research excellence. While there is a wealth of research expertise within the universities, these nodes of expertise are not necessarily widely known outside of the region's academic networks. For example, the Chicago Metro-Region is the 6th largest in terms of nanotech publications from 1990-2006 (Shapira and Youtie, 2008). And the increasingly inter-disciplinary and multi-disciplinary nature of scientific discoveries requires new combinations of research competencies. Sometimes regional or national designations of excellence or research excellence are used for promotion and building on recognised strengths. Some universities, regions and countries around the OECD have directories or mappings of such research competence, which is also used in attracting firms. For example, the regions around Cambridge and Oxford in the UK worked together to develop an Innovation Research Map and a Research Excellence Directory. The Tri-State Region could better market itself to key target investor and research stakeholders by advertising its ranking results as well as its success in capturing national R&D funds as indicators of these assets.

Stakeholders in the Tri-State Region need to act more proactively to sustain inter-university strategic alliances to drive R&D. While different forms of ad hoc co-operation occur among the region's laboratories and universities, a more deliberate, strategic focus for their joint actions is needed. The University of Chicago and Northwestern University, among the region's most prominent research-intensive universities, are reported to have relatively ad hoc relationships. However, some university officials are beginning to think more strategically about regional strengths.[8] There are multiple examples of more strategic consortiums of universities in a region with the goal of creating greater critical mass together to compete for national resources and global recognition. Examples include the Georgia Research Alliance in the US, the N8 Research Partnership in the North of England, and the MaRS medical incubator in Toronto, which brings together a diversity of public and private stakeholders to spur basic and applied research and the commercialisation of its results (see box). In both cases these consortia help co-ordinate research and encourage partnering with industry to maximise the impact of the research base (OECD, 2008). The Illinois Science and Technology Coalition (ISTC) and the Wisconsin Technology Council are well placed to trigger such collaboration and act as "honest brokers" with the different universities across the Tri-State Region given that many local higher education institutions are partners in the coalitions (Box 3.3).

Table 3.1. **Leading university and federal lab research resources in the Tri-State Region**

Name	Description
Argonne National Laboratory	• Federally funded laboratory of the US Department of Energy, operated by the University of Chicago • Employs roughly 3 200 employees, 1 000 scientists and engineers (of which around 750 hold doctoral degrees) • Annual operating budget USD 630 million supports upwards of 200 research projects • Since 1990 worked with more than 600 companies and other organisations or federal agencies
Fermi National Accelerator Laboratory	• Federally funded laboratory of the US Department of Energy, operated by the Fermi Research Alliance, a joint venture of the University of Chicago and the Universities Research Association, located near Batavia, Illinois • Specialising in high-energy particle physics with particular accelerator second largest in world • 1 960 employees include about 960 physicists, engineers and computer professionals • Another 2 090 scientists and students from across the US and world carry out research in lab
Northwestern University	Private university with undergraduate and graduate education in multiple schools (business, medical, etc.) • License income 85.3 million USD (4th in US but mainly attributable to one pharmaceutical) (07) • 173 active licenses (07) • 23 start-up firms (04-07) • 11 tech transfer staff (07)
University of Chicago	Private university with undergraduate and graduate education in multiple schools (business, medical, etc.) • -License income 15.1 million USD (07) • -192 active licenses (07) • -2 start-up firms (04-07) • -22 tech transfer staff (07)
Illinois Institute of Technology	Private technological, Ph.D.-granting research university with five campuses throughout the Chicago area • -University Technology Park (including an entrepreneurship centre, incubation and office space, and wet and dry labs)
University of Illinois system	• -Main campus outside of the study region in Urbana-Champaign but a campus in Chicago • -Research parks in both locations, including Chicago Technology Park • -License income 8.1 million USD (07) • -399 active licenses (07) • -40 start-up firms (04-07) • -23 tech transfer staff (07)
University of Wisconsin / Milwaukee	• - Public university with undergraduate (83% of students) and graduate education that enrols more Wisconsin residents than any other university in state • -Stated commitment to support economic health of the state • -Research expenditures have increased from just more than USD 21 million in 1999-2000 to USD 68 million in 2009-10

Source: CMAP (2009), *Innovation Strategy Report*, using data from the annual survey of the Association of University Technology Managers (AUTM); Internet sites of institutions.

Box 3.3. **Science and technology coalitions in the Tri-State region**

The Illinois Science and Technology Coalition (ISTC)

ISTC is a membership organisation aiming at cultivating economic development in Illinois by increasing resources for R&D initiatives at Illinois-based businesses and institutions (including the University of Illinois at Urbana-Champaign, University of Illinois at Chicago, University of Chicago, Northwestern University, Northern Illinois University, and Argonne and Fermi National Laboratories). Its mission is (a) to foster public private partnerships to execute research and development projects, (b) to advocate for funding for R&D initiatives and (c) to collaborate with public and private partners to attract and retain research resources and talents in Illinois. Its current priorities include biotechnology and life sciences, energy and energy storage, food innovation and nanotechnology. With the support of ISTC, its partner research institutes and businesses collaborate with the international R&D community to advance science and discover new technologies that have applications far beyond Illinois' borders. ISTC is the administrative home of the Illinois Innovation Council, an advisory group of leaders convened by Governor Pat Quinn to promote engagement, innovation, and economic development in Illinois. The Council convenes and partners with academic, industry and policy leaders to improve support for innovation, align public and private resources and attract innovation-driven enterprises and individuals to Illinois in order to grow existing industry clusters.

Indiana's BioCrossroads, Conexus, and Energy Systems Networks

These three Indiana-based organisations have common origins and are examples of strong public-private coalitions designed to stimulate economic development in three different "sectors", focusing heavily on research, science and innovation. Indiana's three major research universities (Purdue, Notre Dame, and Indiana University) are heavily involved in one or more of these three cluster-based initiatives.

BioCrossroads serves as a catalyst for the continued growth of Indiana's robust life sciences industry (*http://www.biocrossroads.com/*). Functions include providing funding, launching new businesses or products, and partnering with research institutions, global companies, philanthropic organisations and government. Indiana has a strong base upon which to build as it is home to 825 companies and more than 50,000 life science workers as places like the global headquarters for Eli Lily and Company, WellPoint, Cook Medical, DePuy Orthopaedics, Dow AgroSciences, Zimmer, Bioment; and also serves as the North American headquarters for Roche Diagnostics.

Conexus Indiana is the catalyst to position Indiana as the recognised global leader in advanced manufacturing and logistics (*http://www.conexusindiana.com/).* Indiana has long been labelled as "The Crossroads of America" and has been seen as a national leader in the manufacturing sector, recognising that manufacturing is rapidly evolving as a high tech, innovation-driven industry that has led to an explosive growth in productivity. Conexus Indiana is designed to capitalise on emerging opportunities in advanced manufacturing and logistics, aligning resources and expertise to make Indiana a leader in these exciting industries.

Energy Systems Network (ESN) is an initiative focused on bringing 'clean technology' solutions to market, using innovation to confront tremendous energy challenges that include an overdependence on foreign oil, rising carbon emissions, and the need for a more energy efficient electrical grid (*http://www.energysystemsnetwork.com/*). The mission of ESN is to build an energy ecosystem that connects partner companies and institutions – in Indiana, across the country and around the world – to address energy needs and generate new jobs and investment in the process. ESN provides development and co-ordination for collaborative projects and joint ventures between network members who are working to commercialise new energy technologies.

Box 3.3. **Science and technology coalitions in the Tri-State region** *(cont.)*

The Wisconsin Technology Council

The Wisconsin Technology Council is the science and technology advisor to the Governor and the Legislature. Launched in 2001 and created by state statute, the Tech Council is an independent, non-profit and non-partisan board with members from tech companies, venture capital firms, all levels of education, research institutions, government and law. The Tech Council has three main functions:

1. It provides policy guidance to lawmakers, the governor, state agencies and other institutions in Wisconsin.
2. It serves an important in-state networking role through Wisconsin Innovation Network (WIN), a community-based organisation dedicated to fostering innovation and entrepreneurship.
3. It serves as an economic catalyst through programmes such as:
   - Wisconsin Innovation Network (WIN), community-based organisation dedicated to fostering innovation and entrepreneurship.
   - Wisconsin Entrepreneurs' Conference A programme focused on stimulating more entrepreneurial activity in Wisconsin across all segments of our economy.
   - Wisconsin Early Stage Symposium Open to technology companies seeking all capital.

Source: *http://istcoalition.org; www.wisconsintechnologycouncil.com.*

Box 3.4. **MaRS Toronto**

Toronto's MaRS incubator, standing for Medical and Related Sciences, is not only a successful example of an effort to link commercial success, economic growth and jobs to high quality basic research, it is a good model of a diverse stakeholder approach to achieving those goals.

Historically, Toronto has had a strong level of basic science research, particularly in medical-related areas. In Canada, governments typically fund basic science research through various research councils and grants. Toronto's several downtown teaching hospitals and the University of Toronto all have enviable international reputations in basic research. Toronto is also a major financial services centre, and home to a significant pharmaceutical industry. Yet these strengths did not lead to strength in the commercialisation of basic medical and pharmaceutical research.

As a result, a number of stakeholders – civic leaders, the University of Toronto, the major teaching hospitals such as Mt Sinai, Toronto General and Sick Children's, and private sector business people, (many of whom traditionally were rivals) raised initial funds and then approached the Federal, Provincial, City governments to establish an incubator to help generate social and economic prosperity through innovation. Opened in 2005, the project has been overwhelmingly successful. Everything a start-up needs – from lab space too expensive for any one start-up to build, to venture capital, to legal and patent advice – is available under one roof. MaRS has now incorporated a green lens with its new Tower Labs (supporting technological innovation in the construction and retrofitting of high rise buildings, and other Green initiatives).

The region's universities need to pay greater attention to the educational needs of the metropolitan workforce. Universities serve multiple needed roles in supporting the innovation ecosystem: teaching (the primary mission), research and a third mission of

economic development. Setting strategic objectives in pursuit of these other missions is important, but these objectives should be defined as a function of the primary mission – the education of the future labour force (SSTI, 2006). In terms of the teaching mission, the region has several universities that attract from the local area but also nationally and internationally. The total share of students in tertiary education as a share of the Illinois population is 7.41%, ranking it rather high among OECD regions (26 out of 331 regions). However, the overall share of the working age population with tertiary education is not among the top. In addition to mechanisms that link student curricula to regional industrial needs, there are also opportunities for greater placement of students and recent graduates into local firms to support innovation. One of the best-known programmes internationally is the Knowledge Transfer Partnership programme of the UK's Technology Strategy Board, whose mandate is to map recent graduates against job vacancies in key technology clusters across the UK. In the US a good example of an effective economic development focus can be found in Pittsburgh: Carnegie Mellon, Pittsburgh and Duquesne universities worked effectively with local leadership to develop a comprehensive set of initiatives aimed at redeveloping parts of the Pittsburgh Metropolitan Region.

Many countries and regions promote the placement of highly skilled workers, particularly PhDs, into small and medium-sized enterprises (SMEs) to improve their innovation capacity.[9] While there are no formal programmes at present to finance such placements in the Tri-State Region, different existing programmes could consider looking into opportunities for greater matchmaking between skilled graduates and regional firms. The universities themselves as well as private organisations may play this role in the absence of a publicly funded programme, albeit in many international examples public funding helps subsidise the placement in SMEs for a period of time.

The Tri-State Region's universities need to be more proactive and deliberate in combining these three missions and building strategic partnerships with other players in the region, such as laboratories and key firms, to extend their reach, whether domestically or internationally. The third mission of universities, namely economic development, generally tends to over-shadow the pursuit by the Tri-State Region's regional universities and engineering schools of the other two missions when compared to the global research leaders in the Tri-State Region. While world leading universities tend to focus on integrating all three missions into strategies that seek global reach, institutions that have a regional focus tend to be more active in pursuing local development partnerships (OECD, 2007a). This approach has focused on community development as a means to demonstrate that the university is a "good neighbour" through projects and research that address local (often social) challenges. This is hardly surprising, given that this type of local initiative is truly a function of the school's physical location in a neighbourhood. Since physical proximity seems to drive these relationships, economic development initiatives driven by these universities tends to focus on social issues in their neighbourhoods, given the university's responsibility for the safety of their faculty, staff and students. In the Tri-State Region, regional universities have made a significant commitment to local economic development in their respective sub-regions.

However, this "local" approach to economic development is evolving. The recognition of the value of a broader economic development mission has been gaining ground. The active involvement of the universities in different regionally based committees and councils represents one mechanism that has been adopted to link more convincingly the research-intensive universities with region-wide initiatives that can be marketed nationally and abroad, often garnering international recognition for the members of the partnership. Other incentives could be provided for universities and

national public laboratories in the Tri-State Region to engage regionally, a consideration for future public, private or non-profit initiatives seeking to promote regional economic development.

A number of more regional or applied universities are actively promoting this third mission in the Tri-State Region. Universities like the University of Illinois at Chicago, Northern Illinois University, as well as more local private universities such as DePaul, Roosevelt and Loyola, all have more explicit regional engagement missions and more applied academic programmes help match curricula and research towards regional needs. In the 21-county Tri-State area, the Universities of Wisconsin at Milwaukee and Parkside, Marquette University, the Milwaukee School of Engineering, Valparaiso University, the University of Notre Dame's Chicago operations, University of Indiana-Northwest and Purdue University-Calumet are also notable assets. Illinois recently signed into legislation the Higher Education Technology Entrepreneur Center Act that allows its public universities and community colleges to start such centres, albeit the centres would need to be funded. And the Illinois Institute of Technology, given the direct relevance of its research for firms, is also a key component of the regional system.[10]

The role of intermediaries or "brokers" in optimising research results

Tri-State Region universities are promoting patenting, licensing and start-ups, but the potential impact of such efforts on the regional (and the national) economy can be limited. In many OECD regions, there is an over-emphasis on the measures of success for universities in terms of patents, licensing and start-ups, as well as the resources dedicated to supporting such initiatives. However, these are the indicators by which many university technology transfer offices are evaluated. Often university spin-offs do not grow because the researchers involved do not have the requisite skills and network access to drive commercialisation of research results. And licensing revenues can be like a lottery, with an extremely low share making considerable revenues. Northwestern University's 4th ranked licensing revenues among US universities (2007 data) are mainly attributable to one blockbuster drug, Lyrica. At the University of Chicago, one drug under development ultimately failed a Phase III trial two decades later.[11] The highly variable potential results of these efforts do not guarantee a strong contribution to the regional economy.

Greater efforts should be pursued by universities, laboratories and other key stakeholders in the region to create and support common strategies and activities in a region-wide collaboration on innovation and entrepreneurship. The aim is to achieve greater region-wide effectiveness and to maximise the potential for national and international market penetration of the goods and services that result from effective technology-transfer processes. Indeed research oriented towards commercial application or regional business needs can provide greater potential economic benefits to the region, sometimes with national and even international implications. Technology developed of direct relevance to regional firms is more likely to be used than the occasional win for a high-technology (often in biotech) discovery.

One local report proposes a possible consolidation of university technology transfer offices for greater effectiveness across the region's public laboratories and universities (CMAP, 2009). Whether this specific recommendation is feasible at this time is questionable. However, new models for effective collaboration among university technology transfer offices should be explored. One possible model of such a consortium that could be of interest to regional stakeholders is Springboard Atlantic, a network to support the commercialisation of research in Atlantic Canada that includes fourteen

member universities and five provincial community colleges.[12] By pooling resources, this organisation is able to provide higher quality services at lower cost than if each institution had its own technology transfer office. These are the same principles behind a local example. The Northern Illinois Technology Enterprise Center (NITEC), while based at Northern Illinois University, also supports commercialisation and growth of technology-based enterprises in other local universities and research institutions (including e.g. College of Dupage, DuPage tech-park and IIT). NITEC should investigate the possibility to link with other University technology-transfer offices in the Metro-Region and not only those of technology universities; efforts should be made by the relevant public stakeholders to support such links.

A handful of Science and Technology (S&T) parks in the Tri-State Region support, to a certain extent, the region's innovation ecosystem. The Illinois Science and Technology Park located north of Chicago has a focus on life sciences. The Dupage National Technology Park in West Chicago has considerable space for firms, as does the Purdue Northwest Indiana Technology Center in northwest Indiana. The Chicago Technology Park (on the Chicago campus of the University of Illinois) and the University Technology Park (at IIT) appear to have more services for supporting incubation than the other parks given their university affiliation. Purdue University operates three S&T parks in the Tri-State Region in addition to its tech centre, including the largest one in the country. However, when firms based at these more space-limited university-based parks reach a stage to "graduate" from the parks, there may not be sufficient alternatives (CMAP, 2009). Indeed, the success of science and technology parks is about more than the physical infrastructure. There have been several generations of S&T parks across OECD regions, with the new generation accenting the combination of soft and hard infrastructure. Therefore it will be important that services to link start-up firms to relevant programmes as well as matchmaking services, which may be funded by the park or other sources, accompany such hard infrastructure investments (OECD, 2011a). In this context, key private and public stakeholders, including the chambers of commerce, municipal and county administrations and State agents responsible for innovation policy should undertake a review of incubation services in the Metro-Region to identify the opportunities for developing them and develop ways to address unmet needs in this area across the region.

Private-sector intermediary organisations or "brokers" that help articulate research expertise and business needs are critical for maximising regional "ecosystem" linkages. The most effective brokers often come from the ranks of business service professionals—individuals who have strong networks and relationships among inventors, transformers, and financiers. Economic development practitioners are less likely to play the broker role because they are expected to provide marketing, recruitment, information collection, technical assistance, or other services. Brokers act as facilitators; they help identify current and potential sources of innovation in a region. They help connect innovators to other key actors in the innovation ecosystem often by facilitating collaboration, thereby contributing to the acceleration and expansion of innovation activity in the region. In the Tri-State Region, key institutional players, whether in the universities or the private sector, should seek to identify and maximise the type and role of innovation brokers to enhance innovation capacity in priority business clusters region-wide.

Mobilising the region's clusters of expertise

Conditions for job creation and innovation improve when there is a strong cluster of linked competencies in firms, universities, the workforce, and other related actors. While

the use of the term "cluster" is subject to debate, the general concept of building on different regional assets and making them work better together is not (OECD, 2007b). The efforts to support these groups, commonly referred to as a cluster initiatives or a cluster organisation if there is a specific entity, help to articulate the needs for such clusters of expertise to grow through more strategic private and public efforts.[13]

Key stakeholders in the region could consider adapting current partnerships that have led to successes in innovation in certain business clusters to other, emerging sectors of activity to maximise innovation potential in these sectors A few partnership initiatives have formed to capitalise on clusters of expertise in the Tri-State Region that can support innovation success (Box 3.3). The Illinois Biotechnology Industry Association (iBIO), for example, has focused on an area of regional strength and seeks to build critical mass in traditional biotech as well as linking with agriculture – a strength in the Midwest. The Illinois Technology Association supports the technology base of the region, particularly the IT-related sectors "that make the technology that makes businesses run." In addition to its networking role, it has supported an incubator for technology-based firms (102 firms over four years thus far).

The Tri-State Region has not traditionally had the reputation of being a technology hot spot as its typically business-to-business oriented IT assets tend not to be viewed as key, although more attention is being paid to the region's IT base (Box 3.5). A couple cluster organisations, such as the Milwaukee Water Council and the Clean Energy Trust, are both very new and were not identified based on a cluster mapping but rather recognition of assets and opportunities. The Milwaukee Water Council, for example, grew out of a regional champion and vision, despite a consulting firm reporting to the contrary, believing that it had significant water related assets.[14] Key players in these new business clusters and other emerging ones should build on the successes in the region's biotech and IT sectors to drive the region's partnership-driven innovation capacity. Given the strategic importance of these emerging clusters to green growth, the impact of such innovation could be national and global, as well as regional, over the longer term.

As a global hub for firm headquarters, the Tri-State Region's different advanced business services are of tremendous potential for supporting innovation yet are incomplete in terms of the research functions required to drive innovation in the region. For example, Boeing moved its corporate headquarters to Chicago. However, the research and production-related staff remain in their original location, resulting in more limited impacts on the Tri-State Region's innovation system. The region therefore needs to consider not only the global headquarters functions in its firm attraction strategy, but also those business functions that are best suited to drive innovation and the commercialisation of the results of this innovation. The case of Airbus industries in Europe might be worth considering. Even if its components plants are relatively scattered throughout the main partner-countries, some of its main business and R&D functions are located in Toulouse (France) along with the company's main headquarters that were transferred from Paris. The City of Toulouse has also succeeded in attracting complementary institutions and companies e.g. the National Center for Space Activities or the Spot (satellite) Company.

As the needs of each cluster will vary, further analysis is required. There are significant variations in the nature of technologies or innovations, product lifecycles, skills gaps and other factors that are cluster specific. Only through the identification by cluster actors themselves and associated studies can more clear recommendations be addressed by the cluster members themselves or through public policy efforts. The

recommendations by both the Chicago Metropolitan Agency for Planning (CMAP), in its *GoTo2040* report and others such as The Chicago Metropolis Strategies to further explore cluster needs are important for taking different components of the innovation system to the next level. The Oregon Cluster Plan, emphasising as it does the need to meet cluster demand, could be a useful benchmark here.

Box 3.5. **Industry/cluster organisations in the Tri-State Region**

Illinois Biotechnology Industry Association: iBIO, has a mission is to make Illinois and the surrounding Midwest one of the world's top life sciences centres. It does so through public policy advocacy, business connections (such as supporting venture capital and angel investor opportunities), group purchasing (helping particularly small and midcap funds), and special programmes to help firms (such as iBIO PROPEL that is a series of programmes to support life sciences start-ups and existing companies).

Illinois Technology Association: ITA is a 700+ membership organisation of firms "that make the technology that make businesses run." While it covers a range of sectors, its core constituency appears to be IT-related firms that are focused on technology for business-to-business needs.

Milwaukee Water Council: Founded in 2009, the Council seeks to align the regional fresh water research community and water-related industries to establish the Milwaukee 7 Region as the World Water Hub for water research, economic development, and education. It includes several committees (Talent/Education, Corporate-University Linkages, Global Communications, Policy Economic Development, International and Water Stewardship).

Clean Energy Trust: Launched in 2010, with support from the private sector and the US Department of Energy, it offers business development support to clean energy start-ups for commercialisation and market growth and possibly financial assistance (renewable energy, energy efficiency, smart grid and energy monitoring/controls and next generation transport). It also has a broader mission of education and advocacy related to the adoption and advancement of clean energy technology.

Source: *http://www.illinoistech.org/, http://www.thewatercouncil.com/, http://www.cleanenergytrust.org/, http://www.ibio.org./.*

Tri-State Region's is much broader than the above clusters and innovation is also relevant for the rest of the economy. While some are more explicitly research and technology-based and should be promoted, one cannot neglect the vast share of the economy in the region that is not R&D-driven but that generates significant value-added and jobs and ought therefore to be addressed through broader approaches to innovation. Even small increases in the productivity levels in the largest sectors in the economy could significantly impact the region's economic performance. In addition, important spillovers occur between clusters that should be tracked when developing policy to support innovation capacity: for instance, the region is a significant air and ground passenger transportation hub; this spurred the creation of the internet-based travel company Orbitz. Founded by several of the region's airlines, Orbitz was launched in Chicago due in part to the existence of a hub of such international importance in the region.

Entrepreneurship: key to innovation-driven high-growth potential

The Tri-State Region's economy is shifting towards a smaller firm size, and the challenge will be for such firms to grow to the next stage with critical mass to invest in innovation. In 1999, only 21% of the region's labour force was in firms of fewer than ten employees or self-employed, 36% in key, "second-stage" firms from 10-99 employees, and 43% in firms with 100+ employees. Over the following decade, the absolute and relative share of employment in these small firms has grown (to 31%) while those in firms over 100 has declined (to 34% of employment) (Figure 3.1). Therefore it is small and "second-stage" firms, and the self-employed, that have generated around 440 000 jobs over the period while medium and large-sized firms (over 100 employees), have shed around 375 000 jobs.

Table 3.2. **Employment shifting to smaller-sized firms in the 21-county region**

Establishments	2007	2008	Opened	Closed	Net Opened	Expanded	Contracted	Net Expanded	Move In	Move Out	Net Moved In
Total	668 330	719 839	80 094	28 327	51 767	26 726	5 668	21 058	2 705	2 973	-268
Non-commercial	39 729	41 516	2 934	1 211	1 723	1 656	343	1 313	97	100	-3
Non-resident	31 571	30 544	641	2 358	-1 717	509	378	131	170	169	1
Resident	597 030	647 779	76 519	24 758	51 761	24 561	4 947	19 614	2 438	2 704	-266
Self employed (1)	191 571	211 305	39 009	8 159	30 850	12 792	0	12 792	652	862	-210
Stage 1 (2-9)	334 254	366 373	36 757	14 058	22 699	10 632	3 941	6 691	1 326	1 431	-105
Stage 2 (10-99)	65 980	65 088	727	2 346	-1 619	1 011	850	161	416	372	44
Stage 3 (100-499)	4 607	4 422	23	171	-148	106	131	-25	38	34	4
Stage 4 (500+)	618	591	3	24	-21	20	25	-5	6	5	1
Jobs	**2007**	**2008**	**Opened**	**Closed**	**Net Opened**	**Expanded**	**Contracted**	**Net Expanded**	**Move In**	**Move Out**	**Net Moved In**
Total	6 431 545	6 396 718	185 385	275 291	-89 906	127 181	81 683	45 498	43 448	33 905	9 543
Non-commercial	856 410	855 423	9 950	15 075	-5 125	7 783	4 283	3 500	723	540	183
Non-resident	1 221 885	1 171 442	25 650	90 285	-64 635	16 187	32 827	-16 640	8 124	7 103	1 021
Resident	4 353 250	4 369 853	149 785	169 931	-20 146	103 211	44 573	58 638	34 601	26 262	8 339
Self employed (1)	191 571	211 305	39 009	8 159	30 850	20 906	0	20 906	652	862	-210
Stage 1 (2-9)	1 050 560	1 126 624	84 774	42,428	42 346	40 510	5 775	34 735	4 693	4 848	-155
Stage 2 (10-99)	1 593 281	1 572 439	18 210	56,095	-37 885	25 381	8 731	16 650	10 532	8 907	1 625
Stage 3 (100-499)	796 912	763 300	4 742	28 339	-23 597	9 744	11 589	-1 845	6 195	5 873	322
Stage 4 (500+)	720 926	696 185	3 050	34 910	-31 860	6 670	18 478	-11 808	12 529	5 772	6 757

Source: *Youreconomy.org* based on NETS database, Edward Lowe Foundation.

Fiscal incentives to large firms do not work

While there are several examples of entrepreneurship support programmes, the most visible public to support firm growth in the region are tax incentives for large firms. Federal, state and local programmes for SME support and entrepreneurship in general are accessible in the Tri-State Region, including through universities and specialised centres, as well as those managed by local private initiatives (Box 3.6). However, much of the effort for supporting firms is actually oriented to large firms through tax incentives at both state and municipal level, with a limited focus on entrepreneurs who are actually driving innovation. As one prominent local financier has noted, efforts have been focused on attracting corporate headquarters instead of helping "the guy who's tinkering around in the garage."[15] Therefore consideration should be given conducting a thorough cost-benefit analysis of the impact of public expenditure (and foregone tax revenues) on innovation and job-creation in the region generated by such expenditures.

Some high profile cases of locally educated entrepreneurs who have left the Chicago region have begun to raise awareness about regional conditions for entrepreneurs. Founders of several famous internet firms such as Netscape, Paypal and YouTube studied at the University of Illinois but founded their companies in California where there was greater access to talent, capital, and other environmental factors conducive to internet-based high-tech start-ups. A co-founder of YouTube, a graduate of the Illinois Math and Science Academy as well as the University of Illinois, has indicated that the region does not have a sufficiently attractive environment for new technology investment.[16]

Box 3.6. **Examples of local innovation and entrepreneurship initiatives in the Tri-State Region**

Chicagoland Entrepreneurship Center: The CEC was created in 1999 by the Chicagoland Chamber of Commerce in response to studies commissioned by the Commercial Club of Chicago and the Mayor's Council of Technology Advisors and prepared by McKinsey & Co. and the Metropolis Project. The studies determined that there were many supportive agencies for entrepreneurs, but most had a narrow focus that didn't allow for the type of comprehensive guidance high-growth businesses often require. It identifies the region's most promising entrepreneurs and helps them build high-growth, sustainable businesses that serve as platforms for economic development and civic leadership for the Chicago area. In turn, CEC clients mentor young talent, advising their peers, and joining the CEC "movement" to inspire entrepreneurship in the Chicago region. The CEC is funded through private entities and corporations, as well as government grants. It is also supported by numerous budding and successful entrepreneurs, established businesses and academia.

The Kellogg School of Management, Northwestern University: The Center for Research in Technology and Innovation (CRTI) pursues academic research of relevance for innovation managers, notably concerning the role of technology. The centre and its faculty are engaged in collaborative research with many multi-national firms. The Kellogg Technology Strategy Summit (KTSS) are forums for firm executives for discussion that informs CRTI research.

The **Kellogg Innovation Network (KIN)**, founded in 2003, is a global community of innovation and growth leaders. The core members represent large, established corporations, though since 2009 the KIN has expanded to include leaders from non-profits, government, academia, defence and the arts. The mission of the KIN is to enhance its members' capabilities and professional networks to help them build prosperity through innovation. In 2011, the KIN initiated a KIN ASEAN for the southeast Asian region, a KIN Nordics for the Nordic countries and KIN Natural Resources for the global mining industry. Over the next few years, these informal groups will develop their own regular programming, with everyone congregating at the Kellogg School each May at KIN Global.

Box 3.6. **Examples of local innovation and entrepreneurship initiatives in the Tri-State Region** *(cont.)*

The **Wisconsin Angel Network** (WAN)'s mission is to build angel network capital capacity throughout Wisconsin in order to increase the number and amount of seed-stage equity investments in Wisconsin companies, creating jobs and improving our economy. The ***Wisconsin Entrepreneurs Network*** provides entrepreneurs with access to a state-wide network of resources and expertise, identifies high-potential entrepreneurs and helps move their businesses forward, facilitates collaboration between entrepreneurs and between organisations that assist entrepreneurs, and helps create and grow minority-owned businesses.

The Wisconsin Entrepreneurs Network provides entrepreneurs with access to a state-wide network of resources and expertise, identifies high-potential entrepreneurs and helps move their businesses forward, facilitates collaboration between entrepreneurs and between organisations that assist entrepreneurs, and helps create and grow minority-owned businesses.

The mission of BizStarts Milwaukee is to create a vibrant, innovative and prosperous entrepreneurial business climate in the Milwaukee 7 region by inspiring, nurturing, connecting and celebrating entrepreneurs and their companies.

The **Wisconsin Security Research Consortium** of research institutions in Wisconsin is dedicated to delivering world-class science and technology solutions in response to our nation's homeland security requirements.

BioForward is the member-driven state association that is the voice of Wisconsin's bioscience industry. The association focuses on creating investment and partnership opportunities, attracting and retaining talent and supporting public policy that fosters continued growth.

Source: www.wisconsinbiotech.org; http://www.innovatenow.us; http://www.kellogg.northwestern.edu/research/crti/kin/; http://www.chicagolandec.org/.

Family-owned firms: the next level

The region's manufacturing sector has a significant family-owned component of SMEs that requires tailored strategies to move these enterprises to the next level of productivity and market reach. OECD research has shown that greater economic impacts may be found by helping existing SMEs as opposed to focusing on start-ups. The OECD and others have found that many high-growth SMEs are not necessarily high-tech pioneers, but have been able to incorporate existing technology or business models quickly for innovation with commercial benefit (OECD, 2010b). In the U.S., data show that 1% of firms with high growth are responsible for around 40% of new jobs (Stangler, 2010). Another entrepreneurship issue for the region is the transition planning for family-owned firms, such as in manufacturing that could grow but suffer from weaknesses in management and succession. In a survey of 1 100 member manufacturing firms in the area, the average company was around 50 years old, family owned, had 47 employees, USD 10 million in sales, and only exported 4% internationally.

Private financing of innovation

In the Tri-State Region, access to venture capital by start-ups and SMEs is significantly hampered, notwithstanding the fact that the region is an important national banking centre. Venture capital (VC) is among the private financing sources commonly used to measure the dynamism of an innovation system. Funds tend to be sector based and require a critical mass of companies and skilled talent. VC funds also rely on tight

networks for providing more than financial support.[17] This is why the flow of private VC funds is highly skewed in any national context to a limited number of higher-technology firms for expansionary capital. It is therefore not a financing source for most high-growth firms. Firms in the Tri-State Region are reporting that they are being asked by VC funds to move to the coast to receive funds, and that funds for start-ups and major investments are more readily available than for the middle range of VC investments.[18]

Indeed, in the Tri-State Region, while research universities conduct more than USD 1 billion annually in basic research, innovative firms face a "Valley of Death" syndrome, meaning that entrepreneurs cannot seem to obtain financing to move their invention to a stage where it can be produced and commercialised. As a result, inventions in the region sometimes "wither on the vine".[19] While Illinois is ranked 5th in the US in 2010 for volume of VC, due in large part to investments in Groupon that year, it remains far behind the coastal hotspots. Illinois investments were approximately USD 732 million (Figure 3.2) California raised 16-fold the level of investments of Illinois, and Massachusetts over 3-fold. When considering the volume relative to population, even just taking the Chicago Metro-Region population, those rates for California and Massachusetts are still five-fold and four-fold higher relative to the figure for Illinois.[20] Illinois investments covered a range of industries, 34% biotech, 19% industrial/energy, 18% business products and services, 16% telecom, 7% software, and 6% other sectors. Three-fourths of the funds invested in Illinois companies actually came from funds located outside of the state (16% California, 7% New York, 6% Texas, 3% Massachusetts, and 44% other). While the amounts for the other two states may not flow to the Chicago region of this study, it should be noted that Wisconsin ranked 21st at USD 122 million, 76% to biotech and 95% coming from outside the state. Indiana ranked 23rd with USD 80 million (mainly to the computers & peripherals, software, and media & entertainment sectors, with half of the investments coming from California-based funds and 25% from funds based in other Midwestern states).[21]

The Tri-State Region could also generate greater economic benefit from these venture capital investments by developing and implementing strategies to commercialise the results of VC-funded R&D, thereby creating more jobs through start-ups, spin-offs and tech-transfer schemes in the region. A joint study by the National Venture Capital Association and HIS Global Insight found that Illinois ranked 13th for jobs and revenues for Illinois-registered venture capital backed firms, yet it was 5th for overall volume of fund receipt. This implies a greater potential economic impact of such investments than currently achieved.[22] Wisconsin ranked 25th in jobs and 24th in revenues (versus 21st for volume) and Indiana 19th in jobs and 17th in revenues for venture-backed companies headquartered in the state (versus 23rd for volume). In comparison, other states ranked lower than Illinois for volume but higher for impact include: Washington State (6th for volume yet 4th for jobs and 2nd for revenues) and Pennsylvania (7th for volume but 3rd for jobs and 4th for revenues).

Financial support for innovation in firms comes mainly from private sources, but there are some possible public levers with respect to venture and angel capital. For example, state and even large local governments in the Tri-State Region may supply capital (through its own fund or as a fund of funds via equity or loans, generally for seed and start-up needs as opposed to expansion), give incentives or regulations to encourage venture capital investment (including tax incentives – including investment (including tax incentives – including investment tax credits of the kind explored by Wisconsin, and guarantees, tax credits of the kind explored by Wisconsin, and guarantees, allowing new actors to invest in VC), or provide other services (organise events to link venture capital

funds to firms, provide services to aid firms in becoming venture capital ready, etc) (OECD 1997). The recently renewed authorising legislation for the Technology Development Account in Illinois allows the state to invest up to 2% of its portfolio in venture capital funds.[23] Illinois has ceased matching support for the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programmes (while Indiana continues to do so), yet such funds serve as early stage capital innovation finance where venture capital funds may not invest. As angel capital networks rely more on local information and trust than venture capital, there is even greater scope for filling information gaps through such localised networks that include linkages with technology incubators, public/university spinoffs and national networks. For example, in regions where VC funds are less likely to seek investment opportunities, the City of Ottawa (Canada) organised visits for venture capital funds located elsewhere to meet the region's local ITC firms. The Tri-State Region could therefore consider adopting some of these approaches to enhance the supply of venture capital.

While venture capital is important for firm growth, there are many other forms of investment in innovation that could be further developed in the Tri-State Region such as investments in skills, management practices and external R&D absorption capacity by firms. While there was USD 260 million venture capital invested in Illinois in 2005, R&D spending by private firms that year totalled USD 9.7 billion (37 times more) in addition to the USD 2.8 billion in public/non-profit R&D spending. Furthermore, many innovations are generated without R&D so these values under-estimate the total of firm-level innovation investments. One study shows that around 75% of innovations in the United Kingdom derive from investments in activities other than traditional R&D investments, including investments in skills, organisational innovations and design (NESTA, 2009). Therefore public or private efforts that seek to influence firm spending on innovation should not be focused solely on R&D. The goal of public spending is to have a leverage effect on private spending on innovation in its different forms.

3.2. Broaden the innovation focus

Non-science-and-technology-based innovation

In the context of its innovation efforts from public and private actors, the Tri-State Region can also promote innovation policies that go beyond science and technology. For example, 77% of the economy is in service sectors. The Tri-State Region has been a long-time innovator in the financial services sector. The Chicago Board of Trade (now part of Chicago Mercantile Exchange Group) began in 1848 as the first futures and options exchange in the world. The Tri-State Region is also a global hub for knowledge-intensive business services such as transportation and logistics, legal, consulting, accounting and advertising industries where innovation is important. The Tri-State Region has strong cultural industries as well as architecture that buttress a thriving creative sector. Other OECD regions have made active efforts to promote their design capacities, along with the linkages between design and local firms, through cluster associations, specialised centres, financing incentives for firms, and other means (Box 3.7). Chicago has a strong foundation in the discipline of design. The Illinois Institute of Technology's Institute of Design, established in 1937 as the New Bauhaus, is the largest full-time graduate design programme in the United States. Private sector design and innovation firms founded in Chicago, such as Gravity Tank and Doblin, have led the way in helping global clients grow through boosting design and innovation capacity. Other firms not founded in Chicago but with offices in Chicago, like IDEO, provide additional depth in the design community.

Box 3.7. **Non-traditional forms of innovation support**

Beyond the different tools to promote innovation via R&D spending and technology transfer, newer forms of innovation support are being promoted at national and regional level in OECD countries, including those regions with a strong industrial tradition.

Building on creative sectors: Baden-Württemberg in Germany has recognised for over 15 years that there are important synergies between culture and the creative industries with its technology base. The agency created by the region is focused on linking the IT, software and telecommunications sector with the creative industries.

Using design: As innovation through design can result in significant commercial value, there are many programmes to promote design. Many countries have created agencies to support industrial design, including France, the United Kingdom and Canada. The province of Quebec (Canada), for example, offers incentives to firms for design-led innovations to groups of three or more firms that engage in design-led innovation projects in manufacturing, ICT and services. Others have promoted regional branding with design, such as regions in Italy.

Promoting business and organisational innovation: The Basque Country, Spain has supported programmes and institutions that promote excellence in management, such as Euskalit, the Basque Foundation for Excellence, as a driver for innovation.

Developing new skill sets for the future workforce: The province of Guipuzcoa in the Basque Country, Spain has recognised that culture change is important for its future in the knowledge society. One of the initiatives has been to adapt Daniel Goleman's work on emotional intelligence to educational modules for school children as well as the workplace and other civil society actors such as sports teams. The province has also promoted entrepreneurship initiatives in schools to raise awareness at an early age.

Establishing universities as a core actor of regional innovation system. The NURI (New Universities for Regional innovation) was planned to strengthen the innovation capacities of provincial universities in Korea. . Major strategies of NURI includes i) attracting good students and retain talents in the regions, ii) improving educational conditions and develop workforce education and develop programmes, iii) building productive partnerships with local authorities and business and to provide skilled workers and advanced technologies to the industrial clusters in the regions and iv) playing a leadership role in developing and maintaining effective regional innovation systems.

Expertise pooling: The Plato initiative: The concept of expertise pooling is based on learning by interaction among participating SMEs on the one hand and between SMEs and large well established companies playing the role of tutors on the other hand. Typically, Plato is a two year programme addressing the managerial needs of regional network of small firms. Small business owners and managers are forming groups of 8-12 members. Each group has usually two leaders representing large local parenthood companies. The Plato experience started in the Flemish region but is now replicated in many European countries including Denmark, France, Germany, the Netherlands, Sweden and the UK

Strengthening social innovation Stanford University's highly ranked Graduate school of Business hosts a large Centre for Social Innovation that has the mandate to build and strengthen the capacity of individuals and organisations to develop innovative solution to social problem. Stanford defines social innovation as a novel solution to a social problem that is more effective, efficient, sustainable than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals

Source: OECD (2011), OECD Reviews of Regional Innovation: Basque Country, Spain, OECD Publishing; OECD (2010) Higher Education in Regional and City Development: Amsterdam, the Netherlands, OECD Publishing; and OECD (2010), Higher Education in Regional and City Development: the Autonomous Region of Andalusia, Spain, OECD Publishing.

The levers for public support in service sectors differ from traditional S&T support instruments associated with R&D or technology transfer, often focusing on talent development and attraction. OECD work on services has noted that success for large service firms is often based on: a) open markets, b) innovation and ICT and c) work organisation and human resources (OECD, 2005). Furthermore, studies of innovation in knowledge intensive service activities (KISA) show that such firms serve as sources, facilitators and carriers of innovation throughout the economy (OECD, 2006). Efforts to revitalise the city of Chicago and its downtown as well as its cultural vibrancy are elements of this increasingly attractive environment for certain kinds of skilled labour, the so-called "creative class", serving as a magnet for talent.[24] And training the workforce to adapt to new ways of thinking and working, as well as entrepreneurship, could be promoted in the Chicago region, either through educational systems in K-12, like in the Basque Country, Spain, as part of the upcoming reinvention of Chicago's community college system and in the reform of higher education more generally (Box 3.6). The links between creative media and technology reinforce innovation, as promoted in Germany through cluster development efforts (Box 3.6). Chicago's Tribeca Flashpoint Media Arts Academy is one local institution training for this interdisciplinary mix of media products and services with technology. Stakeholders in this cluster in the region could therefore examine whether these linkages could be deepened across the Tri-State Region to enhance the performance and growth prospects in the region's ICT cluster.

Meeting social challenges through innovative service delivery

The Tri-State Region has a long-standing tradition of philanthropy and civic engagement, including efforts to support for the region's development and social innovation. Innovation driven by philanthropists and civic institutional leadership can potentially significantly improve the lives of thousands of the region's residents through enhancements in the delivery of basic public services, in stressed neighbourhoods, for instance. Philanthropy and civic leadership groups play a prominent role in the region. In fact, the initial Burnham plan for the region's development was commissioned in 1906 by the Merchants Club, which later merged with the Commercial Club of Chicago, which published the report under its name in 1909. More recently, it has created the Chicago Metropolis 2020 (now Metropolis Strategies) to promote healthy regional growth. The Chicago Metropolis Strategies, founded in 1915, has a mission through philanthropic efforts to improve the quality of life and prosperity of the region by supporting projects and research, including more recently support for broader regional economic development. The Civic Consulting Alliance, which brings together not-for-profit, private and public actors, provides concrete solutions to public sector challenges. For example, it has provided technical support for the implementation of the new Chicago Metropolitan Agency for Planning (CMAP). It has also helped tackle issues of education, workforce development, public safety and the environment.

That said there has not been a comprehensive evaluation conducted of the impact of all this civic-minded activity on key policy outcomes across the Tri-State Region. What impact have the Foundations and community-based not-for-profits actually had on addressing social challenges in the Tri-State Region? Can positive impacts be scaled up? Can successes achieved by philanthropic organisations decades ago be adapted to today's social challenges in stressed neighbourhoods across the Tri-State Region? Can the traditional business-civic relationships that characterised the successes in the Tri-State Region in the last century be replicated today, given the profound transformation in the region's economy and evolution of region's business leadership? Can successes in a

given policy area in a given neighbourhood be replicated to address different challenges in different neighbourhoods in the region? Do these successes represent a business opportunity for export into other Metro-Regions around the country and abroad? These issues could be studied more systematically to understand the civic leadership potential in the Tri-State Region more clearly.

Indeed, the Tri-State Region suffers from many social challenges that can be addressed through innovative solutions in the delivery of basic services to the public; for example by adopting purpose-designed software to increase the effectiveness of delivering, say, training or educational services, based on a general public call for proposals for new software. There are persisting pockets of poverty in the region that are often grouped along racial and ethnic lines. The lesser successful public schools in the Chicago region are a problem both for the general skill level of the workforce as well as retaining a strong tax base to improve city attractiveness. The concept of social innovation is gaining ground internationally. There are numerous examples of social innovation efforts in the Tri-State Region, including those supported by area universities and philanthropies. One of the Illinois Innovation Council initiatives is to support better services in the Chicago metro area through software applications that are created by the public at large in an open innovation approach.[25] And social innovation is now being promoted by the new US federal government Social Innovation Fund to finance activities that will lead to high-impact innovations to social challenges. In 2010, the Chicago area had ten sub-grantees in the economic opportunity area of this Fund, the largest number of sub-grantees of any region in the country.[26]

Social challenges also represent market opportunities, not simply an arena for philanthropy, and the public sector can help drive this through procurement and other regulations. Much of the efforts in the Tri-State Region are associated with some form of charity or civic responsibility. But there is a limit to what can be supported outside of the market. The region's efforts with respect to supporting innovation and clusters in health care, water and clean energy are some examples of market based efforts addressing social challenges. Government action to support the demand side of innovation (i.e. giving an incentive for the private sector to develop products), is often neglected in favour of policies that promote uptake of knowledge from public laboratories or universities. Such demand-side policies are used by many OECD countries to address social challenges where market and system failures may justify public intervention (OECD, 2011c). Standards and regulations can oblige firms to develop innovations to address social needs, such as in areas of green growth. Public procurement approaches that promote development of new products, depending on procurement regulations, can also have an important impact. The region may consider how local and state level procurement and regulations can be used more effectively to encourage innovation with existing spending through innovative, strategic partnerships between public authorities and their civic and philanthropic counterparts.

3.3. Public-Private-Partnerships for innovation: adapting to the knowledge economy

The three states belonging to the Tri-State Region maintain, overall, relatively traditional economic development approaches among advanced OECD regions, characterised by initiatives designed to lure businesses away from one part of the functional region to another (or from other parts of the country), often with old-fashioned financial incentives whose impacts are short-term at best. One of the primary areas of focus for economic development is attracting and retaining large firms via lowering tax

rates in exchange for a move into the state. This is typified by the "Illinoyed" campaign (a play off of the words Illinois and annoyed) launched by the Indiana Economic Development Corporation to attract firms from the Illinois part of the region based mainly on its lower tax rates. Even within Illinois, there is intense competition among municipalities. For example, United Airlines made a symbolic move of its operational centre (including 2 800 jobs) from a location in a suburb near the airport to the Willis Tower (formerly Sears Tower) in downtown Chicago. This move may have benefitted the city but it was clearly not a net gain for the Tri-State Region as it is an intra-regional move. A culture change among state and local public officials towards innovation-driven growth is needed.

A degree of competition across municipalities and states is critical; however this "race-to-the-bottom" type of competition is not a durable source of job creation and economic growth. Several studies in the US have highlighted this problem within and across states for regional and US competitiveness in a global marketplace (ITIF and Kauffman, 2010; Council on Competitiveness, 2010). This problem was also observed for Mexican states whose economic development approaches have been focused on attracting foreign direct investment and large multi-national firms but not as much on building a knowledge-based infrastructure to attract and maintain multi-national firms (OECD, 2009). Swiss cantons are knowledge-intensive regions that are highly competitive for firm attraction. As many of the cantons are relatively small in size and population, this is a disadvantage for the functional regions to which multiple cantons may belong. A recent study highlighted this problem for the country's innovation-driven regional development (OECD, 2011d). In the EU the INTERREG programme, implemented by the European Commission to promote co-operative projects between regions including hard and soft infrastructure projects, represents a good tool to balance these centripetal forces.

Many OECD regions that are highly successful knowledge hubs, even with relatively higher level tax regimes, nevertheless remain competitive because they have put a strong focus on fostering innovation. The region that includes Gothenburg Sweden, for example, was successful in retaining a Ford Plant because it mobilised around its research strengths and not tax giveaways (OECD, 2007c). The Copenhagen Metro-Region has also proven highly competitive in areas such as biotechnology and design. It has been attracting international highly-skilled talent to reinforce the positive dynamics of its innovation ecosystem (OECD, 2009d).

Among the more technology and innovation-driven state-level efforts in the Tri-State Region, there are a few noteworthy public or public-private institutions and programmes (Table 3.3). The Governor of Illinois recently created the Illinois Innovation Council, at the public urging of the Chairman of the Chicagoland Chamber of Commerce, the late Jim Tyree,[27] in its efforts to expand beyond the basic economic development approaches. The state also has a Technology Development Account to invest in private venture capital funds. However several authorised programmes have seen budgets cut or eliminated, such as the Innovation Challenge Grant program (to match federal SBIR grants) or the Illinois Technology Enterprise Centers program. The creation of the public-private Wisconsin Economic Development Corporation is another step towards providing institutions better able to address innovation-driven economic development. Indiana's 21st Century Fund created in 1999 supports commercialisation and technology development, including through matching grants to the federal SBIR program. The state also promotes a Venture Capital Investment Tax Credit. Overall, for an OECD region, particularly those in a decentralised country context such as the U.S., state policy efforts to support innovation in the region remain relatively limited.

Table 3.3. **Key state level innovation bodies and programmes in the Tri-State Region**

State	Agency or Council	Key innovation programmes
Illinois	Department of Commerce and Economic Opportunity (public)	-Technology Development Account: to support VC funds (up to 2% of state's portfolio) - -IEN: Illinois Entrepreneurship Network offers co-ordinated access to small business services.
Illinois	Illinois Innovation Council (private)	Launched in 2011 to advise the Governor, it seeks to transform the state economy through 30-50 new projects in five areas They concern: *i*) **message** (broaden the notion of innovation, improve image), *ii*) **Productivity/connectors**, *iii*) **Stakeholder groups** (to build on disparate organisations and share information), *iv*) **Access to capital** and *v*) **Innovation in government** (examples include developing data and challenging the technology community to take into account under-utilised assets)
Indiana	Indiana Economic Development Corporation (public-private partnership)	-21st Century Research and Technology Fund, created in 1999, supports development and commercialisation of advanced technologies, including 20% fund set aside for matching grants to federal SBIR program -Venture Capital Investment Tax Credit
Wisconsin	Wisconsin Economic Development Corporation (public-private corporation)	-Wisconsin Angel Network (WAN); (privately managed) -Wisconsin Entrepreneurs' Network (WEN); funded by state (managed by the University of Wisconsin-Extension's Division of Entrepreneurship and Economic Development) -Wisconsin Innovation Network (WIN);
Wisconsin	Wisconsin Technology Council (private)	Launched in 2001 as the science and technology advisor to the Governor and the Legislature.

3.4. Capitalising on federal innovation support programmes

There are several federal programmes to support innovation, including new cluster-related initiatives, notwithstanding the fact that innovation policy generally falls under state-level economic development responsibility. Federal support for research and innovation is fragmented across a number of departments and agencies, with defence research spending accounting for a large share of R&D, and other mission-driven research spending such as in health and increasingly energy and nanotech (Shapira and Youtie, 2010). Many programmes, including those with a regional dimension in their conception or implementation, come from the Department of Commerce, the National Science Foundation, and even the Department of Labor.[28] Furthermore, there have been increasing efforts to consider a regional innovation cluster approach in policies of several federal agencies, including in addition to the above, for example, the Department of Agriculture (Muro & Katz, 2010). Among programmes of the Economic Development Administration of the Department of Commerce, there are several projects in the region that directly support its innovation system (Box 3.8). The Department of Commerce Manufacturing Extension Partnership program has centres and offices in all states, and which serve the Tri-State Region via the state administration of the programme. While there have been some additional federal investments with recent stimulus packages, state budgets are getting tighter, and public investments to spur innovation are at risk for being cut dramatically across the country.[29]

Among the most prominent federal programmes that firms may access are the SBIR/STTR programs, and the Tri-State Region does not capture a strong share. Eleven federal departments participate in the SBIR (Small Business Innovation Research) program. The funds are awarded to small firms for feasibility or proof of concept. Several federal departments participate in the related STTR (Small Business Technology Transfer) program as well. For uptake for the prominent SBIR program, Illinois ranked only 17th among US states for awards from 2000-07, capturing about 1.6% of the national total (versus 4.5% and 6th for state GDP in 2007). For Indiana, which also gives matching SBIR awards, the state's capture is 0.7% ranking it 26th (versus 1.8% and 18th

for state GDP), albeit an analysis of recipients reveals that most are located outside of the Tri-State Region and are elsewhere in the state.[30] For Wisconsin that figure is 1.0%, ranking the state 24th (versus 1.7% and 22nd for state GDP).[31]

Box 3.8. **Innovation-related projects supported by EDA of the US Department of Commerce in the Tri-State Region**

- ***Chicagoland Entrepreneurship Center:*** funding for a Cluster Acceleration Program to provide critical business information, resources, knowledge and relationships to incubate emerging business ventures and encourage entrepreneurship growth.
- ***Chicago's Sustainable Industries:*** financing of a project to identify opportunities for the City to create greater long-term economic and environmental impact from public and private investment. The three phases include: *i)* a strategy document that identifies the manufacturing sectors that have a future in Chicago, economically and ecologically, and recommendations to support these industries, *ii)* obtaining data and developing that data into systems for future use, and *iii)* targeting public investments, preserving industrial land, co-ordinating business services, and public/private enterprise facilitation.
- ***Battelle Memorial Institute:*** Assist and recruit businesses in Chicago's Humboldt Park neighbourhood to increase local capacity by providing management expertise and technical support and contributing technology and literacy training initiatives as the basis for a comprehensive "Latino Development and Technology Accelerator" operating plan.
- ***Illinois Institute of Technology:*** Interior and exterior build-out and renovation, including equipment, for wet and dry lab business incubator facility.
- ***Southeast Wisconsin Innovation Center:*** Construction of a LEED-certified Southeast Wisconsin Innovation Center (and business incubator), including, office space, a wet lab and flexible R&D space. The office space will include modest accommodations for entrepreneurial support agencies and related technical assistance for incubator tenants, including for economic development and University partners.
- ***BizStarts Milwaukee:*** to create a network of support resources for start-ups in Southeast Wisconsin
- ***Center for Advanced Technology and Innovation (CATI):*** Its mission is to connect "technology patrons and entrepreneurs" with "technology beneficiaries." Serving as a technology transfer intermediary, CATI helps private industries leverage their idle intellectual properties by matching them with existing companies and start-up businesses in need of those technologies. CATI is the link between technology excess and technology success. CATI is located near midway between Milwaukee and Chicago outside of Racine, Wisconsin
- ***EDA's University Center Program:*** its most recent round of funding (2011) was unprecedented in its emphasis on innovation and entrepreneurship. Three of its 2011 awards went to Tri-State Region universities: Purdue, the University of Illinois and the Milwaukee campus of the University of Wisconsin.

Source: Economic Development Administration, US Department of Commerce and local sources.

Stakeholders in the Tri-State Region should focus on engaging federal and state responsibility centres that manage innovation-support programming to co-ordinate their investments more systematically and tie these investments more explicitly to evidence of innovation potential across the established and emerging business clusters in the region. Federal and state governments should, for their part, focus on achieving a balance

between longer-term new or basic research and development versus applied R&D for the dissemination/commercialisation of existing technologies and develop more inter-institutional collaboration and partnerships of a complementary nature to exploit both. Indeed in a study of a nearby Midwestern large-scale region, federal innovation funds were noted as larger scale financing sources with greater impact on firm-level innovation but not linked to regional development strategies. The Cleveland, Akron, and Youngstown (Ohio) and Pittsburgh (Pennsylvania) area was one of the 19th century industrial motors of the US While it has suffered from industrial decline, the region has taken many innovative actions to reinvigorate declining industries. The study found such federal innovation funds were too time consuming to access and siloed, that state and local funds were easier to access but were more limited in amounts, and that the combination of programmes did help firms both leverage private financing as well as benefit from new expertise and financing sources. Federal funds were found to be more successful at supporting incremental improvements in goods and services than state funds, in part due to larger aids. The study also suggested that federal programmes work more closely with state and local leaders who are close to firms to take into account more regionally tailored and new approaches to regional economic development (Feldman and Lanahan, 2010). Indeed, with respect to supporting research, federal and state governments should pay attention to the balance between longer term basic R&D for new development and applied R&D for the use and dissemination of existing technologies. Such a focus can lead to more inter-institutional collaboration and partnerships of a complementary nature.

Networking to overcome barriers

There are many impediments to a more coherent strategic approach to supporting innovation in the Tri-State Region. While the private sector does not restrict its operations to jurisdictional boundaries, public actors do. Some of the reasons for the lack of a strong coalescence around core goals include: a diversified economy which require co-ordination and policy coherence, an excessive number of units of local government, the three state boundaries, and the tax competition based economic development approach of public actors focused on firm attraction based on job counts but not necessarily quality.

Common goals and limited transactions costs are essential for collaboration but have been hard to address. Such collaboration motivations generally include: functional ties that span administrative borders (labour markets, clusters, research competencies); confronting common problems; building critical mass; increasing specialisation and complementarity of regional assets; or economies of scale for jointly financed public action. As developed in Chapter 1, the functional linkages have been growing over time. For certain sectors and clusters, building greater critical mass is still an issue to place the region more squarely within global networks. The other rationale also holds in the case of the Tri-State Region. However, given that Illinois' innovation assets predominate in volume and performance in the region, supporting the integration of innovation assets located in the parts of the other two states located in the Tri-State Region requires even greater political will (and foresight) since it requires a recognition of the need to support an out-of-state asset that drives the regional economic engine. In a context of slower growth in the Tri-State Region the need to accelerate region-wide innovation might nevertheless become more pressing. At the same time regional actors are now in a better position to build strategies as new analytical tools, methodologies and metrics are being made available by federal departments such as the EDA's Regional Innovation Acceleration Network (RIAN). Stakeholders in the region should take full advantage of these federal support tools.

Administrative boundaries notwithstanding, it becomes crucial for key public and private stakeholders from across the region to sustain strategic alliances to encourage innovation and expand domestic and international market-penetration opportunities for the region's innovation-driven enterprises. Indeed many OECD cross-border regions have been working to overcome these barriers in line with common interests, even across countries, ranging from light to more intensive interventions (Table 3.4).

Table 3.4. **Examples of cross-border S&T and innovation collaboration in some OECD regions**

Name	Scale	Focus	Instruments
Southern Technology Council (US)	13 southern US states	• Information sharing • Investment promotion • Image/culture change	• Publications such as "Innovation with a Southern Accent" to highlight facts about the South and areas of technical competency • Periodic theme meetings
Northern Way (UK)	Spans 3 administrative regions	• Building critical mass • Advocating to central government the importance of this region • Increasing functional linkages	• N8 Research Partnership program to support excellence in industry-relevant research for priority sectors/clusters • Policy intelligence and data on the functional linkages within the Northern regions • Interfacing with central government as a group of regions
Greater South East (UK)	Spans 3 administrative regions	• Building on strong connectivity and critical mass	• Joint innovation programmes University business fellows and technology transfer programme • Innovation research map • Research excellence directory • Joint business support and knowledge networks in area of common strengths
Oresund (Sweden and Denmark)	2 regions spanning two countries	• Broader economic integration agenda • For innovation, cluster initiatives like Medicon Valley	• Infrastructure investments to facilitate movement and economic linkages • Cross-border cluster organisation to promote region's life sciences research and firms
Brainport – Eindhoven area (Netherlands)	21 municipalities that span parts of two Dutch provinces	• Promoting the region as a knowledge hub internationally • Advocating to central government the importance of this region • Supporting business and technology efforts	• Promotes the region as an attractive location to bring in high skilled labour • Support of High Tech campus with open innovation model • Knowledge transfer activities
Co-ordination across Bureaus of Science and Technology	Shanghai municipality with neighbouring provinces of Zheijang and Jiangsu	• Supporting science and technology projects jointly for large economic zone • Mobilising greater national funds for research projects of joint interest	• Harmonisation of policies for actors to engage across administrative boundaries

Notes: Following the change in government of the United Kingdom, regional administrative districts were abolished in 2011.

In the wider Tri-State Region, the Milwaukee 7 group is a local example of how to overcome the competition barriers once there is recognition of a common goal. While individual counties may still compete for firm attraction, they do so with the support of this branding through the Metropolitan Milwaukee Association of Commerce and using their economic development code of ethics. The private sector has therefore been facilitating efforts to make the region stronger, thus helping all seven constituent counties better off. The Denver Metro Economic Development Corporation has also created a regional code of ethics to reduce the losses associated with inter-municipal competition (Council on Competitiveness, 2010). For cross-state and cross-country boundaries, there are also examples. The Oresund region between Copenhagen (Denmark) and Malmo (Sweden) have been working to integrate this cross-national region. For the Southern Technology Council, an advisory council on innovation and technology policy issues for a group of Southern US states, the primary motivation for collaboration is a set of common goals (information sharing, investment promotion and image/culture change). There are many examples of cross-boundary strategic partnership building, some close to home, one within the Tri-State Region itself that regional stakeholders can examine as they pursue the development and implementation of region-wide strategies to support innovation-driven growth.

The closest document to an overall regional strategy that includes innovation is the *GOTO 2040* Comprehensive Regional Plan produced by the Chicago Metropolitan Agency for Planning. While it only covers north-eastern Illinois by mandate, many of the principles are valid for the Metro-Region or the Tri-State Region more generally. It identifies the importance of: *i*) improving data and information systems, *ii*) nurturing the region's industry clusters, *iii*) enhancing the commercialisation of research, targeting investments and pursuing new funding opportunities, and *iv*) developing a "culture of innovation". The plan also identifies key public and private actors that can support innovation, be they CMAP, the Illinois Department of Commerce and Economic Opportunity or the private and non-profit sectors via the Chicagoland Chamber of Commerce, foundations or universities.

The Chicago Metropolis Strategies, which helped support the development of the GOTO 2040 Plan, has encouraged further community discussion by also supporting an analysis by RW Ventures, Regional Innovation Acceleration Network of the plan's economic impacts and additional recommendations, notably including those focusing on innovation. The analysis notes that:

The recommendations are not deeply tailored to analysis of the particular types and stages of innovation which present current opportunity in the local economy – a key next step as implementation proceeds

The emphasis of GOTO 2040's recommendations around knowledge networks and spillovers is primarily focused on the later stages of the innovation process – fostering relationships that contribute to increased commercialisation and entrepreneurship – rather than on the earlier stages. As it moves toward implementation, CMAP may want to consider augmenting its innovation recommendations to address strengthening of networks and idea exchange in the idea generation and concept testing states, including particularly between research institutions and the private sector

The recommendations aimed at improving the region's institutional environment and culture for innovation may be focused in three ways:

- Efforts to improve the commercialisation of technology may be more effective if they were delivered through a cluster-based framework

- Cultural improvements need to be targeted. In particular, the business community may offer insight into both the innovation opportunities in the marketplace and the types of challenges that they face in pursuing innovative activities in the region

The innovation needs of large firms, in addition to those of start-ups and small business, need to be addressed.[32]

In addition to CMAP, there are several other state and local councils and associations that are promoting technology and innovation-related strategies and actions. Illinois has recently launched the Illinois Innovation Council that will finance projects seeking to transform the Illinois economy through five levers. The Illinois Science and Technology Coalition, relatively dormant for several years, has become more active in lobbying efforts at state and federal level for S&T-based development, as well as supporting some other innovation-related projects like the secretariat of the Illinois Innovation Council. The Chicago Council on Science and Technology (C^2ST), founded in 2006, has a mission of promoting science education and science awareness through public events. The Wisconsin Technology Council, in place for ten years, has a *Vision 2020: A Model Wisconsin Economy* that recognises the importance of education and other key drivers of a knowledge economy. The strategy highlights guiding principles, such as a global perspective, international centres of excellence and a focus on wealth not just jobs. To do so, it recommends organisational initiatives such as a think tank (Institute for Inter-disciplinary Research), Research Centres of Excellence and Technology Clusters.

Achieving region-wide benefits

Several actions could set the stage for greater future collaboration among regional public and private actors towards more strategic regional thinking in support of innovation. This is of course easier said than done, but is increasingly an imperative in light of global competition. In fact, Indiana has a Regional Economic Development Partnership Program to support communities working together regionally, albeit within the state borders. Success in several regional examples for the US on collaboration for innovation have noted that to move from "competitive disadvantage to collaborative advantage", regions need: *i*) regional leaders, *ii*) joint actions, *iii*) ongoing intermediary organisations, iv) identities and a story to tell, v) a focus on enabling action over precision of regional definitions (Council on Competitiveness, 2010). Some of the actions that the region could take to achieve the common goals for a stronger regional innovation system include:

- *Create inter-state and inter-municipal dialogue to reduce zero-sum-game competition*: The notable economic linkages within region and the Midwest more generally, illustrate that all have an interest in the success of this area for driving growth. Tax incentives that simply move firms from one side of a border to the other do not contribute to overall regional growth or to improving its innovation ecosystem. There are examples in the US of economic development codes of ethics developed by different groups, including through a recommendation encouraging regional governors associations or even the National Governor's Association to consider this issue (ITIF and Kauffman, 2010). As is the case with the need to harmonise inter-state fiscal policy for the benefit of the entire Tri-State Region's growth prospects (see Chapter 6), the need to sustain inter-state dialogue on innovation policies, even if it simply focuses on reducing overlap or duplication in regulations or incentives to attract business, is crucial to build trust

across state lines as a basis for developing a common approach to optimising the region's innovation-driven growth potential over the long term.

- Expand the types of stakeholders involved in building regional innovation actions by extending the notion of innovation to non-R&D-based activities and by ensuring that non-profit, civic and academic actors are included within innovation networks across the region. One of the challenges for changing the traditional approaches to promote innovation-driven regional development is to involve new actors in the process, including young entrepreneurs and firms that are not always among "the usual suspects". The large-firm bias in many public policies is reinforced by the nature of leading associations that are often driven by large firms.
- *Produce relevant data on innovation at the regional scale.* As recommended in other regional reports, this step will help raise awareness that underpins more regional thinking. The work to develop an Illinois Innovation Index is one important step at raising awareness, and should allow when possible for cross-county and cross-state calculations. A balance will need to be struck between an index based on indicators that simply valorises the region versus serving as a true measure of areas of problematic performance that needs to be addressed by regional actors (Box 3.8).
- Federal agencies and philanthropic foundations could provide incentives for learning to collaborate, as well as programme-related investments to support start-ups. Federal actors may provide incentives for developing strategies for functional regions. For example, the EDA has provided a grant to support the regional strategy of the three counties in northeast Indiana. As they are dependent on the health of the Tri-State Region, incentives could be provided to for such a project to include strategy development collaboration with the entire functional economic area. Congressional leaders from the three states associated with the Tri-State Region could work more together in Washington in support of joint needs. And private foundations that play an increasingly important role in supporting regional economic development could also make this collaboration a condition for certain grants. Indeed, in the Tri-State Region, there is a history of private foundations supporting start-ups in stressed neighbourhoods and such community organisations as the Clean Energy Trust that focus on bridging the gap between research institutions and start-ups. In the OECD the above-mentioned INTERREG programme has supported cross-regional STI activities in a more general development context over the past two decades. It has been so successful that its budget has grown regularly over the period. In France, co-operation is being enhanced between competitiveness poles in several regions notably in the aerospace, automobile and green technologies industries. In the US, the southern technology council groups 13 states all seeking to promote innovation through information sharing, investment promotion and image/cultural changes (OECD, 2011a).
- *Critically review economic development programming for cost-neutral innovation-driven growth.* It is also a time to prioritise among existing investments, including lost revenues in tax breaks, to make strategic choices. Even if there is no additional public expenditure, there can be a reorientation of existing approaches towards more durable sources of economic development. And public procurement and regulation, cost neutral to public budgets, can also be

potential tools for spurring innovation. Thus many state departments can consider how to make their portfolios innovation-friendly.

- *Consider a long-term-investment strategy for innovation-supported economic development.* While many of the actions to support the regional innovation ecosystem may be achieved without significant expenditure, public investment is of course an important option to consider. Ohio voters supported a USD 700 million bond issuance to extend the state's Third Frontier programme during the recent recession given their commitment to technology-based economic development. OECD countries such as Finland, Korea and Sweden have made investments in innovation during prior crises that helped them successfully grow later. In the Tri-State Region, given the states' debt and operating deficit challenges (see Chapter 6), any strategy to convince the state administrations to enhance public investments in support of innovation needs to underscore the key importance of pooling scarce resources across state lines and between public, private and academic stakeholders.

Box 3.9. **Examples of innovation-related categories and scoreboards for regions in OECD countries**

Regional Innovation Scoreboard (EU): This periodic analysis of EU regions considers a range of indicators classified into enablers, firm activities and outputs which ultimately classifies regions into high, medium-high, average, medium-low and low innovation regions. (*http://www.proinno-europe.eu/page/regional-innovation-scoreboard*)

State New Economy Index (IITT and Kaufmann Foundation): This index uses a range of variables that are organised into sub-indices covering the categories of: knowledge jobs, globalisation, economic dynamism, the digital economy, and innovation capacity. (*http://www.kauffman.org/research-and-policy/snei-interactive.aspx*)

OECD Categorisation of Regions: This analysis considers 12 indicators across OECD regions to classify them into eight groups based on similarities of performance on economic structure and innovation-related variables.

Source: Ajmone Marsan, G. and K. Maguire (2011), "Categorisation of OECD Regions Using Innovation-Related Variables", OECD Regional Development Working Papers, No. 2011/03, OECD Publishing.

Box 3.10. **Argonne National Laboratory**

Argonne National Laboratory, one of the US Department of Energy's oldest and largest national laboratories for science and engineering research, employs roughly 2 800 employees, including about 1 000 scientists and engineers, three-quarters of whom hold doctoral degrees. Argonne's annual operating budget of around USD 695 million supports upwards of 200 research projects, which are broadly described below. Since 1990, Argonne has worked with more than 600 companies and numerous federal agencies and other organisations.

Argonne's mission is to apply a unique mix of world-class science, engineering and user facilities to deliver innovative research and technologies. We create new knowledge that addresses the most important scientific and societal needs of our nation.

Source: U.S. Department of Energy (2011), *http://www.anl.gov/*.

Notes

1. According to a recent stream of research (OECD 2010a, Corrado et al. 2009), firms' investments in new knowledge, namely in intangible assets, benefit from a higher output growth not only at the time of the investments but also years later. In some countries, such as the US, estimates show that intangible assets have a great impact on economic growth and they explain a good portion of the multifactor productivity growth (i.e. a measure of technological change and the inability to fully measure the sources of economic performance) data to be added on the economic multipliers of each of the forms of innovation cited – and the skills sets and characteristics of the workforce that implements the innovation or that produces or brings on-line the new product/service to determine whether the Tri-State area would score high on process innovation, which would support a race to the bottom in extracting cost out of production as a substitute for creating a new product or service.

2. OECD (2010) Ministerial report on the OECD Innovation Strategy: Innovation to strengthen growth and address global and social challenges: Key Findings, OECD Publishing, Paris; OECD and Eurostat (2005), Oslo Manual – Guidelines for Collecting and Interpreting Innovation Data, OECD Publishing, Paris; OECD (2010), Measuring Innovation: A New Perspective, OECD Publishing, Paris.
3. Per interviews with firms, workforce development professionals and other agencies during OECD mission 21-25 March 2011.
4. Per study by the Chicago Workforce Investment Council for the Chicago Metro Region, Q2 2011, based on 234 430 recent postings from internet job boards from 3 April through 1 July 2011 in the following counties: Cook, DuPage, Lake, Will, McHenry, Kane and Kendall.
5. Academic Ranking of World Universities is compiled and published by the Center for World-Class Universities and the Institute of Higher Education of Shanghai Jiao Tong University, China. The ranking uses six objective indicators to rank world universities, including the number of alumni and staff winning Nobel Prizes and Fields Medals, number of highly cited researchers selected by Thomson Scientific, number of articles published in journals of *Nature* and *Science*, number of articles indexed in Science Citation Index - Expanded and Social Sciences Citation Index, and per capita performance with respect to the size of an institution.
6. Per data from the National Science Foundation.
7. Data provided in background survey to OECD based on data from Prof. Michael E. Porter, Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard University.
8. Per interviews during OECD mission 21-25 March 2011.
9. For further information, see *http://www.ktponline.org.uk/*.

10. For example, New York City announced in mid-2011 that it would provide significant incentives (land in Brooklyn's Navy Yard or on Roosevelt or Governors Island and up to USD 100 million in infrastructure upgrades) for a university to build engineering or applied sciences campus with the goal of building a critical mass of technology entrepreneurs.
11. Per interviews during OECD mission 21-25 March 2011.
12. For more information on Springboard Atlantic, please see *http://www.springboardatlantic.ca/index.html*.
13. While the concept of clusters is not new, it has gained prominence in policy circles in large part due to the research of Prof. Michael Porter. For further detail on the common definitions of cluster-related entities, please refer to Sölvel, O., G. Lindqvist and C. Ketels (2003) *The Cluster Initiative Greenbook*, Ivory Tower AB, Stockholm, Sweden.
14. Per interviews during OECD mission 21-25 March 2011.
15. "We're not doing a good enough job of letting people outside Chicago know what exists here," says Mr Pritzker. "Many of our business organisations have been focused on getting the headquarters of big corporations to locate here, rather than saying: 'How do we help the guy who's tinkering around in the garage?'" from Financial Times Article 28 December 2011 *High-tech savvy helps Chicago shrug off rustbelt image http://www.ft.com/cms/s/0/72cd826a-129d-11e0-b4c8-00144feabdc0.html#ixzz1Ty3kEh4k.*
16. Per interviews during OECD mission 21-25 March 2011 and 20-24 June 2011.
17. See Sorenson and Stuart (2001) and Sorenson and Stuart (2008) for a detailed analysis on VC networks and spatial distribution.
18. Per interviews during OECD mission 21-25 March 2011 and 20-24 June 2011.
19. *February 2011 issue of* Technology Transfer Tactics.
20. Over the last ten years, the Illinois Ventura Capital Association reports that the Chicago MSA has accounted for approximately 93% of deals and 99% of venture capital and private equity volume in the state.
21. For more data on venture capital, see the National Venture Capital Association *http://www.nvca.org/* VC Impact by State and *https://www.pwcmoneytree.com/*.
22. Per a 2011 study by the HIS Global Insight and the National Venture Capital Association *http://www.nvca.org/*.
23. However, the conditions imposed for within-state investment (the fund must double the state investment in the fund in terms of investments in Illinois firms), while already occurring in the last round of the TDA, is an example of conditions that could nevertheless add an additional barrier for attracting outside funds to the state.
24. Term coined by Richard Florida.
25. See examples at *http://appsformetrochicago.com/*.
26. For further information, please consult *http://www.nationalservice.gov/about/programs/innovation.asp.*
27. ("Help wanted: Innovation czar to transform Illinois", Crain's Chicago Business, March 30, 2009
28. National Science Foundation programs include, among others: the Partnerships for Innovation; Advanced Technological Education Program; and the University Cooperative Research Centres. Department of Commerce programs include:

Manufacturing Extension Partnerships; Technology Innovation Program; and Economic Development Administration programs. The Department of Labour has the WIRED program, Community-Based Job Training Program.

29. For example, 30 states have made significant cuts in higher education expenses, a major source of innovation-related funding for research as noted in European Commission, 2009 based on information from the Rockefeller Center on Budget and Policy Priorities.

30. Analysis of recipients of Indiana state matching SBIR grants may be found in Ball State University (2010), *Comprehensive Examination of the Performance of the Indiana 21st Century Research and Technology Funds*, Prepared by the Center for Business and Economic Research, Ball State University, September 2010.

31. For all US states, see US National Science Foundation Science and Engineering State Profiles: 2006–08 (November 2009*), http://www.nsf.gov/statistics/nsf10302/*.

32. "Economic Impacts of GOTO 2040", Kosarko, Gretchen and Robert Weissbourd, RW Ventures, LLC, pp 27 – 28, January 2011, The Chicago Metropolis Strategies (*http://www.cct.org/sites/cct.org/files/CCT_GOTO2040Impact_0111.pdf*).

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Chapter 4

Transportation and logistics in the Tri-State Region

This chapter focuses on the region's transportation and logistics functions. This major continent-wide player in passenger air travel, air cargo, railways and trucking generates significant employment and value-added activity. The chapter suggests that the state of the hub's economic health should be of concern not only to local and state-level stakeholders but to the US federal government as well. The hub faces serious challenges – space constraints, congestion, financing issues and poorly integrated, region-wide planning to sustain its capacity to contribute meaningfully to regional and national growth. The chapter outlines the need for greater planning and co-operation among stakeholders. Key players from the various transportation modes and industrial sub-sectors making up the hub need to work together across state lines to drive interstate collaboration in the form of a comprehensive Tri-State inter-modal plan.

Key Findings

- *The region is North America's premier transportation and logistics hub. It is a major continent-wide player in passenger air-travel, air cargo, railways and trucking, with a concentration of warehousing and intermodal facilities across the Metropolitan Region. These hub-functions generate considerable impact: significant employment, value-added activity and indirect effects through strong forward and backward linkages with other business sectors in the region.*
- *The hub contributes not only to regional growth but to national performance. The state of the hub's economic health should therefore be of concern not only to local and state-level stakeholder but to the US federal government as well.*
- *The hub faces serious challenges: space constraints, congestion, financing issues and poor integrated, region-wide planning to sustain its long-term economic performance and its capacity to contribute meaningfully to regional and national growth.*
- *Key stakeholders from the various transportation modes and industrial sub-sectors making up the hub need to work together across state lines to drive interstate collaboration aimed at integrating the various state-level inter-modal plans that already exist, but not yet in the form of one comprehensive Tri-State inter-modal plan. Simultaneously, pursuing this collaboration openly can serve as an "attention-getting device" to convince the US government, in particular the US department of Transportation and its modal-based agencies, to seize the economic opportunity that the hub presents and work with its state-level and metropolitan counterparts to develop and implement a more integrated, region-wide strategic approach aimed at sustaining the hub's competitiveness over the long term.*
- *A key surface transportation infrastructure issue is chronic under-investment in rail- and road-based mass public transit. Efficient, effective and affordable public transit is a crucial contributor to long-term, sustainable metropolitan economic growth. These arguments are presented in Chapter 5 on green growth. That said, any integrated, region-wide, intermodal strategic planning aimed at enhancing the economic vitality of the logistics hub needs to integrate fully Tri-State Region transit issues.*
- *A more strategic focus on sequencing public investments in transportation infrastructure across the region should be developed, along with new sources of funding, from user-fees to polluter-pay rules to broaden funding sources for the hub's infrastructure.*
- *Region-wide data collection and sharing, particularly relating to performance measurement, regional skills miss-match, and value-added potential, should constitute a priority for the federal and state governments.*

The Chicago Tri-State Metropolitan Region (indeed the 21-county region) carries out important hub-functions for the United States and the continent, with far-reaching regional and national economic effects; yet the region faces significant challenges that need to be addressed if these hub-functions are to be sustained over the long term. The Tri-State/21-county region is a major North American player with respect to passenger air-travel, air cargo, railways and trucking. Its importance is further underlined by the concentration of warehousing and intermodal facilities in the region. These hub-functions have considerable impact: they generate regional employment; regional value-added along with indirect economic effects such as strong backward and forward linkages with other sectors, and have contributed to attracting high value-added services and headquarters to the region.

This chapter will examine the main challenges facing the hub and propose an approach to address them. This chapter:

- describes the economic potential of the hub, underscoring the fact that it is of strategic importance not only to regional growth but to national competitiveness;
- examines the main challenges facing the hub, including space constraints, congestion, financing issues and a paucity of coherent, region-wide planning; and
- proposes that regional stakeholders work together across state lines, transportation modes and hub-related business activities to develop a rationale based on the economic contribution to national performance the hub makes to convince the US and State governments to work together to define and implement integrated, long-term strategies using a multi-sector planning toolkit to achieve a coherent set of policy objectives for sustaining the Tri-State Region's role as the continent's premier logistics hub.

4.1. The economic potential of the Tri-State Region's hub

This chapter analyses the Tri-State Region's *hub* activities. In so doing, the chapter does not address metropolitan transit and road-congestion issues, which are not only significant but worsening, as Chapter 5 on green growth suggests. Rather, this chapter focuses chiefly on freight transportation issues – both air and surface – in the Tri-State Region, while demonstrating its international importance as an air-passenger hub. It is important to underscore again, however, that transit and road-congestion issues are of crucial consequence to the economic performance, quality of life and attractiveness of the Tri-State Region. That they are addressed elsewhere in this Review rather than in this chapter should not be interpreted as minimising their importance.

A major hub in North America

The Tri-State Region[1] is a major passenger airline hub in the US with a diversity of direct destinations. Chicago O'Hare International Airport is second in the US (after Atlanta) and fourth in the world, handling 66.6 million passengers in 2010. In addition, the Tri-State Region has important air passenger hub-functions. O'Hare Airport, by itself, is the only airport where two major airlines operate large hub operations; neither carrier has a 50% share. This is an important distinction, as a busy airport is not always synonymous with being an important hub. Hubs have a central place in airline networks, which is more important to them than passenger volume, although large volumes certainly help sustain hub-functions. These functions can be expressed with different indicators: degree centrality, betweenness centrality and a clustering coefficient (explained in the note of Table 4.1). Calculation of these indexes for major US metropolitan areas and their airports shows that Tri-State Region has important hub-

functions, although in some instances to a lesser extent than do Atlanta, New York and Los Angeles. Moreover, the airports of Chicago have a large diversity of direct destinations; only the airports of New York are more diverse (Table 4.1). A map of the top 50 connections of the region's two major passenger airports[2] shows this variety, but underlines at the same time the importance of the Tri-State Region as hub for the domestic US market (Figure 4.1).

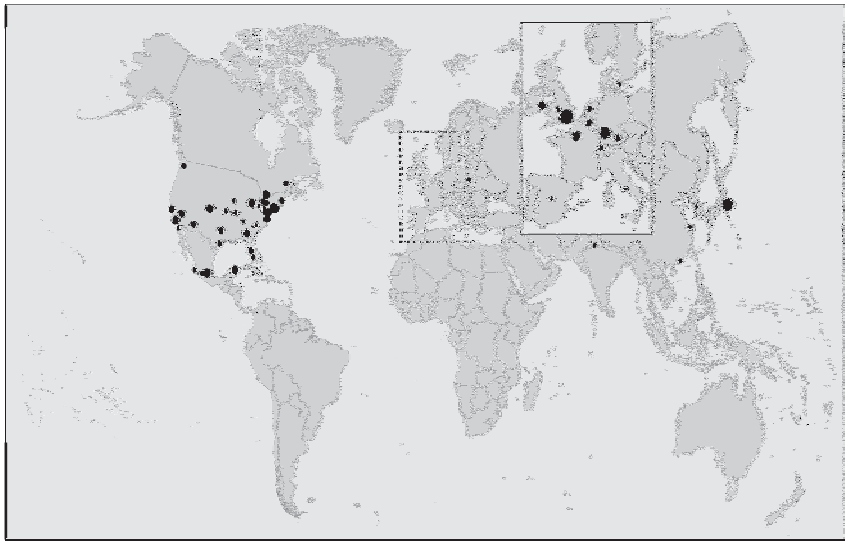
Table 4.1. **Indicators for air passenger hub-functions of large US Metropolitan Areas**

	Degree centrality	Betweenness centrality	Clustering coefficient	Diversity index destinations	Average distance reached (km)
Atlanta	218	87 942	0.087	0.859	3 572
New York	193	57 428	0.132	1.534	4 931
Chicago	172	49 053	0.117	1.074	4 353
Dallas	154	43 303	0.098	0.762	2 314
Houston	142	41 663	0.091	0.773	2 392
Los Angeles	121	50 373	0.154	0.941	4 633
Miami	92	18 199	0.162	0.623	3 327
Minneapolis	90	35 475	0.099	0.678	2 987
San Francisco	74	15 894	0.229	0.633	5 887
Memphis	39	4 354	0.213	0.590	707

Note: Air connections for all passenger US airports that can be attributed to the 154 MSAs; only direct connections with more than 8 000 passengers per year are included in order to ignore relatively minor connections. *Degree centrality*: number of directly connected cities; *Betweenness centrality*: number of times the city occurs on shortest paths throughout the graph; measure of overall accessibility; *Clustering coefficient*: proportion of closed triplets among all possible triplets in the vicinity; measure of intermediacy (low values for hubs situated between dense clusters, high values for nodes embedded within dense clusters). *Diversity index*: inverse of the sum of absolute differences in shares of traffic distribution by country in the world.

Source: Calculations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

Figure 4.1. **Top 50 air passenger destinations of the Tri-State Region's airports**

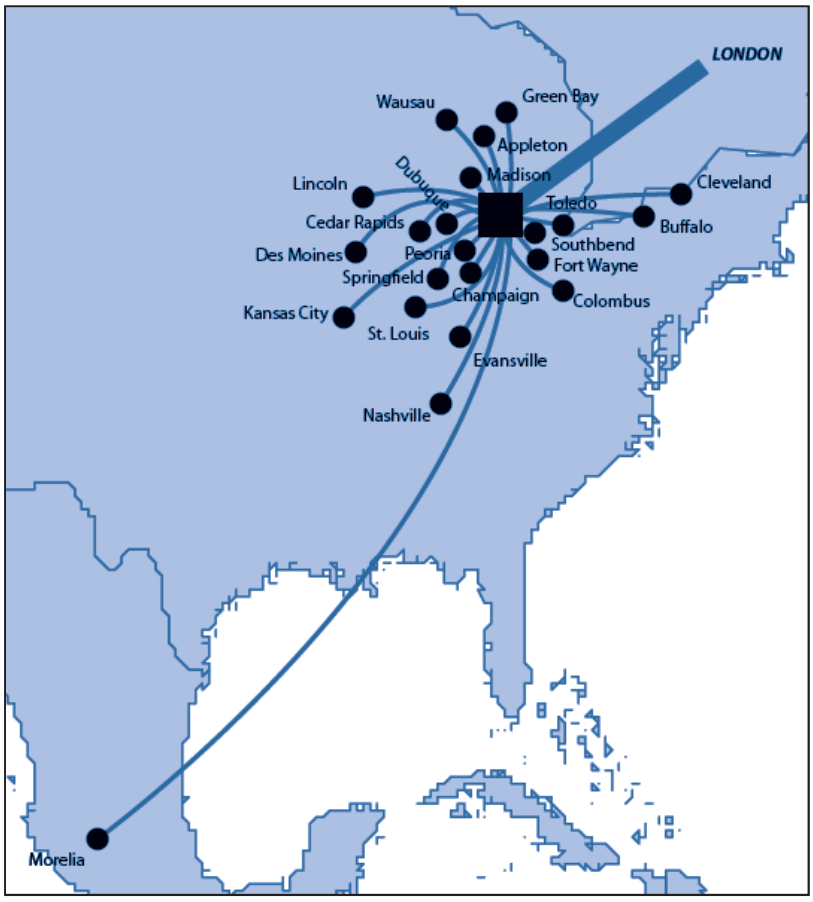


Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: Elaborations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

The air-passenger hub of the Tri-State Region is connected to a large variety of "spokes" in the US. This means that the Tri-State Region's airports – mainly but not exclusively O'Hare – are used as the centre through which main continental and intercontinental connections are channelled, connected to a network of smaller regional airports. This role can be illustrated by observing the airports whose most important connection is with those in the Tri-State Region: that is, airports that are dominated by those in the Tri-State Region. In three of these airports (Springfield, Illinois; Dubuque, Iowa; Champaign, Illinois), the air passenger traffic with the Tri-State Region represents more than 50% of their traffic; in 30 airports, the traffic with the Tri-State Region represents more than 20% of their traffic. Most of these airports are located in the Mid-West (Figure 4.2).

Figure 4.2. **The Tri-State Region's dominant flows (tributary area) for air passengers**



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: Elaborations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

The Tri-State Region has a less central position with respect to air cargo, but still possesses one of the most diverse air-cargo networks on the continent. Several airports, such as Miami, New York, Los Angeles, Atlanta and Houston score higher on various hub-indexes, such as betweenness centrality (Table 4.2). At the same time, the Tri-State Region scores high on the diversity of destinations; this can also be illustrated by the map

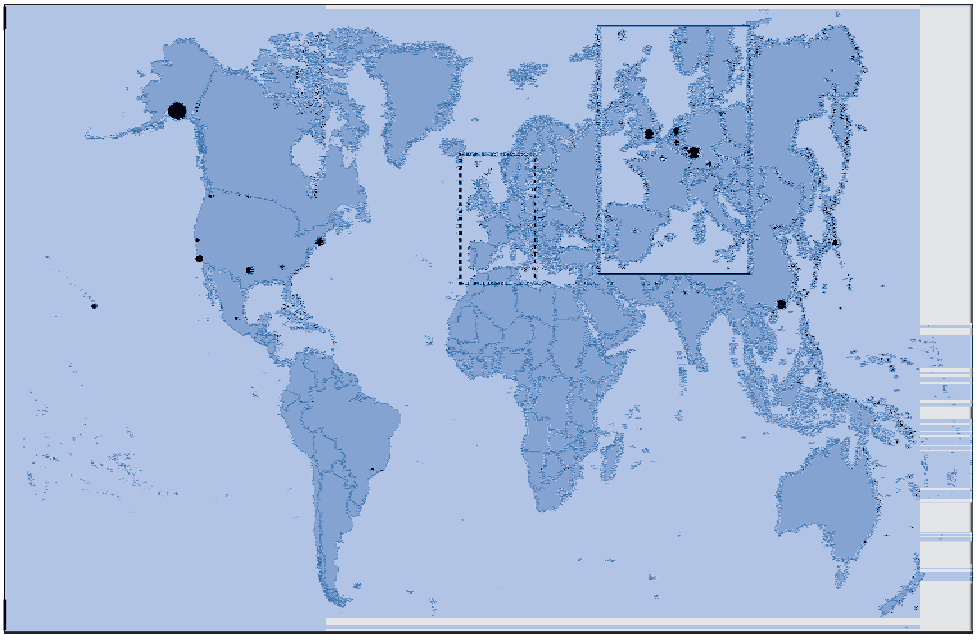
of top 30 air cargo destinations of the region's airports (Figure 4.3). The less developed hub-function for cargo can also be illustrated by looking at the air cargo ports that are dominated by the Tri-State Region (Figure 4.4): the only cities having their dominant traffic inflow to the Tri-State Region are Milwaukee, Krakow, Dusseldorf, Jaipur, and Morelia. The Tri-State Region's dominant traffic outflow is to London. The Tri-State Region also "dominates" Munich but it is also "dominated" by Anchorage (outside the figure), a bridge to Asia.

Table 4.2. **Indicators for air cargo hub-functions in US Metropolitan Areas**

	Betweeness centrality	Degree centrality	Clustering coefficient	Diversity index
Miami	19 143	110	0.091	0.615
New York	14 555	130	0.174	1.013
Los Angeles	8 535	67	0.218	1.348
Atlanta	6 556	92	0.203	0.857
Houston	5 364	62	0.168	0.747
Chicago	3 831	72	0.285	1.185
Dallas	3 295	53	0.280	1.051
Memphis	1,331	30	0.310	0.636
San Francisco	712	34	0.397	0.921
Louisville	574	19	0.333	0.550
Minneapolis	289	19	0.467	0.624

Source: Calculations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

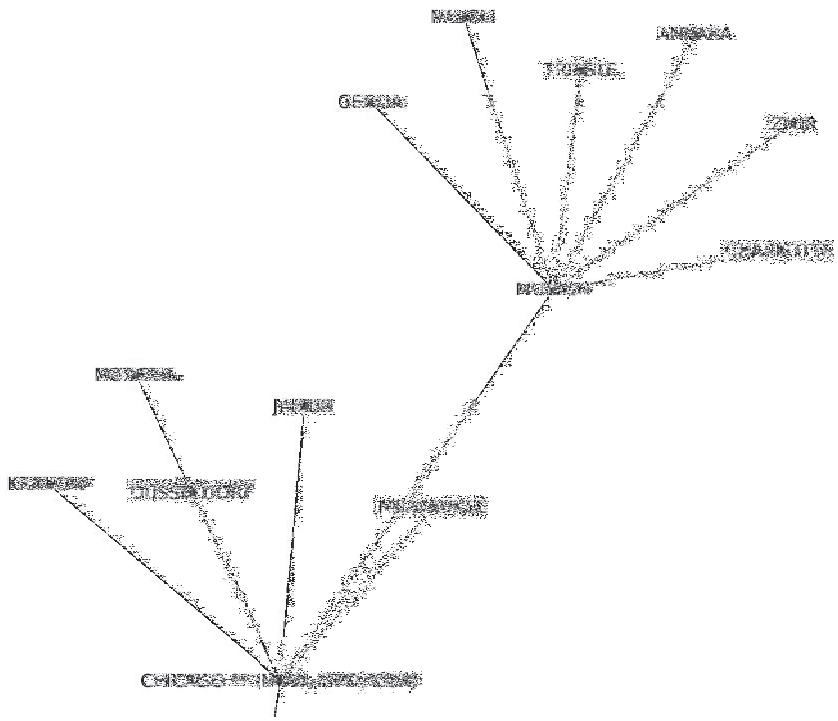
Figure 4.3. **Top 50 air cargo destinations of the Tri-State Region's airports**



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: Elaborations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

Figure 4.4. **The Tri-State Region's dominant flows (tributary area) for air cargo**



Source: Elaborations by OECD on the basis of database of École Nationale d'Aviation Civile (ENAC).

The Tri-State Region is North America's most important freight hub. The region lies at the centre of high-density rail freight networks (Figure in Box 1.2). In term of freight rail movements, Chicago has some 500 freight trains comprised of 37 500 rail cars passing through it every day, constituting 50% of all United States rail freight movement (CCCG, 2008).[3] It is the only hub that has six Class 1 railroads operating from it. The region handles more containers than any other hub or gateway in the country (United States Bureau of Statistics, 2011b). In addition about 25% of all freight movements in the United States "touches" the Tri-State Region, and in particular 46% of all intermodal units do, including 54% involving the gateway of Seattle/Tacoma and 26% involving Los Angeles/Long Beach.

The Tri-State Region is also a major trucking hub: of the 1.5 billion tons of freight moved in the Metro-Region in 2007, trucks carried just over half; rail carried about 43%. Trucks also carried about 73% of the regional freight by value, some USD 2.8 trillion, and rail USD 918 billion. It is estimated that one in six vehicles on the region's interstate highways are trucks. This is not surprising. Many truck movements are of high-value commodities and this pushes up the value figure, but in addition trucks provide the bulk of last and first mile transportation of freight, and carry significant tonnage to areas just outside of the region. Trucking is also important in interacting with railroads in the intermodal supply chain and moving containers between eastern and western railroads; indeed secondary movements constitute the largest category for this activity. Local, intra-regional truck movements are estimated to account for about 200 million tons annually.

In the past the Tri-State Region was a major waterborne transportation hub, but its water transportation functions have declined. Its location as the only point where the Mississippi River system joints the Great Lakes and the Saint Lawrence Seaway system gave it considerable natural advantages, especially after 1948 when full connectivity was completed. The advent of the railroads and then trucking initially reduced the role of water transportation in the region for many commodities. The decline in many heavy industries in the United States has adversely affected the demand for water ports, and the region is no exception: it traditionally used the water arteries of the Chicago River, the Chicago Sanitary and Ship Canal, and the Illinois River to move heavy-industry based cargo – but no longer. The result of this decline has been the redevelopment of port and related areas in the region for non-waterborne transportation uses, both industrial and residential. Where port facilities continue to exist, they are generally not located for efficient inter-modal supply chain development and do not have sufficient adjacent "land-banks" to construct necessary facilities. That said, the 21-county metro region is served by three important commercial ports that all have foreign trade zone designation: The Port of Indiana – Burns Harbor, the Port of Chicago/Illinois International Port District, and the Port of Milwaukee. The marine sector continues to carry significant amounts of bulk commodities, notably metallic ore, non-metal minerals and coal. In addition, the ports are able to serve important niche markets. For example, the Port of Milwaukee is highly specialised in shipping extra-ordinary manufactured goods that are over-sized, over-weight or unusually shaped and do not travel well by rail or over long distances by truck.

The hub's economic impact

Transport is one of the economic specialisations of the Tri-State Region. This means that more people in the region work in these sectors than the average in the United States (around 20% more); in other words, the location quotient (LQ) of the Tri-State Region in transport and logistics is 1.22.[4] This specialisation is not unique among large US metropolitan areas: several of these, such as Houston, Miami and Atlanta specialise in transport or one of their business clusters. The Tri-State Region has a particularly strong specialisation in air transportation, which makes it similar to Dallas and Atlanta, as well as to the largest European metropolitan areas (Table 4.3). Other large US metropolitan areas (Miami, Houston, New York) are specialised in both air and sea transport; and then there are the ones that are not at all specialised in transportation (Philadelphia and Boston). Some smaller US metropolitan areas are even more specialised in transportation, for example Memphis, which has a location quotient of 3.34 in transportation; in comparison with 1.22 for the Tri-State Region (a score of 1 is the national average).

In line with its railway hub function, the Tri-State Region has a large specialisation in the railway sector. This cannot be established on the basis of employment data (as these are not available on the level of Metropolitan Statistical Areas), but this becomes apparent from LQs based on value-added. The relatively large trucking sector in Chicago is remarkable: in the other large US and European metropolitan areas (with the exception of Paris) the employment in the trucking sector is lower than the national average. The Tri-State Region also specialises in logistics functions, such as transportation services and warehousing. However, the region is relatively small in courier services, in which larger metropolitan areas, such as New York and Los Angeles, are specialised, but also smaller ones such as Louisville and Memphis (Figure 4.5).

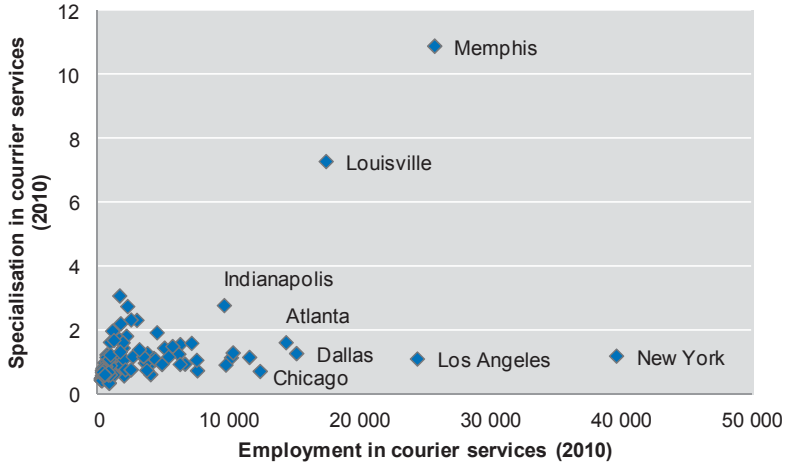
Table 4.3. **Economic specialisations of US and European Metro-Regions**

	Total	Air	Water	Truck	Support	Storage	Couriers
Chicago	**1.22**	**2.10**	**0.53**	**1.03**	**1.30**	**1.32**	**0.72**
New York	n/a	1.58	1.16	0.47	n/a	0.68	1.20
Los Angeles	0.92	0.94	1.27	0.56	1.84	0.77	1.11
Dallas	n/a	3.13	0.11	n/a	n/a	1.34	1.28
Philadelphia	0.89	0.96	n/a	0.58	0.81	n/a	n/a
Houston	1.32	2.70	3.39	n/a	n/a	0.67	0.74
Washington	0.61	1.22	n/a	0.65	0.92	n/a	n/a
Miami	1.16	2.21	9.08	0.34	2.49	0.55	1.15
Atlanta	1.57	4.95	0.14	n/a	1.10	1.41	1.62
Boston	n/a	n/a	n/a	0.38	0.5	0.43	n/a
London	0.99	5.73	0.67	0.63	n/a	1.23	1.00
Paris	1.98	5.39	0.39	1.10	n/a	1.11	n/a
Rhine-Ruhr area	1.34	2.99	0.27	0.82	n/a	1.09	3.15
Milan	0.76	0.65	0.18	0.63	n/a	1.34	0.55
Madrid	0.98	3.55	0.73	0.98	n/a	0.92	0.71

Note: The sectors indicated here are (from left to right columns): NAICS sectors 48-49, 481,483, 484, 488, 492 and 493 (for US metropolitan areas); for EU Metropolitan Regions. Years: 2010 for US metropolitan areas; 2008 for London, Rhine-Ruhr, Milan and Madrid; 2007 for Paris.

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages of the US metropolitan areas. SBS-statistics of Eurostat for EU metropolitan areas.

Figure 4.5. **Specialisation in courier services in US Metropolitan Areas, 2010**



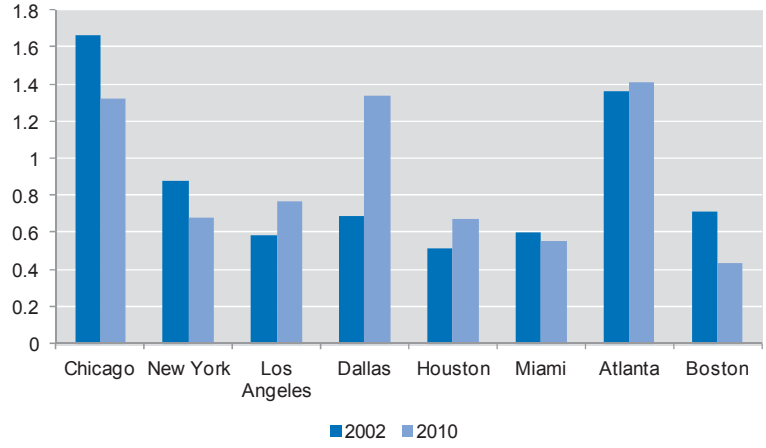
Note: The definition of courier services is NAICS 492: Couriers and messengers. The blue dots indicate the 154 Metropolitan Statistical Areas (MSAs) in the US that had more than 100 000 jobs in 2010.

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

The transport specialisation of Chicago has been stable over the last decade (2002-10), but its position in warehousing has declined, perhaps because of the relative lack of inter-modal integration across the Tri-State Region: much of the recent industrial real-estate developments is not serviced by rail and cannot take advantage of the rail-hub's superiority. Its location quotient in transportation remained 1.22, as it was in 2002. The Tri-State Region became much less specialised in warehousing, whereas many other

large US metropolitan areas, such as Los Angeles, Dallas, Houston and Atlanta, became more specialised in it (Figure 4.6). With respect to truck transportation, the Tri-State Region has strengthened its position as the large US Metropolitan Region most specialised in trucking; its specialisation index went up whereas the ones of other large metropolitan areas went down (Figure 4.7). Developments in other transportation sub-sectors are more mixed. With respect to air transportation the Tri-State Region's specialisation index remained stable, whereas New York and Atlanta became more specialised – possibly underlining the concentration of US air hub-functions – and Los Angeles, Dallas and Miami became less specialised. The Tri-State Region became more specialised in support functions for transport (from 1.18 in 2002 to 1.30 in 2010), in contrast to the metropolitan regions that were highly specialised in this (Miami and Los Angeles), but other areas gained ground (Atlanta and Washington).

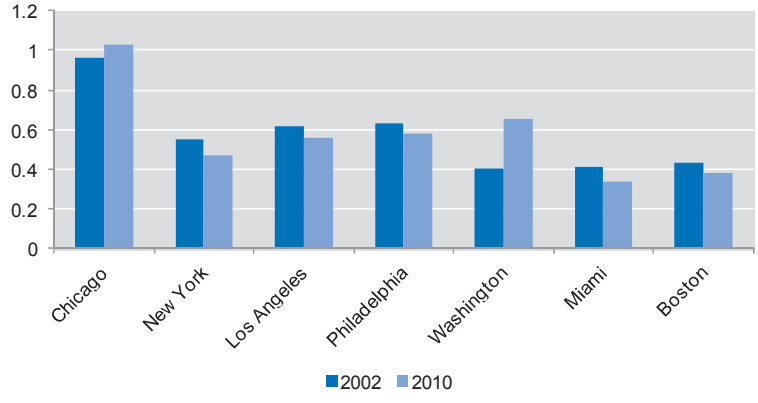
Figure 4.6. **Development of specialisation (location quotients) in warehousing, 2002-10**



Note: the location quotient indicates to what extent a Metropolitan Statistical Area is more or less specialised in certain economic sectors, as compared to the national US average. A score of 1 means similar to the national average; a higher score means higher specialisation in the sector; a lower score means lower specialisation.

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Figure 4.7. **Development of specialisation (location quotients) in trucking, 2002-10**



Note: the location quotient indicates to what extent a Metropolitan Statistical Area is more or less specialised in certain economic sectors, as compared to the national US average. A score of 1 means similar to the national average; a higher score means higher specialisation in the sector; a lower score means lower specialisation.

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Transportation and logistics as job providers

Transport and logistics are important sources of metropolitan employment; they together represented approximately 160 000 jobs in 2010: that is 4.5% of direct employment in the Tri-State Metro-Region (Table 4.4). Large shares of these are in trucking, air transportation and warehousing. A considerable share (7%) of total US employment in air transportation is based in the Tri-State Region. In some of the transport support activities, the region also represents an above-average share of US employment in the sector; this is the case for support activities for rail transport and freight transportation arrangements; they represent both 8% of US employment in this sector, underlining the role of the Tri-State Region as an important logistics hub for the US.

Table 4.4. **Transport and logistics employment in the Tri-State Region, 2010**

	Employment	Share of total employment in Chicago (%)	Share of Chicago in US employment in this sector (%)
Total transportation and warehousing	**159 728**	**4.5%**	**4.1%**
Air transportation	31 186	0.9%	7.0%
Truck transportation	42 593	1.2%	3.4%
Transit	19 949	0.6%	4.8%
Support activities for transportation	23 336	0.7%	4.3%
Couriers and messengers	12 379	0.4%	2.4%
Warehousing and storage	27 488	0.8%	4.4%

Note: The sectors indicated here are (in their respective order): NAICS sectors 48-49, 481, 484, 485, 488, 492 and 493. The Tri-State Region is here defined as the Metropolitan Statistical Area of Chicago-Jolie-Naperville IL-IN-WI.

Source: Calculations OECD on the basis of U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Overall, the transportation and logistics sector in the Tri-State Region has suffered job losses, but this is in line with the employment decreases in the overall US economy. The decline in transport and logistics employment over 2002-10 was 8 095 jobs; a reduction of 4.8% (Table 4.5). However, the share of transport employment in the Tri-State Region's economy hardly changed (in fact, grew marginally by 0.03%), as is the case for total US transport and warehousing employment as share of total US jobs. This illustrates that the job losses in the metropolitan economy correspond to job losses in the overall US economy over 2002-10.

However, job losses in air transportation and warehousing were more severe than on average in the US. The Tri-State Region's employment in air transportation declined by 23% over 2002-10 and warehousing by 6%; as a result the share of these sectors in the total metropolitan employment declined (for air transportation from 1.1% of the metropolitan employment in 2002 to 0.9% in 2010). The reduction for air transportation in the Tri-State Region is larger than the reduction of total national employment in air transportation as share of total US employment. The share of total warehousing employment as share of total US employment is in fact increasing – and not decreasing as is the case in the Tri-State Region. The decline in employment in courier services is also considerable (-15.5%), but in line with the decline of the sector at national level. In other transport sectors, the employment growth record of the Tri-State Region is much better than the national level, especially in urban transit and support activities for transportation. Also the trucking sector employment is doing better than the national average, despite job losses of 4% over 2002-10.

Table 4.5. **Development of transport employment, 2002-10**

	Employment growth 2002-10	Growth local share 2002-10 (% points)	Growth national share 2002-10 (% points)
Total transportation and warehousing	**-4.8%**	**0.03**	**0.00**
Air transportation	-23.1%	-0.20	-0.10
Truck transportation	-4.0%	0.02	-0.07
Transit	30.2%	0.15	0.05
Support activities for transportation	10.9%	0.10	0.03
Couriers and messengers	-15.5%	-0.04	-0.04
Warehousing and storage	-6.2%	-0.01	0.12

Source: Calculations OECD on the basis of U.S. Bureau of Labor Statistics, Quarterly Census of Employment and wages.

Transportation as a source of metropolitan value-added

The transport sector in the Tri-State Region generated USD 16.9 billion in 2010, which represents 3.4% of the total metropolitan economy (Table 4.6), as can be calculated based on data from the U.S. Census Bureau. If the wholesale sector is also included as part of the transport and logistics sector (which it is not the case in this chapter), then the share of the metropolitan economy rises to 8.9%. The largest transport sectors (in terms of value-added) are truck, air and rail transportation, followed by support activities and warehousing. Urban transit and courier services generate much less value-added. Important shares of the total US transportation sectors are generated in the Tri-State Region, in particular rail transportation and air transportation (8.7% and 5.4% respectively of the total US value-added in these sectors). Courier services represent a share below the US average.

Table 4.6. **Value added of the Tri-State Region's transport sector, 2010**

	Gross value added (mln USD, 2010)	Share of total value added in Chicago (%)	Share of Chicago in US value added in this sector (%)
Total transportation and warehousing	**16 911**	**3.4%**	**4.2%**
Air transportation	3 084	0.6%	5.4%
Truck transportation	**4 303**	**0.9%**	**3.6%**
Rail transportation	2 855	0.6%	8.7%
Transit	973	0.2%	3.9%
Support activities for transportation	2 436	0.5%	4.7%
Couriers and messengers	783	0.2%	1.8%
Warehousing and storage	1 962	0.4%	4.6%

Source: Calculations based on data from U.S. Census Bureau.

Value-added in the transport sector in the Tri-State Region declined over 2000-10, in particular in air transportation and courier services (Table 4.7). As a result, the importance of transport for the metropolitan economy has declined, from 3.9% in 2000 to 3.4% in 2010. This decline (-0.44 percentage points) is larger than the decline at the national level. The largest declines in value-added occurred in air transportation (-37%) and couriers (-24%), which led to larger declines in local shares than those at the national level. The decline in truck transportation was in line with that in the rest of the country. Chicago performed better in rail, transit, warehousing and storage, and support activities for transport, which become more important sub-sectors of the region's economy. Given this decline in value-added across the sector, the chambers of commerce or the transport industry associations in the region should consider the need for a study to analyse whether more value-added can be generated through hub-related business expansion and

diversification, (e.g. final-assembly plants and warehousing in the region's train-yards, etc) and/or through technological advances or other factors, to maximise the long-term economic contribution of the hub to the region's and the nation's economic performance.

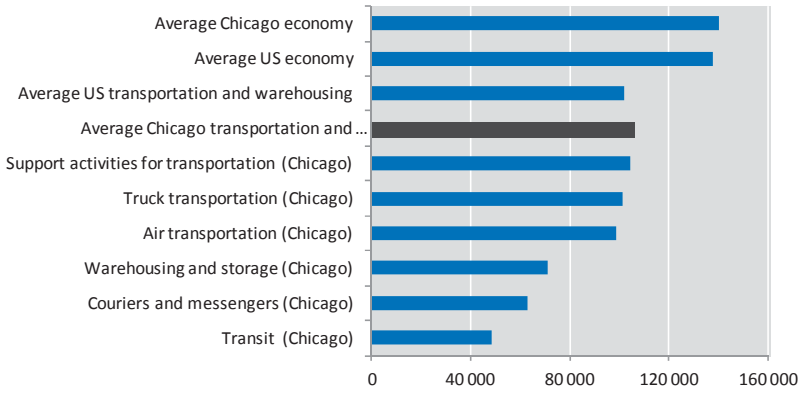
Table 4.7. **Value added growth of the Tri-State Region's transport sector, 2000-10**

	Value added growth 2000-10	Growth local share 2000-10 (% points)	Growth national share 2000-10 (% points)
Total transportation and warehousing	-5.7%	-0.44	-0.26
Air transportation	-37.0%	-0.43	-0.14
Truck transportation	-9.4%	-0.15	-0.16
Rail transportation	16.8%	0.05	0.00
Transit	34.0%	0.04	-0.01
Support activities for transportation	26.5%	0.08	0.02
Couriers and messengers	-23.6%	-0.06	-0.04
Warehousing and storage	12.2%	0.02	0.03

Source: Calculations based on data from U.S. Census Bureau.

Labour productivity in the transport sector in the Tri-State Region ranks higher than the sector's national average: the value-added per transport worker is around 4% higher in the region than in the US as a whole (Figure 4.8). At the same time, the average of total economic sectors in the region is 32% more labour productive than the transportation sector. The Tri-State Region's relative specialisation in transport is thus to some extent a drag on its performance in metropolitan labour productivity rankings. The most labour productive transport sectors are support activities, truck and air transportation; sectors in which the Tri-State Region is specialised. The courier sector, not a specialisation of the region, has lower labour productivity; with the lowest being in urban transit.

Figure 4.8. **Productivity of transport sector, 2010**



Source: Calculations OECD on the basis of U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, and U.S. Census Bureau.

Important indirect impact on the Tri-State Region's economy

The transportation sector has important links with the broader Tri-State metropolitan economy – in particular truck transportation, pipeline transportation and water transportation. These indirect economic effects constitute forward and backward linkages. Backward linkages occur when spending in *sector A* leads to additional spending in the sectors that provide the inputs to this sector. Forward linkages occur when spending in *sector A* leads to additional spending in another sector because the output of *sector A* is

used as an input for that other sector. These effects can be expressed in multipliers, which indicate the extent of the effect. The multipliers for some of the transport sectors are large, i.e. truck transportation (ranked seventh in forward linkage), pipeline transportation and water transportation (ranked second and seventh respectively in backward linkage).

Table 4.8. **Output multipliers for the transportation sector in the Tri-State Metro-Region**

	Forward linkage effect	Ranking	Backward linkage effect	Ranking
Trucking and warehousing	1.3169	7/45	1.0719	10/45
Railroad and transport services	1.1265	10/45	1.0181	16/45
Air transportation	0.7426	27/45	1.0147	18/45
Transit	0.7147	35/45	0.9381	36/45
Pipeline transportation	0.7099	37/45	1.1399	2/45
Water transport	0.6920	43/45	1.0909	7/45

Note: definition of Chicago used here is the 16-county Combined Statistical Area.
Source: Based on I/O tables from IMPLAN 2009.

Many sectors are inter-linked with truck transportation, and to a lesser extent railway and air transportation. These inter-linkages can be illustrated by the extraction method as explained in Table 4.9; the method analyses the importance of a sector by hypothetically extracting that particular sector from the input-output system. This analysis can illustrate how different sectors are interconnected. In addition, exports and imports are relatively important to Chicago's economy, which is facilitated by the transportation sector.

Table 4.9. **Backward and forward linkages of the transport sector in the Tri-State Region**

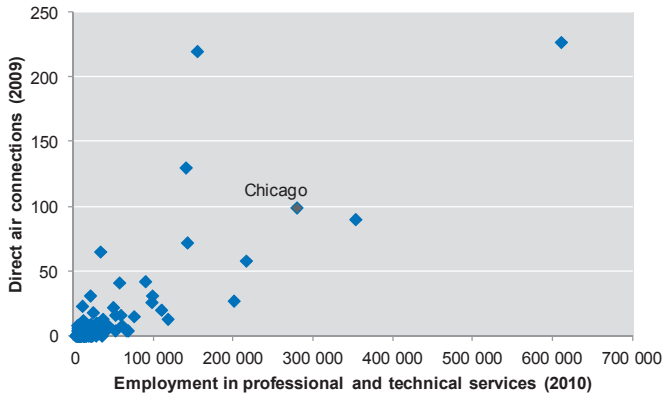
	Backward, impacted by:	Backward, impact on:	Forward, impacted by:	Forward, impact on:
Trucking and warehousing	Food and kindred products Apparel and textile products Leather and leather products Paper and allied products Stone, clay and glass products Primary metals industries Fabricated metal products Miscellaneous manufacturing Retail trade, Water transportation Transit , Real estate	Petroleum and coal products Railroad and transport services Finance and Insurance Real Estate Professional Services	Petroleum and coal products Transport equipment manufacturing Railroad and transport services	
Railroad and transport services	Utilities, Wholesale trade Air transportation Water transportation Trucking and warehousing	Petroleum and coal products Wholesale trade Finance and Insurance Real Estate Professional Services	Transport equipment manufacturing Trucking Energy conservation Manufacturing	
Air transportation		Petroleum and coal products Wholesale trade Railroad and transport services Finance and Insurance Professional Services Food services	Petroleum and coal products Transport equipment manufacturing Railroad and transport services	
Transit		Petroleum and coal products Wholesale trade Trucking and warehousing Finance and Insurance Professional Services		
Pipeline transportation		Mining, Wholesale trade Petroleum and coal products Finance and Insurance Professional Services		Utilities Petroleum and coal products Chemicals
Water transport		Railroad and transport services Trucking and warehousing Finance and Insurance Real Estate Professional Services		

Note: definition of Chicago used here is the 16-county Combined Statistical Area
Source: Based on I/O tables from IMPLAN 2009.

Attraction of high value-added services

Good airline service is an important contributor to urban economic development. It facilitates face-to-face contacts with businesses in other cities; as such it creates a kind of intercity agglomeration effect. Face-to-face contact is particularly important for sectors in which tacit knowledge plays an important role. These are in many cases innovative and knowledge-intensive sectors. Studies of the US show that a 10% increase in passenger numbers leads to a 1% increase in service-related employment (Brueckner, 2003). In another study of the US, passenger boarding *per capita* and passenger origination *per capita* in the nation's largest metropolitan areas were found to be powerful predictors of population and employment growth. This might suggest that, where airports are constrained by capacity (such as they are in the Tri-State Region, Boston, New York and Los Angeles), adding to capacity might well have an important beneficial economic impact (Green, 2007). Analysis of the airport connectivity and services sectors indicates that air connections are positively associated with employment in sectors such as professional and technical services and management of companies (Figures 4.9 and 4.10).

Figure 4.9. **Link between services industry and air connections**



Note: Employment in professional and technical services refers to NAICS sector 54. The blue dots indicate the 154 Metropolitan Statistical Areas (MSAs) in the US that had more than 100,000 jobs in 2010. Air connections for all passenger US airports that can be attributed to the 154 MSAs; only direct connections with more than 8 000 passengers per year are included in order to ignore relatively minor connections.

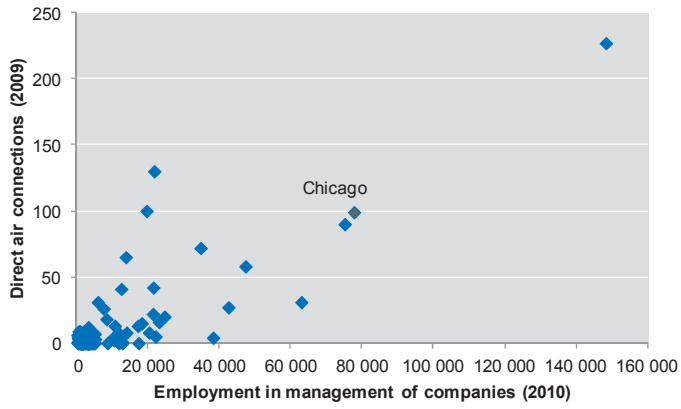
Source: OECD calculations based on ENAC database and data from U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Good airport access is also important in attracting and retaining high-technology employment. Workers in this sector travel by air about 60% more than their counterparts in manufacturing. In aggregate terms it was estimated in the early 2000s that across all major US cities, the location of a hub airport in their region resulted in about 12 000 extra high-technology jobs locating in that region. This also causes trickle-down effects on other forms of employment (Button *et al.*, 1999). Access to international markets, although declining with each additional destination served, can also positively affect local high-technology employment (Button and Taylor, 2000).

The Tri-State Region's air hub-function has contributed to the region's success in attracting global headquarters. The probability of headquarters locating in a metropolitan area increases substantially in cases where the region's airport(s) function as airline hubs. Headquarters are important for a regional economy because they attract high value- added business services. A study on the location of headquarters in the EU showed that a 10 % increase in the provision of intercontinental flights leads to a 4% increase in the number

of headquarters located in the urban area (Bel and Fageda, 2008). Data for the US also show that airline connectivity is positively correlated with the dominance of headquarters of the largest transnational firms (Global Forbes 2000 companies). The Metro-Region of Chicago is home to 31 of the largest companies in the world (in the Forbes Global 2000 list on 2010), which together represented USD 516 billion in 2010; their location might have something to do with the large airline connectivity of the Tri-State Region (Figure 4.11). The region could also be considered one of the more important US hubs for maritime company headquarters and advanced producer services (APS), despite the lack of seaport presence (Hall *et al.*, 2011). In line with the Tri-State Region's strong headquarters position, two of the 101 world-wide transport and logistics-related firms in the Forbes Global 2000 are located in the region: United Continental Holdings and Smurfit Kappa Group.[5]

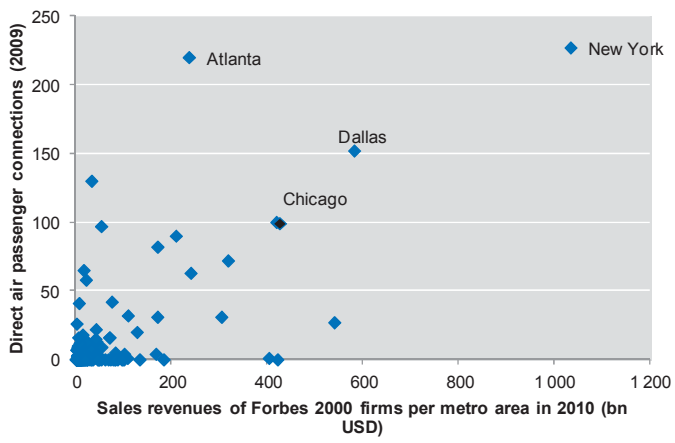
Figure 4.10. **Link between management functions and air connections**



Note: Employment in management of companies refers to NAICS sector 55.

Source: OECD calculations based on ENAC database and data from U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Figure 4.11. **Link between global headquarters and air connections**



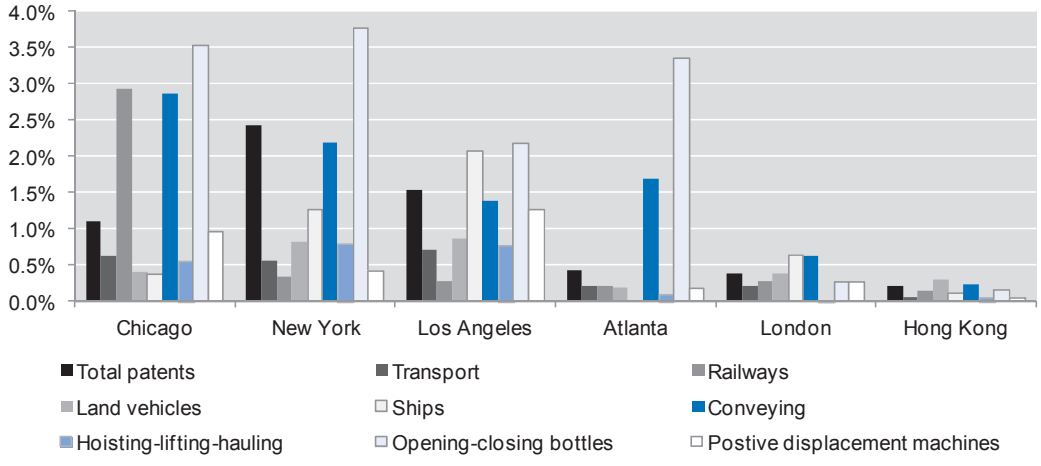
Note: The 537 US companies in the Forbes Global 2000 ranking of 2011 have been classified according to the US Metropolitan Statistical Area (MSA) in which their headquarter is located. Airports and their connections have been classified to US MSAs as well. The dots in the figure indicate US MSAs and their airline connection and sales revenues of the Forbes 2000 located there.

Source: Data on sales revenues of Forbes Global 2000 firms on the website of Fortune (*http://www.forbes.com/global2000/list*). Headquarter locations based on the websites of the 537 US firms. Airline connections based on the ENAC database.

Transport as a source of innovation

The Tri-State Region's transport hub position might have resulted in its large share of patent applications in railway transportation, but not in the other transportation sub-sectors (Figure 4.12). In railway transportation, the region is the fourth most important region in the world in terms of patent applications, according to the OECD Patent Database. Another US hub- Metro-Region, Los Angeles, has a similar role for shipping, but New York or Atlanta do not particularly benefit from their transportation hub position, as they do not have patent applications in these sectors that are larger than the average of their patent applications. The Tri-State Region also seems to have more inventions in logistics-related applications, such as conveying and the opening and closing of bottles. In these areas the region is one of the leading regions in the world, ranked second world-wide in both areas. Apart from patent statistics, it is difficult to assess the region's innovative position in transportation, as this is not an area for which university rankings or detailed R&D statistics are available, as is the case for engineering and biotechnology.

Figure 4.12. **Global shares in logistics-related patent applications of selected metropoles, 2005-07**



Note: US Metro-Regions are Metropolitan Statistical Areas; London consists of Inner London and Outer London; Hong Kong consists of the Hong Kong SAR.

Source: Elaborations on the basis of OECD Patent Database.

4.2. Main challenges facing the hub

The Tri-State Region performs major hub-functions which have important economic implications. In order to sustain these functions, several challenges will have to be tackled: land use, space constraints and congestion, infrastructure financing, enhancing hub-based value-added activities and the implications this enhancement has for skills supply in the Tri-State Region. Tackling these challenges based on evidence needs comprehensive Tri-State Regional data collection, in particular with regards to the value-added potential and the skills miss-match of the region.

Space constraints and congestion

Due to land-use constraints, a large part of logistics activity has moved away from the urban centre of Chicago. Logistics activities in intermodal facilities are by their nature very land-intensive. Large pieces of flat land near the centres of large urban areas are not

normally available without considerable clearance, and public opposition to the intrusion of large-scale intermodal activities would be likely. Consequently, sites for intermodal facilities are established some distance from the urban core, as with the CenterPoint Intermodal Centers in Joliet and Elwood (see Box 5.1). In the Tri-State Region, like in many metropolitan areas in the United States, a sub-urbanisation of warehousing has been observed (Cidell, 2010; Bowen 2008), with intermodal centres located in all three states in the region.[6]

Box 4.1. **CenterPoint Intermodal Centers: Joliet and Elwood**

CenterPoint Intermodal Center is the largest master-planned inland port in North America. It is situated on more than 6 000 acres 40 miles southwest of downtown Chicago and is strategically positioned in relation to the Chicago region's transportation infrastructure; it is adjacent to the Interstate 55/Interstate 80 interchange and anchored by the BNSF Logistics Park-Chicago and Union Pacific-Joliet Intermodal Terminal.

CenterPoint Intermodal Center-Elwood encompasses 2 500 acres with an investment of USD 1 billion. At full build out, the project is expected to create over 8 000 new jobs and increase property tax revenue by up to USD 27 million per year. The state-of-the-art intermodal and industrial business park features a 770-acre intermodal yard, BNSF Logistics Park - Chicago, which has been operational since 2002 and was born out of a partnership between the world largest rail company (BNSF) together with of the largest promoters and managers of logistics space (ProLogis and CenterPoint). A large share of the real estate of 12 million square feet is leased, underlining that the business model is based upon revenue generation from location to amortise capital investments. The main tenants are Wal-mart, DSC Logistics (a third party logistics service provider), Georgia Pacific (the world largest wood producer), Potlach (forest products), Sanyo Logistics (distribution), Partners Warehouse (3PL), California Cartage (3PL) and Maersk Logistics (3PL). The presence of the maritime shipping company Maersk underlines the setting of a hinterland strategy pursued by several shippers around the world, linking it to the West Coast ports (Rodrigue and Hesse, 2009, Rodrigue *et al.,* 2010).

Significant improvements have been to the area's infrastructure, but also to the region's environment. Through USD 35 million in grants, new water and sewer systems have been constructed to clean up contaminated water in the community and serve park tenants and area residents. Similarly, USD 125 million is being used for essential roadway components of the development and other infrastructure.

CenterPoint's private investment is expected to exceed USD 2 billion, including USD 180 million of new infrastructure, and will generate more than 14 000 new jobs according to local authorities. Additionally, The facility is employing a number of 'green' development initiatives to make this inland port the most environmentally- friendly, modern integrated logistics centre in the nation. These include minimising the dray in rail to truck movements to reduce diesel particulate emissions and fuel burn, by fostering the movement of containers by rail, reducing trucking related emissions, use of wide span gantry cranes to reduce noise, priority parking for van-pools, the protection and fostering of native vegetation, and storm water management (Dreher and Barbol, no date).

This decentralisation of logistics activity to suburban areas has generated some new challenges, including access for workers and concerns about excessive economic dependence of local communities on transport and logistics. Their land intensity and the nature of their main economic function can make access for workers difficult. Locations around intermodal facilities can be noisy and the subject of vehicle movements throughout the day. New facilities like Joliet and Elwood have also been largely built during a major recession in the housing market making the construction of new houses an

unattractive commercial proposition.[7] The result is a mismatch between where the jobs are located at Joliet and Elwood facilities and where many of the workers live.

Long-haul and local freight transport interferes with metropolitan passenger transport. There are numerous challenges associated with this interactivity in the Tri-State Region, including congestion. With the exception of dedicated tracks for high-speed rail in Europe and Japan, for example, most transportation infrastructure in the world is used by both local and long distance transport for a diverse range of freight and passenger purposes, and the Tri-State Region is no exception. This allows for the realisation of economies of scope that can justify investment in the system, but can produce serious issues when the various uses have different operating characteristics including speed and frequency of stopping.[8]

Indeed logistics activity has contributed to congestion in the Tri-State Metro-Region. Trucks accelerate more slowly than automobiles, often involve wider turning angles and their functions of delivery and collection further inhibit the flow of traffic. This can be exacerbated in places with curfews on delivery times (usually designed to reduce night-time annoyance to residents) that force pick-up and drop-offs to be made during busy periods of automobile traffic. In addition, the Tri-State Region, because of the large amount of rail freight in its geography, the legacy of non-integrated road and rail infrastructure in its suburban areas and the fact that many of the grade-separating viaducts in the City of Chicago now need upgrading or widening, faces a significant number of infrastructure deficiencies that cause gridlock. The large number of Class I freight trains with numerous wagons passing over roads is a particular challenge for the region. As a result, the region's internal transportation system is at times severely congested. According to the Texas Transportation Institute, the costs of congestion in the Tri-State Region amounted to USD 8.2 billion in 2010, with truck congestion estimated to cause a USD 2.3 billion loss, the highest among very large metropolitan areas (over 3 million population) in the US (Table 4.10). Time series show that congestion is getting worse until 2008, then plateauing, probably due to high gasoline costs and the recession.

Table 4.10. **Congestion in very large US Metro-Regions in 2010**

	Travel delay (1000 hours)	Truck congestion costs (USD million)	Total congestion costs (USD million)
Los Angeles/Long Beach/Santa Ana	521 449	2 254	10 999
New York/New Jersey	465 564	2 218	9 794
Chicago	367 122	2 317	8 206
Washington DC	188 650	683	3,849
Dallas/Fort Worth/Arlington	163 585	666	3 365
Houston	153 391	688	3 203
Miami	139 764	604	2 906
Philadelphia	134 899	659	2 842
Atlanta	115 985	623	2 489
San Francisco	120 149	484	2 479
Boston	117 234	459	2 393
Phoenix	81 829	467	1 913
Seattle	87 919	603	1 905
Detroit	87 572	382	1 828
San Diego	72 995	321	1 541

Source: Texas Transportation Institute (2011).

Limitations of current infrastructure financing

The mixture of public and private involvement in sustaining the Tri-State Region's role as the major United States logistics hub poses major financing challenges. There is a need to find resources to address the most immediate infrastructure challenges to the logistics base as well as to ensure that the infrastructure network can be maintained and developed over the long term as a sustainable region-wide transportation system. The public financing of transportation infrastructure and its operations has been seriously neglected, and its maintenance even more. Indeed the public sector often has limited resources and is generally reluctant to tap new revenue streams to finance transportation. This is in part a local problem because of the importance of transportation to the region's economy, but it also reflects a larger, national problem in the financing of transportation (Transportation Research Board, 2009). The United States Chamber of Commerce (2007) summed up its view of the situations as:

> "The nation's transportation infrastructure is in crisis. Without significant repairs and new construction, our aging roads, bridges and transit cannot begin to handle the growing transportation needs that commuters, emergency responders, truckers and delivery drivers, and law enforcement require on a daily basis. To begin facing this enormous challenge, we need to commit adequate resources while finding new and creative ways of financing the new construction and repair of existing roads, bridges, and transit as quickly as possible".

Federal funding in the United States has represented a major source of transportation infrastructure financing in the past. It has also been unequally spread across the various modes (Table 4.11). Current funding levels are unlikely to continue on the same scale into the future. Funding has come via a series of mechanisms including the federal excise tax on gasoline that goes into a highways trust fund and the Airport Passenger Facilities Charge. In addition there are specific federal transportation investment programmes such as those under the *American Recovery and Reinvestment Act* of 2009 that has a transportation component and the *Transportation Infrastructure Finance and Innovation Act* of 1998 that gives federal credit assistance to infrastructure projects.

Table 4.11. **Capital expenditure for freight transportation infrastructure, 2004**

USD billions

	Public			Private	Total
	Federal	State and local	Total		
Highways.	30.2	36.5	66.7	n.a.	66.7
Freight railroads	0	0	0	6.4	6.4
Aviation	5.6	6.8	12.4	2.0	14.4
Ports, harbours, and inland waterways	0.7	1.7	2.4	0.1	2.5
Total	36.5	45.0	81.5	8.5	90.0

Source: United States Bureau of Transportation Statistics (2010).

The reliance on a fuel tax to support the road network is now dated and is unlikely to generate enough revenue to maintain the existing system let alone create additional capacity in the future. The issue lies partly in maintaining and refurbishing the region's ageing road system if it is not to deteriorate significantly. Indeed, considering the Tri-State Region's hub-function, a degradation of its own transportation infrastructure will have an impact along the whole supply chain, and thus be felt in large parts of the US and beyond. The increased fuel efficiency of most vehicles coupled with technological

advancements in vehicle propulsion, and a reluctance to increase the rate of the fuel tax, are reducing the fiscal base upon which the tax is collected. Alternative sources of finance have become available at the local level in some jurisdictions, including in the Tri-State Region, in the form of tolls and hypothecated taxes (like the excise tax on gasoline) but these have largely been added piece-meal or been dedicated to a single mode of transportation (like roads), outside of any integrated public policy framework.

Direct user-charges reflecting the costs of individual transportation movements have long been used by the railroads and the airlines, but have been less common for road and other transportation users. For a variety of historic reasons and non-financial considerations such as meeting the transportation needs of particular groups of individuals, such as the elderly, or specific communities, such as those in peripheral areas, direct subsidies are often given, or licensing and other measures used to induce cross-subsidies from profitable services delivered by private firms to unprofitable services provided by those same firms to meet social policy objectives.

There is also the broader issue of whether there is the need for significant incremental new infrastructure in the region, or whether the main challenge is in fact making more efficient use of existing networks (Transportation Research Board, 2003). Congestion is inevitable at times on any transportation infrastructure; it is the level of congestion that matters for economic efficiency. For a link in the transportation chain, such as a road, or a node, such as a parking place, to be used efficiently a user must appreciate the full cost of using the facility and set this against the benefits derived from it (OECD, 1992). Transportation user charges, set at the appropriate level, can constitute a mechanism for achieving this as well as a source of revenue for maintaining transportation infrastructure and investing in its expansion when needed.

An additional challenge to developing efficient financing of transportation infrastructure in the Tri-State Region is that much of this infrastructure has multiple users – railway tracks by freight trains as well as by Amtrak and commuter services, runways by passenger airlines and cargo planes, and roads by trucks, cars, and buses – making cost allocation difficult. Applying user charges in the region, for example, is difficult because of the challenges of cost allocation, and in any case could engender large transaction costs if only because of the atomised administrative structures and state and county boundaries across the region. International experience shows that these difficulties can be overcome, but they will need robust mechanisms for regional co-operation.

Limited integrated, region-wide, cross-modal planning

The strategic importance of the Tri-State Region as a logistics hub might suggest that its development has been the subject of on-going interest paid by policy makers from the State and federal governments in a manner that reflects its contribution to national economic performance. Yet there is little evidence that suggests this is the case. An examination of CREATE – the Chicago Region Environmental and Transportation Efficiency Program (Box 4.1) – can illustrate the timidity on the part of senior levels of government regarding the need to engage in integrated, multi-modal long-range planning for a functional region straddling state boundaries. This, of course, is not a criticism of CREATE by any means. It is simply an illustration of the planning limitations faced by the Tri-State Region. CREATE is a major public-private partnership primarily aimed at improving rail capacity in the region, in particular with respect to non-grade separated points in the rail-road network. Most of the improvements to the network focus on five corridors that are located largely in the western and southern sections of the City of

Chicago and in Cook County. The CREATE program is an example of successful co-operation between the public and private sectors in developing and launching a viable package of transportation infrastructure projects.

Box 4.2. **The CREATE Program**

The Chicago Region Environmental and Transportation Efficiency Program (CREATE) is a project to improve the efficiency of the rail network and road networks in the Chicago area by building, amongst other things, overpasses to separate rail traffic from road traffics where their networks conflict. The tracks and junctions in the Chicago area have grown with little co-ordination between the railroads and the city since the first railroads arrived in the 1830s. There are a large number of at-grade crossings, sometimes not located a train length apart which is a problem as train lengths have grown. Some flyovers exist but do not always have clearance for tall or double-stack trains. Some connections that would create short cuts for some traffic are missing. There are highway crossings at grades.

CREATE is a public-private partnership estimated to cost around USD 3 billion, up from an initial predicted cost of USD 1 billion. The six class 1 railroads and the two belt railways serving Chicago that are part of the programme are to contribute USD 230 million, with the remainder coming from governments at federal, state and local levels. In July 2010, a USD 100 million federal transportation investment generating economic recovery TIGER grant from the federal government was finalised. As of late 2010, around USD 320 million had been committed to the project, with an additional USD 133 million to be provided from the American recovery and reinvestment act.

The programme is composed of 71 separate projects of which 46 involve eliminating rail junctions and the remainder at eliminating grade crossings, improving viaducts, and rail operations and visibility improvements. For details of the projects see city of Chicago department of transportation (2011). Of these, as of January 2011, 11 had been fully completed, nine were under construction, eight were having designs finalised, and 15 were having environmental studies carried out.

As examples of the programme, a junction in Englewood, Chicago received USD 133 million to construct a flyover for Metra tracks above a Norfolk Southern route, eliminating a grade-level crossing. 138 rains a day operate through the junction, which is the cause of the majority of delays in the Midwest for Amtrak trains. Planned since 2002, the project was originally scheduled to begin construction in late 2010, with a completion date in 2012. On 22 June 2011, it was announced that the state of Illinois, Amtrak, Norfolk Southern and the Federal Railway Administration had signed a final agreement for financing the project, with the federal government paying 95% of the cost, with construction to begin later in the year and a completion date sometime in 2013.

Source: CREATE.

Yet an examination of the CREATE program reveals the following limitations:

First, the programme's establishment was largely reactive – many of the issues it is designed to resolve have been longstanding; indeed one of CREATE's characteristics is public-private partnerships in developing and carrying out specific infrastructure projects. Yet these public-private partnership agreements emerged in reaction to longstanding infrastructure issues and took considerable time to implement.

Second, the programme's investments only covered rail infrastructure issues primarily in the Chicago/Cook County area;[9] there was no wider, Tri-State spatial co-

ordination to guide its implementation, nor was there any link to road, air or water transportation planning objectives;

Third, there did not appear to be any meaningful sequencing in the roll-out of individual infrastructure projects under the programme. The programme itself was launched in 2003 but project funding was only committed piecemeal starting in 2005, with an initial USD 100 million pledge from the railways and USD 100 million of federal investments; of which USD 48 million of federal money was released in 2007, with another USD 23 million the following year. In 2009 USD 19 million of federal money was released, with the final USD 10 million released in 2010. USD 400 million was authorised in Illinois under a state Capital Bill, and USD 1.9 million came from Railroad Relocation Funds. Another USD 100 million in federal *Recovery Act* transportation infrastructure funds were awarded in 2010 as were USD 133 million in *Recovery Act* high-speed rail funds;

Fourth, CREATE was conceived and funded outside of any consideration of the infrastructure needs related to enhancing air-cargo movement – usually handled by third-party private-sector players. This is no excuse for not engaging in intermodal planning: there is no mention of a relationship between the rail and road network upgrade needs identified in CREATE and whatever planning is being pursued regarding O'Hare and/or the establishment of a third airport in the region.

Indeed, current air-freight capacity is likely to be adequate for some time, but it is important, given the time-lag involved in implementation, to develop a region-wide airport-capacity strategy to meet both passenger and freight transport needs. The roles of O'Hare and Midway airports are likely to change as the region grows and as technology and economic shifts occur. There is thus a need to think not only about the role of these facilities, but of other airports in the region as well. While the O'Hare Modernization Program (OMP) is aimed at enhancing the operating efficiency of the airport and includes an expansion of cargo facilities, the main objective of this USD 6.6 billion programme is to increase passenger capacity at O'Hare. Several 21-county region stakeholders are also focussing on alternatives. For instance:

- Gary/Chicago International Airport[10] is located about 25 miles from the Chicago loop in northwest Indiana. While Gary/Chicago airport's current operations include no scheduled commercial passenger service, it is currently undergoing facility improvements, and the airport administration is courting airlines aggressively. A long-standing proposal to turn the airport into Chicago's third major airport received a boost in early 2006 with the approval of USD 48 million in federal funding over the next ten years. Expansion plans include a new multi-level intermodal terminal combining three modes of transit – passenger rail, passenger vehicles, and air travel. The rail system is designed to combine both commuter and high-speed lines.
- General Mitchell International Airport is approximately 86 miles north of the Chicago loop in southeast Wisconsin. The airport provides regularly scheduled passenger service on nine carriers to 44 non-stop locations in the U.S., Canada and Mexico. While it draws its passengers primarily from Milwaukee, Waukesha, and Racine counties, 3.34% are from Lake County, Illinois. A website designed specifically to target Chicago-area travellers was developed by the airport. This is part of a long-term strategy to position General Mitchell as the third airport for the

Chicago Metro as well as the 21-county regions. Gateway Milwaukee has launched Aerotopolis Milwaukee to stimulate more rapid economic growth for south-eastern Wisconsin by creating an efficient multi-modal passenger and freight transportation system for the area. Its aim is to develop and move forward with land use, multi-modal transportation, economic development, aesthetic design and environmental plans, policies and programmes in connection with General Mitchell airport.

- At the same time, Chicago Rockford International Airport[11] is currently being positioned by Rockford officials as the airport of choice to attract customers from Chicago's western suburbs. This commercial aviation airport is located in Winnebago County, Illinois, 68 miles northwest of Chicago and four miles south of Rockford. The airport is also in a foreign-trade zone and, because it has a 10 000 foot-long runway, a wide variety of cargo aircraft can use it.
- Still others are advocating for a new Chicago airport to be built at Peotone, Illinois,[12] a southern suburb of Chicago. Supporters of this airport think it will bring new jobs to the local community, while relieving critical runway and terminal congestion at O'Hare and Midway. They argue that a new airport would accommodate the larger jet service that Midway cannot. The US Federal Aviation Administration has yet to approve land acquisition and a detailed plan, however.

The point in listing these plans for expanding the region's airport capacity is not to suggest one initiative is more worthy than another, but to illustrate the fact that there appears to be little coherence, if any, between them, and between these air-traffic initiatives and the surface transportation ones laid out in the CREATE program. It is true that forecasted region-wide population growth indicates that airport-capacity expansion will be required in the future. But airports, as any other form of transportation, facilitate rather than create economic development. Any prescription for a "best" strategy for the Tri-State Region is very much predicated on an understanding of what the customers (i.e. passengers, shippers, airlines and logistics supply firms) see as important for their long term competitive position. "If we build it, they will come" does not constitute a sound public policy basis on which to make such decisions.

The Tri-State Region's transportation and logistics hub operates in a competitive global environment and there are likely to be major opportunity costs in non-optimising transportation infrastructure investments. It is therefore important, when thinking about available air-capacity expansion options (indeed for expanding any of the transportation sub-sectors' capacity), to ensure that decisions are based upon solid, quantitative data-based analyses of the actual and potential passenger-transport and logistics-related comparative advantages in the region along with the sub-sector's long-term needs. Airports are important to enhancing a region's position in this environment and continuing uncertainties about the development of Chicago's airport infrastructure adds uncertainty. But any decision not based on maximising the economic efficiency of the Tri-State Region's logistics hub and passenger gateway capacity will ultimately damage the welfare of its residents. The planning of airport capacity needs to be expeditious and based on the straightforward economic criterion that airports harness the latent economic potential of a region and are not *per se* generators of economic growth. It is equally important, if not more so, to ensure that air-cargo and surface freight transport needs are articulated within a broader strategic approach to enhancing the Tri-State Region's transport infrastructure to sustain its passenger and logistics capacity over the long term.

What is needed therefore is more integrated multi-modal, comprehensive region-wide strategic planning. While the degree of co-ordination is somewhat unprecedented and is commendable, CREATE nevertheless focuses on rail and consists of a series of individual investments to alleviate congestion and bring about environmental improvements. There did not appear to be any clear sequencing and the overall gains from the combined projects have not been rigorously assessed. The criteria for projects being included in CREATE are largely driven by considerations of congestion relief, but there appears to have been no consideration of alternatives strategies to deal with traffic congestion points. As pointed out in the City of Chicago Department of Transportation (2011) *Chicago Railroad Economic Opportunity Plan: Final Report*, many of the investments under CREATE have more to do with maintaining the existing patterns of rail freight traffic with limited consideration of future trends.

The absence of performance-measurement indicators or outcomes-related data to assess CREATE exacerbates the challenge faced by the private and public stakeholders to gauge whether CREATE can effectively address the Tri-State Region's long-term transportation challenges. Maintenance and retention regarding freight rail transportation is important, but CREATE does not provide a genuine framework to address long-term demands on the multi-modal transportation infrastructure system in the Tri-State Region. Such limitations will have a determinant impact on the hub's dynamism and its capacity to drive national economic performance over the long term.

4.3. A way forward: a planning and financing toolkit for the region's hub

The need for integrated, inter-state, multi-modal, long term planning

The Tri-State Region's hub works in a complex institutional environment. National, state, county and local *public institutions* all play a role. Hub-related activity focuses on co-ordinating passenger and freight transportation which implies infrastructure and institutional arrangements to handle:

- Movements into and out of the region
- Movements transiting directly through the region
- Movements through the region involving transhipment
- Movement entirely within the region

The *market* is the most important engine driving the provision of logistics services in the Tri-State Region. The forces of demand allow consumers of transportation logistics services to articulate their requirements and their willingness to pay for them. The forces of supply allow for these logistics services to be offered at low cost, releasing other resources to meet other social and economic objectives. Thus much of the transportation provided in the region (and on the continent as a whole), such as automobile driving, trucking, airlines, and freight railroads services, are largely provided by the private sector.

The private sector thus includes many of the main actors who provide and use transportation logistics in the Tri-State Region (from the airlines to railway companies, toll way service providers and logistics companies), while the public sector provides the policy and regulatory framework within which they act. Co-ordination occurs through

supply and demand. These forces are exercised through institutions establishing the governance of the system. The private sector thus does not operate in isolation but essentially pursues commercial objectives within a framework of local, state, and federal regulations and makes use of some publicly provided infrastructure investments.

In the Tri-State Region, as elsewhere, large parts of the local transportation, airport and road infrastructure are supplied by the public sector. Within the region there are several local bodies with various transportation responsibilities. Some of these cover administrative areas such as the counties that make up the region. Others, such as the Regional Transportation Authority in northeast Illinois and the Chicago Transit Authority, the operator of mass transit that covers the City of Chicago and some of its surrounding suburbs, transcend municipal and county boundaries. The US federal government regulates all trade that crosses state borders as well as that entering the country through international gateways, and provides funding through a variety of channels for local and regional transportation as well as for infrastructure projects and the operation of such undertakings as Amtrak, the air navigation system, security, and research and development.

No single entity has responsibility for freight transportation in the Tri-State Region or for the interaction between freight and passenger movement. This is not an unusual situation, although bodies like the New York Port Authority have quite a wide-ranging set of responsibilities for regional transportation policy, or the Metropolitan Washington Airport Authority which also manages surface access to airports in the D.C. region.

This lack of a single regulatory entity has spurred demand for a more coherent approach to Chicago's logistics challenges; demand that has emanated from *ad hoc* private-sector institutions that operate in the region. For example the Commercial Club of Chicago produced a report outlining a vision of the *Chicago Metropolis 2020* (Johnson, 1999) and in 2004 released its *Chicago Metropolis 2020 Freight Plan: delivering the Goods*. Business Leaders for Transportation (2002) produced a report primarily aimed at removing bottlenecks in truck movements in the area. CREATE has involved public- and private-sector participants. The more recent *Downtown Freight Study* (Edwards and Kelsey, 2008) focused specifically on local freight movement issues within the City of Chicago.

Most recently, the Chicago Metropolitan Agency for Planning (2010) produced *Go to 2040 regional comprehensive plan* that takes a broader, region-wide and longer-term perspective on transportation, and looks in particular at quality-of-life issues as its primary objective. The City of Chicago Department of Transportation (2011) has also examined the probable longer-terms trends in railroad activities in the City, looking at the role it may play and the opportunities for greater leverage of the system to create employment and income. Cambridge Systematics (2010) contributed a detailed assessment of the regional freight system and made recommendations on how to improve it.

Wisconsin and Indiana each have developed transportation plans as well. The *2040 Comprehensive Regional Plan* (2011), produced by the Northwestern Indiana Regional Planning Commission (NIRPC), envisions an "accessible region" and pursues specific goals in safety, mobility, accessibility, funding, and pollution reduction. The Southeastern Wisconsin Regional Planning Commission (SEWRPC) published a *Regional Transportation System Plan for Southeaster Wisconsin: 2035* (2006) and currently runs

the *Transportation Improvement Program for Southeastern Wisconsin 2011-2014*, focussing on highway- and transit preservation, improvement and expansion, as well as on safety and environmental enhancement.

There has thus been much thinking about the challenges of sustaining the Tri-State Region as a mega-logistics hub. Some of the analysis has perhaps been less broad-based geographically than it could have been, and sometimes it has been too mode-specific. The networked nature of transportation means that a change made many hundreds of miles away can affect any node in the system, either negatively or positively. While it is not possible to foresee changes at remote geographical locations, or even react to changes if they can be foreseen, it is important that the institutional structure overseeing a hub continually monitors the situation and modifies its own policies to address the imperatives of an evolving environment.

The previous section highlighted important basic issues – whether there is a genuine need to expand the region's transportation infrastructure network or simply increase the efficient use of the existing one; the piece-meal approach to applying dedicated excise taxes and user fees to single transport modes; the fact that much of the decade-long private-sector demand for greater policy and regulatory coherence as expressed in the various reports listed in the previous section remains to be addressed – speak to what is essentially a *missed opportunity* on the part of State and Federal policy makers to address the region's hub-related needs effectively by working with the region's stakeholders in a way that recognises the importance of Tri-State Region's hub.

Arguably the single most important principle driving the need for long-term, integrated, Tri-State Region-wide strategic planning to ensure that the hub can continue to contribute to the region's economic health is a clear understanding on the part of all public and private stakeholders that the hub is a key contributor to *national* economic performance. The data presented at the beginning of the chapter show beyond doubt that the Tri-State Region's logistics-hub activity for passenger and freight movement by land and air affects economic performance well beyond the region's boundaries and determines, along with New York and Los Angeles, the domestic and international efficiency of a broad range of business activity across the country and indeed the continent. This understanding should frame region-wide integrated planning in a way that focuses public, private and joint investments on improving the long-term efficiency of the hub as a multi-component engine of regional and national economic growth, not just on an amalgam of disconnected infrastructure projects to alleviate congestion.

The paucity of inter-state, region-wide planning, especially to address connectivity between air, road and rail or to develop and implement new sources of revenue from excise taxes or toll-based users fees, or the absence of significant federal engagement in articulating and leading the implementation of a vision for the hub's growth over the long term by working with the States and the local authorities to integrate state-level intermodal development plans in recognition of the functionality of the Tri-State Region, illustrate this missed opportunity. After all, in a functional region that straddles three states, the constitutional responsibility for interstate commerce alone legitimises federal leadership on these issues.

A more strategic focus to sequencing transportation infrastructure projects

Grade separation is important because it enhances fluidity of movement for passengers and freight in a complicated rail and roadway network, thereby reducing congestion and the costs to business that stem from it. Therefore it is important to

continue to focus on grade separation as a priority for transportation infrastructure investments. As indicated above, the bulk of CREATE project investments focus on addressing grade-separation issues in the City of Chicago. This is a positive objective and should be pursued with all due haste. If anything, the CREATE initiatives need to be more proactive, systematic in timing, and implemented faster. Indeed much of the surface transportation infrastructure in the region is used for a multiplicity of purposes with limited consideration of the implications this can have on the logistics capability of the region. Transportation institutions, both public and private, in the region need to be clearer about the priorities to be given to freight transportation, over not only passenger transportation, but also other forms of land-use.

Modern logistics also increasingly involves the use of multimodal transportation. The private sector should work with the public authorities in the Tri-State Region to ensure that adequate land is made available for intermodal facilities, and that sufficient corridor space is available for them to operate efficiently. The regional planning authorities should facilitate the development of intermodal facilities where they serve the best interests of the long-term viability of intermodal service suppliers.

Modern transportation networks generally benefit from significant economies of scale, scope, and density and the Tri-State Region needs to develop these further if it is to remain the premier national hub in the United States. Railway companies should be encouraged to pursue joint ventures to increase efficiency where this confers economic and social benefits to the community, provided that these initiatives do not impinge on the competition between the various carriers. The planning of airport capacity needs to be more expeditious, linked more strategically to the evolution of surface transport networks in the region and based on the straightforward economic criterion that airports are tools to harness the latent economic potential of a region.

New sources of financing to improve ageing infrastructure

Much of the existing public infrastructure in the region is in need of maintenance, refurbishment, and up-grading. Local and State authorities should place the maintenance, refurbishment, and up-grading of infrastructure at the top of its priority list when negotiating with the federal government for investment resources before spending on new capacity, no matter how politically attractive. For example, scarce federal and regional resources should not be spent on projects such as high-speed rail that have a poor record of stimulating economic growth elsewhere.

Lack of economic pricing of roads and public transportation has led to congestion, little guidance on where additional capacity would have the most economic benefit, and to inadequate resources being available for investment. More use could therefore be made of *user charges*, particularly in road transport. Direct user charges reflecting the costs of individual transportation movements have long been used by the railroads and the airlines, but have been less common for road and other transportation users. Road transportation user charges, set at the appropriate level, constitute a mechanism for achieving efficient transport infrastructure use, as well as constituting a source of on-going revenue for maintaining transportation infrastructure and investing in it when justified (Box 4.2). These measures could build on the experience in the Tri-State Region with toll roads and the higher willingness to pay toll roads in the region than in other parts of the United States, as found in a study by Greene and Smith (2010). Tolls could be extended to other highways and the existing toll roads could use more variable tolls in order to charge traffic congestion.

Box 4.3. **Road transportation fees and charges**

There is a variety of fees and charges for road transportation that exist in practice. Distinctions could be made between fixed and variable fees, the different purposes of the fees and the different users subjected to the fees.

Fixes fees are more common than variable fees. They can take the form of tolls, which are common in many countries, especially to finance new highways and bridges. Variable fees are less frequently used, because they require more implementation costs. A well-known variable fee is the congestion charge, which obliges road users to pay a fee when they drive during congestion (or pay a higher fee than at non-congested hours). The idea is that part of the traffic users during peak hours are sensitive to price incentives and will change their travel behaviour. Experiences in several Metro-Regions, such as Singapore, London and Stockholm, have shown the effectiveness of congestion charges to reduce congestion. There are instruments that resemble the congestion charge, e.g. HOT lanes and variable parking fees. High occupancy toll (HOT) lanes are highway lanes on which only vehicles with a minimum number of occupants (usually two or three) are allowed to drive, but where vehicles with less than the minimum number of occupants can drive if they pay a toll. Parking fees and taxes are price elastic and there is evidence that they are effective in reducing car trips. Experience with parking fees that vary with the scarcity of parking places at that particular time have been effective ways to influence travel behaviour and thus reduce congestion,

These instruments usually have different objectives. Tolls usually have a financing objective, whereas congestion charges aim to reduce congestion. In some cases, such as London and Stockholm, the revenues from the congestion charges are used to finance additional public transport infrastructure. Some congestion charge-schemes also have explicit environmental goals; the congestion charge introduced in Milan differentiates charges according to the environmental characteristics of the vehicles. Most of these fees and charges are levied on all road transportation vehicles, but some countries have singled out one particular group of transport users. For example, in Germany, trucks are obliged to pay a road tax that varies according to the amount of kilometres they drove on the federal highways.

Local and State authorities should therefore expand the use of existing mechanisms for financing maintenance, refurbishment, and up-grading of infrastructure, including user chargers and engaging the private sector in the provision of transportation including PPPs (public-private partnerships). At the same time, although PPPs can be efficient vehicles to improve service provision, it is not a panacea for lack of public funding. A study of the long term lease agreements for the Indiana Toll Road and the Chicago Skyway (leased in 2004 for a period of 99 years for an up-front cash payment of USD 1.83 billion), revealed that the public sector could have generated as much revenue as the private sector using the tolls, with the benefit of toll revenues remaining in control of the public sector (Ortiz and Buxbaum, 2008).

Logistics systems impose an adverse environmental footprint on regions, and Chicago is no exception. Local and State authorities in Chicago should ensure that a *polluter-pays principle* is applied when applying environmental assessment regulations to infrastructure projects. Planning authorities should ensure that the development of intermodal and other logistics facilities meet high environmental standards and that there is sufficient land available for their successful development. Public authorities through their provision of infrastructure have a role to play in managing its own environmental footprint efficiently; this could take the form of taking environmental indicators into account while granting the construction and operation of infrastructure. An example is the port extension in

Rotterdam (Maasvlakte 2), which has been planned with ambitious environmental targets in mind, that also form part of the bidding criteria for concessions to terminal operators.

Stakeholder leadership to encourage region-wide inter-state planning and federal-state engagement

Under the United States Constitution, responsibility for interstate commerce and international relations, including international trade, falls under the purview of the US government. It might therefore be useful to focus on the role played by the federal government in transportation and logistics in the Tri-State Region, given the region's strategic importance to the country in this area.

Currently, the federal government appears to be virtually absent from the policy design process for the long-term sustainability of the Tri-State Region's logistics hub. At issue is not neglect on the part of federal responsibility centres regarding investments in traditional rail, road and air infrastructure projects in the Tri-State Region, since *Recovery Act* stimulus funding for infrastructure went into the region and department of Transportation programming investments are made in the region. At issue is the absence of a policy framework within which these investments are made that focuses on the achievement of integrated, long-term policy outcomes for the hub's performance, outcomes that reflect the national importance of the region's hub activity and therefore the federal government's interest in ensuring that they are effectively achieved.

The State governments are mandated to develop intermodal strategic plans for the long-term development of transportation infrastructure in their state (SAFETEA-LU; US Code, Title 23 – Highways, Chapter 1 – Federal-aid highways, Section 135 – Statewide transportation planning). At present, there is *no* co-ordination between the three states with respect to the development and implementation of these multi-modal long-term plans as they affect the Tri-State Region. Given the national economic importance of the Tri-State Region's hub, and given its key role in interstate commerce, the federal government has the legitimacy to engage with the state governments and encourage them to co-operate more deliberately to sustain the long-term dynamism of the hub, whether through more strategic, long-term, integrated region-wide planning, broader and deeper regulatory harmonisation, greater intermodal planning (especially regarding the third airport and its relationship to rail and road infrastructure and the business needs of passenger and freight transport service providers), or more co-ordinated infrastructure investments to enhance the impact of scarce financial resources on the performance of the region's transportation infrastructure networks.

Indeed the States exercise important powers related to land-use, environmental protection and workforce development, to name but those. It is therefore in the interest of the Tri-State Region's hub's stakeholders that the three state governments work closely together to co-ordinate infrastructure investments, of course, but perhaps more importantly to engage in the type of collaborative long-term planning on the range of social, economic and environmental issues listed above that highlights the *commonality* of interests for the three states that the hub's long-term viability represents. Insofar as the federal government's investments are used to lever state funding, consideration could be given to instituting conditionality that predicates federal investment flow on inter-State collaboration on long-term strategic planning and co-ordination of infrastructure investments in the region. Examples of such vertical engagement exist in other jurisdictions, including the European Union and Canada (Box 4.4).

Box 4.4. **Logistics: "top sector" for the Netherlands**

The national government in the Netherlands has in 2010 introduced a more sector-based focus to its economic policy. This approach has been elaborated in a policy document called "Top sectors", which defines nine top sectors that the national government would like to strengthen. These include – among others - energy, food, headquarters, high tech and logistics – building on a long tradition of national policy support for the port of Rotterdam, the airport of Schiphol and the hinterland transport connections linked to these hubs. For each of these sectors programmes have been developed by so-called "top-teams" which included representatives of the business sector, academia and government. These reports set out the ambitions, concrete policy agenda's, improvements for governance and funding/budget proposals.

The agenda for the Dutch logistics sector consists of three pillars. First, a well-functioning logistic system, where information is exchanged, paperwork is streamlined, "synchro-modality" implemented (which would entail flexible switching between transport modes, and where seaports and airports co-operate, define and target the infrastructure framework at the European and national level. The second pillar is the development of supply-chain control; that is co-ordination and orchestration of supply chains, more service-oriented logistics, supply chain finance and international operations. The third pillars aims at improving the business and innovation climate in logistics, through laws and regulations, triple helix with a focus on firms and knowledge transfer, education and labour market, knowledge development and an innovation agenda. Within the field of governance: the establishment of one Strategic Logistic Platform was recommended.

Federal engagement need not be understood as code for increased government intervention (or even co-ordination) in the functioning of the hub or increased public interference in the regional market for the hub's business activity. There is a distinction to be made between market intervention and policy engagement. Engagement in this instance can take the form of:

- *facilitating dialogue* between all key private and public stakeholders in the region by providing the means to sustain this dialogue over time and by focussing it on the definition of key region-wide objectives for the hub and on the development and implementation of integrated strategies to achieve them; an example is formed by the long term concerted action of national and regional governments in the Netherlands to build up and sustain its position as main logistics hub (via the port of Rotterdam and the airport of Amsterdam) to Europe, as exemplified in several "Mainport strategies" developed over the years and the recent recognition of logistics as one of the "top sectors" for the Netherlands (Box 4.3).
- applying policy conditionality to its funding programmes, notably to lever *greater interstate co-operation* in integrating infrastructure plans as they affect the Tri-State Region, and in pooling investments in infrastructure development and workforce training to meet the hub's needs; and
- Working with the region's stakeholders to *develop region-wide data and performance indicators* to define infrastructure needs more coherently against the long-term strategic objectives for the hub's performance. The federal government plays a key role in developing performance measurement capacity. There is a dearth of data for assessing the economic contribution of the Tri-State Region as a national logistics hub and the region's infrastructure needs to sustain this role over the long term. Any investments in infrastructure upgrades and expansion

need to be based on empirical evidence, including accurate, region-wide performance indicators. There is always need for good data and all reports inevitably recommend more resources be spent on data collection.[13] Data is important in understanding trends of commodity and traffic flows at the level of a mega hub such as the Tri-State Region's as well as for national, strategic policy formulation and assessment. There is also a need for local transportation and development agencies within the Tri-State Region to co-ordinate data collection for their individual activities. The authorities in the region should seek to gain a better understanding of the US logistics system and to develop more integrated region-wide strategic planning capacity within the Tri-State Region's planning agencies.

At issue is how to "catch the attention" of the federal and state governments. Clearly, in the Tri-State Region (and in the United States generally), there is limited appetite for government co-ordination/leadership in complex economic ecosystems like major transportation and logistics hubs. Indeed, the Tri-State Region's hub's major stakeholders mostly come from the private sector, whether they are the railway companies or the airlines, or the trucking firms or the logistics service-providers or the like. In addition, as Chapter 6 points out, the Metropolitan Planning Organizations (MPOs), business associations and private foundations and other civic groups have traditionally played a leadership role in policy design and planning in the Tri-State Region. Nonetheless, the State and federal governments materially influence the hub's growth prospects because of their policy responsibilities and investments in infrastructure improvements, of course, but also because of their engagement in the variety of interconnected hub-related social and environmental issues including workforce development, access to transit near key hub-related intermodal sites, efficient land-use and densification issues to encourage more efficient intermodal activity along with more efficient access to affordable housing for the workers who operate the intermodal sites. A strategic approach covering this breadth of policy challenges can improve the hub's capacity to contribute effectively to regional and national economic performance over the long term in a way that short-term piecemeal investments in grade-separation projects alone cannot.

Box 4.5. **Multi-level governance and large scale infrastructure: the case of Canada and the European Union**

Canada has instituted a multi-level governance model to achieve long-term, integrated community sustainability objectives as part of its funding mechanisms for urban infrastructure. Under the terms of its 2003 Gas Tax Fund (GTF), the federal programme that flows revenue from the federal excise tax on gasoline to municipalities for urban infrastructure projects related to transit, water and sewer and solid waste management, the federal government established certain policy conditions for municipalities in exchange for which investment funds would flow. These conditions include the requirement for a municipal government, or a cluster of municipalities in a functional metropolitan region, to develop and implement an Integrated Community Sustainability Plan (ICSP) that focuses on a long-term vision for the community or region and on the strategic planning required to implement it. The ICSP is developed and its implementation monitored through on-going community involvement by all key stakeholders – from concerned residents to non-government organisations, business, labour and academics. It is these ICSPs that identify the need for metropolitan infrastructure and embed specific projects, particularly large and complex ones like transit, water and waste systems, within an integrated strategy that seeks to implement a community or regional vision over a twenty to thirty-year time horizon.

Box 4.5. **Multi-level governance and large scale infrastructure: the case of Canada and the European Union** *(cont.)*

To implement its GTF, the government of Canada negotiated formal agreements with the provinces and territories – the order of government constitutionally responsible for municipal institutions that set out the terms and conditions of the programme, including the requirement on the part of recipient municipalities to develop and implement an ICSP. In many cases, the provincial and territorial associations of municipalities are signatories to the agreements, and the governments of Canada and Ontario signed a distinct agreement with the City of Toronto. In all cases, municipalities are held accountable for developing and implementing their ICSP, as well as reporting out on progress in its implementation.

The first impact of these agreements was the trust that was built between partners – vertically between levels of government, and horizontally across stakeholder groups. This approach, while very broad, might be adaptable to the Chicago region, if only because it could afford the opportunity for the US federal government to bring the three state administrations and the metropolitan authorities together around a single table to discuss a cluster of issues that, if addressed effectively, could meet the interests of all parties. This would go a long way to illustrate the fact that key challenges in the Tri-State Region affect all three states and the federal government, and that solving them is in the long-term interests of all governments and their citizens in the region.

The ***European Union*** has a specific programme to foster interregional co-operation: the Interreg IVC programme that is financed through the European Regional Development Fund (ERDF). The aim of the programme is to improve the effectiveness of regional policies and instruments through an exchange of experience among partners from different EU-member states. One of the initiatives within logistics is the CASTLE-project, which stands for Co-operation Among SMEs Toward Logistic Excellence, in which regional partners from eight different EU-countries participate. This project has identified 20 best practices in strengthening the logistics supply, improving logistics demand, strengthening logistics training and institutional consolidation in logistics. The discussion and exchange on these best practices has served public authorities to assess main logistics inefficiencies in SMEs in the mechanical and automotive sectors and to develop relevant policy measures.

Chapter 6 lays out a set of recommendations that focus on the Tri-State Region's stakeholders – both public and private – taking the lead in demonstrating the importance of the logistics hub to national economic performance through data gathering and in articulating a clear policy rationale for why the federal and state governments need to "pay attention" to the challenges faced by the Tri-State Region's hub. Specifically, the region's stakeholders – perhaps led by the MPOs or by a partnership between the MPOs, foundations and key private-sector transportation and logistics firms – could drive a process that would focus on the following:

- Work with the region's universities to establish a network of research centres[14] to engage in policy debate, data-gathering and performance-indicator development to build a coherent evidence base on the economic importance of the hub, on the challenges it faces and on the impact these challenges will have on the country if they are not addressed effectively;
- Articulate a policy rationale on why the state governments need to integrate their multi-modal strategic transportation plans to take account of the functionality of the Tri-State Region and the need for transportation policy, planning and infrastructure investments to reflect this functionality; and

- Include in this policy rationale the need for federal engagement in encouraging inter-state co-operation in policy design, strategic planning and infrastructure investment pooling to address, in an integrated fashion, the passenger and freight transportation issues regardless of mode faced by the region's hub.

Bottom-up leadership is crucial in an environment characterised by competing interests vying for increasingly scarce public resources available to address an ever-expanding list of policy challenges. The list of stakeholders in the Tri-State Region capable of driving this exercise is as long as the exercise is multi-faceted. But the challenges facing the transportation hub, in particular the lack of inter-state planning and the need for significant on-going investments to address passenger and freight infrastructure bottlenecks demand that attention be paid to these issues. No one is better placed than the Tri-State Region's stakeholders themselves to take on this responsibility effectively.

Notes

1. O'Hare and Midway airports
2. The 21-county region's other major passenger airport at Milwaukee falls outside the Chicago Tri-State Metro region as defined in Chapter 1.
3. Approximately 75 000 rail cars move in the United States on an average day – 37,500 through Chicago
4. It is also possible to calculate this location quotient on the basis of value added, but for reasons of international comparison the LQs based on employment will be presented here (there are no European data on value added for detailed sub-sectors available).
5. These are companies in the following categories: air couriers, airlines, containers and packaging, other transportation, railroads, trading companies and trucking.
6. The Tri-State Region has many large suburban brownfield sites. The Southeast side, south of 95th street would benefit from development and job creation as would much of the I-55 corridor between I-94 and LaGrange Road. The CenterPoint development has much more potential than what has been developed thus far. It is in the general vicinity of the proposed third airport. There is ample land for additional rail connectivity projects, it offers proximity to waterway access and it has three major highways in close proximity.
7. While there are wide local variations in the Tri-State Metro-Region, for the region the single-family price index in June 2011 was the lowest for the area since March 2001, according to S&P data. The local index has fallen about 34.7% since its peak in September 2006.
8. The economics transportation and associated jargon are explained in Button (2010)
9. And one project in Northwest Indiana
10. For more information see *http://www.garychicagoairport.com/*.
11. For more information see *http://www.flyrfd.com/*.
12. For more information see *http://www.southsuburbanairport.com/*.
13. Consideration of better ways to collect and use data is one of the themes for the US Department of Transportation establishment of new University Transportation Centers.
14. The recommendation in chapter 6 suggests a research mandate that should cover innovation-driven economic development, transportation/logistics and workforce development in the Tri-State Region; this recommendation highlights the transportation/logistics issues because that is the subject of this chapter.

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Chapter 5

Increasing the Tri-State Region's competitiveness through green growth

This chapter focuses on the Tri-State Region's green growth potential. Green jobs are growing in the region, particularly in building related activities and transportation. The region has also become specialised in professional energy services, air and water purification technologies, lighting, and green architecture and construction services. Sustainable financing mechanisms are needed for energy efficiency retrofits and energy audits to build the region's green architecture and construction sectors. The public transit system is facing a severe funding shortage; congestion charges and value-capture taxes should be considered to address the issue. Changing water and waste fees across the region to better reflect consumption and cost of service delivery would encourage conservation and recycling while generating additional sources of revenue.

Key Findings

- *Green jobs are growing in the Chicago Tri-State Metro-Region, with building-related activities boasting the largest share of jobs after transport. Green job growth over the next 5-10 years is expected to be highest in the building and transportation sectors.*
- *The Tri-State Region has become specialised in the green sectors of professional energy services, air and water purification technologies, lighting, and green architecture and construction services.*
- *Activities to reduce the environmental impact of the built environment should be a priority, given their potential for creating jobs, strengthening sectors in which the Tri-State Region is strong, and increasing the region's attractiveness.*
- *Sustainable financing mechanisms are needed for energy-efficiency retrofits and energy audits to fulfil the sector's potential to significantly reduce energy consumption, create jobs, and build a regional specialty in green architecture and construction.*
- *The emerging wind energy sector, which may still need public intervention to remain competitively priced for the consumer, could benefit from technical assistance to strengthen the regional wind energy supply chain*
- *The public transit system is facing a severe funding shortage; congestion charges on roadways and value-capture taxes should be considered as part of a comprehensive financing package.*
- *Changing water and waste fees across the Metro-Region to better reflect consumption and cost of service delivery would encourage water conservation and recycling, and could provide an additional source of revenue.*
- *Green-related R&D activities in the Chicago Tri-State Metro-Region should be more closely linked to green firms in the region, which could benefit from technology transfers.*
- *Information-sharing and common energy-efficiency program across the Metro-Region (and thus across state lines) would help provide a more stable business environment for the Metro-Region's green clusters.*
- *US federal policy has an important role to play in fostering green growth in the Chicago Tri-State Metro-Region, by supporting green R&D, removing legislative obstacles, and providing clear signals on carbon pricing.*

The Chicago Tri-State Metro-Region faces the challenge of sustaining economic growth while also responding to urgent environmental priorities. Higher energy consumption, rising greenhouse gas emissions, road congestion and deteriorating water quality are the negative externalities that have come with urban growth. Many metropolitan regions across the OECD have turned their attention to the concept of green growth as a means of increasing economic competitiveness through addressing environmental challenges (Box 5.1).

Box 5.1. **What do we mean by urban green growth?**

Green growth aims to steer economic growth in a different direction, addressing externalities and other factors poorly served by current measures of economic activity. It also recognises that environmental policies that do not support economic growth and wealth creation are not sustainable in the long term. The OECD Green Growth Strategy defines the concept as follows: "Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and ecosystem services on which our well-being relies. To do this it must catalyse investment, competition and innovation which will underpin sustained growth and give rise to new economic opportunities."

The scope of this definition can be extended in three ways when applied to OECD urban areas, by taking into account:

- *A need for new sources of urban growth:* given the negative externalities generated by urban agglomeration and cities' urgent need to reduce their energy consumption and greenhouse gas emissions, urban areas have the opportunity to conduct environmental policies that can foster these new sources of economic growth
- *Policy complementarities present at the local level*: there are more opportunities on the local level to enact environmental and economic policies that are complementary, as activities related to environmental protection and economic development are more integrated at the local level than at the national level. Green growth policies benefit from these policy complementarities and can thus be more effective when applied at a local scale
- *The importance of social equity to urban development*: the implementation of green growth at the local level addresses social issues in a more direct way than at the national level. There are clear instances where green growth initiatives can provide social co-benefits and others where the transition might generate concerns for social equity.

Taking these into account: we urban define green growth in this report as:

- Fostering economic growth and development through urban activities that reduce negative environmental externalities, the impact on natural resources and the pressure on ecosystem services. The greening of the traditional urban economy and expanding the green urban sector can generate growth (through increased supply and demand), job creation and increased urban attractiveness. These effects are in part the result of stronger interactions at the urban level among economic efficiency, equity and environmental objectives.

Source: Hammer, S., *et al.* (2011), "Cities and Green Growth: A Conceptual Framework", *OECD Regional Development Working Papers, No. 2011/08,* OECD Publishing. doi: 10.1787/5kg0tflmzx34-en.

The City of Chicago has declared its ambition to become the most environmentally friendly city in the US, and has grown into a model for green buildings and infrastructure. The Chicago Tri-State Metro-Region is home to important and growing green clusters, particularly in the professional energy services. In the Chicago-area 21-county region, the Milwaukee Metro-Region boasts the most important water technology cluster in the US, and is attracting international attention for it. These activities point to strong potential in the Chicago Tri-State Metro-Region for "growing green", but they are still in the early stages.

Two key planning documents serve as the starting point for identifying green growth opportunities and targets in the Chicago Tri-State Metro-Region. The first is the Chicago Metropolitan Planning Agency's *Go To 2040 Comprehensive Regional Plan*, which covers the seven Illinois counties surrounding the City of Chicago (CMAP, 2010a). The plan provides indicators, recommendations, implementation actions and financing strategies for four core themes: *i*) liveable communities; human capital; efficient governance; and regional mobility. More limited in scope, but no less important, is the City of Chicago's Climate Action Plan (CCAP) (City of Chicago, 2008b). With a time horizon of 2020, the CCAP seeks to reduce energy usage around the city, promote the use of clean and renewable energy sources, improve the public transit system and change transport patterns around the city, reduce local waste and pollution levels, and make the city more climate change resilient. The City of Chicago mayor's transition plan committed to refocus CCAP around jobs goals (Chicago2011, 2011). Similarly, regional plans by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and Northwestern Indiana Regional Planning Commission (NIRPC) regional plans serve as starting points for identifying green growth opportunities and targets for their respective regions. Southeastern Wisconsin regional plans for the year 2035 address land use, transportation, water supply and quality, flooding mitigation, open space, and natural resource preservation. The NIPRC Comprehensive Regional Plan 2040 addresses growth patterns, transportation and environmental and green infrastructure. Green growth efforts in the Chicago Tri-State Metro-Region are also being driven by several other analyses prepared by different consulting firms or non-governmental organisations analysing the state of the green job marketplace, and analysing opportunities and impediments to expansion.

This chapter assesses the potential for greater growth through the green sector and environmental policies in the Chicago Tri-State Metro-Region and in the Chicago-area 21-county region. It begins with a discussion of sectors, particularly those related to reducing building energy consumption, which could take priority for increasing jobs growth, production and consumption of green goods and services, and urban attractiveness. This is followed by an analysis of environmental challenges and green growth opportunities in five sectors: buildings, energy, transport, water and wastewater, and solid waste. Energy efficiency retrofitting and green building design are top priorities for job growth and distinguishing the Metro-Region's green architectural expertise, but the right mechanism for financing energy efficiency investments has not yet been developed. Wind energy holds the promise of developing a sector that is beginning to call the Chicago Tri-State Metro-Region home, but renewable energies are still not price-competitive. The public transit system helps the Chicago Tri-State Metro-Region rank high on

attractiveness indexes, but lack of sustainable funding solutions risk squandering this asset, losing with it the opportunity to fight congestion and greenhouse gas emissions, and provide jobs. Water and waste service delivery is costly and does not take into account environmental impacts, which calls for a restructuring of rates to incentivise conservation and recycling. Finally, the chapter presents implications and opportunities for workforce, innovation and governance policies. One important response would be to more purposefully foster the growth of key green clusters, in tandem with the Metro-Region's wealth of research institutions and community colleges. Another response would be to scale the City of Chicago's green ambitions to the Metro-Regional level, working across counties to set the priorities that will enable to the Metro-Region to grow economically while becoming one of the greenest Metro-Regions in the OECD.

5.1. The growth potential of the green economy

The Chicago Tri-State Metro-Region stands out for the number of green sectors that are specialised in the region, particularly those related to buildings and, in the Chicago-area 21-county region, water technologies. Brookings (2011a) has ranked the Chicago Tri-State Metro-Region among the top five Metro-Regions in the US for specialisations in professional energy services, and the Metro-Region also exhibits specialisations in Air and Water Purification Technologies, Lighting, and Green Architecture and Construction Services (Table 5.1). In terms of potential for future growth, RW Ventures, a Chicago-based consultancy, is further deepening the cluster analysis using Brookings (2011a) data and has identified strong opportunities for future growth, including in the sectors of green buildings, wind energy, smart grid, vehicle electrification, and water purification and treatment. All were seen as areas where there was solid intellectual capital development occurring around the region at local research institutions (including Argonne National Laboratory); good niche market opportunities that leverage areas where Chicago has sizable market activity (e.g. the possible electrification of freight drayage vehicles at the region's massive rail yards); and areas where there is already evidence of regional clustering (e.g. proximity to the Milwaukee Water Cluster) (Weissbourd, 2011).

Green sectors related to buildings and energy efficiency particularly stand out as specialties in the Chicago Tri-State Metro-Region. Sectors related to building represent three of the top four specialisations in the Metro-Region: Professional Energy Services, Lighting, and Green Architecture and Construction Services (Table 5.1). A fourth related sector, HVAC and Building Control Systems, is not far behind. The Metro-Region's large architectural and engineering community contributes to the strength of this specialisation. The City of Chicago's distinction as being home to the highest number of LEED-certified square-footage also contributes to local demand for green energy, architecture and construction services, and energy-efficiency technologies including lighting (USGBC, 2011). In addition, the Chicago Climate Exchange (CCX), though no longer operating, created a pool of environmental professionals skilled in carbon auditing in the Chicago Tri-State Metro-Region (Merrion, 2010), adding to the range of professional energy services.

In the Chicago-area 21-county region, the Milwaukee Metro-Region has the strongest specialisation in the US in water efficient technologies (Brookings, 2011) (Table 5.2). This is complemented by specialisation in air and water purification technologies. Both activities reflect the strength Milwaukee Water Council, which advances the interests of more than 150 companies and research institutions located in the greater Milwaukee region, that produce water-related goods, services, or research. The Milwaukee Metro-Region also hosts significant specialisations in Battery Technologies, Appliances and in Lighting, which present opportunities for strengthening supply chains with firms engaged in related activities in the Chicago Tri-State Metro-Region.

The green sector also provides the Chicago Tri-State Metro-Region with an opportunity to increase its international exports, as it has become the largest green economy exporter in the US. Exports of clean technologies, goods and services are estimated at USB 2 billion annually, ahead of the Los Angeles, New York, Albany and San Francisco Metro-Regions, which each export over USD 1 billion annually. Seven sectors each export over an estimated USD 100 million annually, led by professional energy services. Most of the exports from this sector come from a single diversified company whose activities include energy efficient engineering related research related to petro-chemicals. The other large exporters are HVAC and building control systems, followed by bio-fuels, green consumer products, air and water purification technologies, green chemicals and organic food (Brookings, 2011).

Growth in the green sector is an important factor in the Chicago Tri-State Metro-Region's attractiveness, particularly for sectors related to buildings and transportation. Prominent city indexes increasingly include sustainability as a factor of attractiveness or specifically rank cities by their "green-ness", including the Siemens Green city index, Forbes World's Smartest Cities. To increase the Chicago Tri-State Metro-Region's attractiveness to firms and highly skilled workers, it would be important to priorities not only green building design, but also green roofs and alleyways and public transport. The Chicago Tri-State Metro-Region has the potential to build on its reputation as a centre for innovative architecture and the greatest number of LEED-certified buildings to become recognised as a centre for green building design. The City of Chicago's green roofs and alleyway re-paving initiatives would contribute to this distinction, as they are often presented as prime examples of the Metro-Region's forward-thinking approach to urban redevelopment. To sustain this reputation, there is a need to increase the scale of these efforts. Public transportation service is also a key factor in urban attractiveness. The City of Chicago has ranked in the top five among 26 world cities for transportation infrastructure, given the Metro-Region's public transit coverage (PricewaterhouseCoopers, 2011). However, the Metro-Region is at risk of squandering this competitive advantage, if sufficient investment is not made for system expansion and upgrades.

Table 5.1. **Green sector specialisations and jobs in the Chicago Tri-State Metro-Region**

Segment	Specialisation	Ranking[1]	Jobs in Segment 2010	Change in jobs 2003-10	Share of all Green Jobs[2]	OECD category
Professional Energy Services	3.4	4	5 353	4%	12%	b
Air and Water Purification Technologies	2.6	10	2 031	97%	4%	w
Lighting	2.3	12	1 063	5%	2%	b
Green Architecture and Construction Services	1.9	15	3 332	3%	7%	b
Public Mass Transit	1.9	8	20 664	58%	-	
Green Chemical Products	1.4	16	983	33%	2%	
Biofuels/Biomass	1.3	11	856	21%	2%	e
HVAC and Building Control Systems	1.3	20	2 936	4%	7%	b
Green Consumer Products	1.3	14	3 213	-5%	7%	
Recycling and Reuse	1.2	25	5 123	89%	11%	
Pollution Reduction	1.1	28	337	66%	1%	
Nuclear Energy	1.1	20	2 622	9%	6%	e
Waste Management and Treatment	1.1	39	13 567	24%	-	
Renewable Energy Services	1.0	13	64	12%	0%	e
Battery Technologies	1.0	27	531	7%	1%	e
Wind	0.7	28	540	919%	1%	e
Remediation	0.7	59	1 267	37%	3%	
Organic Food and Farming	0.7	44	2 809	37%	6%	
Professional Environmental Services	0.7	64	3 007	30%	7%	
Water Efficient Products	0.6	19	261	-67%	1%	w
Recycled-Content Products	0.6	32	1 152	7%	3%	
Green Building Materials	0.6	30	1 556	29%	3%	b
Training	0.5	54	4	-	0%	
Sustainable Forestry Products	0.5	31	942	-26%	2%	
Energy-saving Building Materials	0.4	84	2 189	40%	5%	b
Geothermal	0.3	25	30	43%	0%	e
Solar Thermal	0.2	41	32	1500%	0%	e
Smart Grid	0.2	34	119	0%	0%	e
Energy-saving Consumer Products	0.2	27	142	-19%	0%	
Appliances	0.2	34	233	203%	1%	
Conservation	0.2	81	1 714	28%	4%	
Fuel Cells	0.1	33	16	-	0%	e
Solar Photovoltaic	0.1	58	101	742%	0%	e
Regulation and Compliance	0.1	74	587	-14%	1%	
Waste-to-Energy	0.0	30	5	-	0%	e
Hydropower	0.0	58	7	-22%	0%	e
Total (excluding waste and transit)			45 157	20%		
Building activities combined			16 429	10%	36%	
Energy activities combined			4 923	26%	11%	
Water/air activities combined			2292	25%	5%	

Notes: 1. Specialisation ranking among US Metro-Regions: the numerator is the ratio of jobs in the segment and Metro-Region in 2010 to total Metro-Region employment in 2010. The denominator is the ratio of total US jobs in the segment in 2010 to total US employment in 2010. 2. Total does not include public transit or waste management.

Source: OECD adaptation of Brookings (2011a) "Sizing the Clean Economy, a National and Regional Green Jobs Assessment", Brookings Institution Metropolitan Policy Program, Washington, DC, US, available at: *www.brookings.edu/~/media/Files/Programs/Metro/clean_economy/0713_clean_economy.pdf*.

Table 5.2. **Green sector specialisations and jobs in the Milwaukee Metro-Region**

Segment	Specialisation	Ranking1	Jobs in Segment 2010	Change in jobs 2003-10	Share of all Green Jobs2	OECD category
Water Efficient Products	14.8	1	1167	9%	13%	w
Battery Technologies	6.2	8	603	1%	7%	e
Lighting	3.4	9	290	0%	3%	b
Appliances	2.4	11	540	-58%	6%	
Air and Water Purification Technologies	1.8	16	266	16%	3%	w
Pollution Reduction	1.7	15	104	3%	1%	
Green Chemical Products	1.5	14	206	-3%	2%	
Green Architecture and Construction Services	1.3	32	435	14%	5%	b
Recycling and Reuse	1.2	26	968	26%	11%	
HVAC and Building Control Systems	1.2	22	520	-64%	6%	b
Sustainable Forestry Products	1.2	13	435	6%	5%	
Training	1.2	22	2	-	0%	
Renewable Energy Services	1.1	12	13	-	0%	e
Public Mass Transit	1.0	36	2 107	1%	-	
Organic Food and Farming	1.0	30	781	46%	9%	
Recycled-Content Products	1.0	23	349	1%	4%	
Waste Management and Treatment	0.8	78	1792	50%	-	
Green Consumer Products	0.8	26	370	60%	4%	
Remediation	0.8	54	270	9%	3%	
Energy-saving Building Materials	0.5	76	491	19%	5%	b
Conservation	0.4	49	821	14%	9%	
Regulation and Compliance	0.4	53	310	3%	3%	
Wind	0.4	36	62	-59%	1%	e
Professional Energy Services	0.2	72	48	92%	1%	b
Professional Environmental Services	0.2	72	48	-90%	1%	
Solar Photovoltaic	0.1	63	12	71%	0%	e
Energy-saving Consumer Products	0.1	41	10	-	0%	
Biofuels/Biomass	0.1	58	8	-	0%	e
Nuclear Energy	0.0	40	0	-	0%	e
Green Building Materials	0.0	82	0	-	0%	b
Geothermal	0.0	30	0	-	0%	e
Solar Thermal	0.0	46	0	-	0%	e
Smart Grid	0.0	44	0	-	0%	e
Fuel Cells	0.0	34	0	-	0%	e
Waste-to-Energy	0.0	31	0	-	0%	e
Hydropower	0.0	64	0	-	0%	e
Total (excluding waste and transit)			9 129	-11%		
Building activities combined			1 784	-30%	20%	
Energy activities combined			698	-8%	8%	
Water/air activities combined			1 433	10%	16%	

1. Specialisation ranking among US Metro-Regions: the numerator is the ratio of jobs in the segment and Metro-Region in 2010 to total Metro-Region employment in 2010. The denominator is the ratio of total US jobs in the segment in 2010 to total US employment in 2010.

2. Total does not include public transit or waste management

Source: OECD adaptation of Brookings (2011a) "Sizing the Clean Economy, a National and Regional Green Jobs Assessment", Brookings Institution Metropolitan Policy Program, Washington, DC, US, available at: *www.brookings.edu/~/media/Files/Programs/Metro/clean_economy/0713_clean_economy.pdf*.

Job growth across a range of green sectors

The growth of the green sector in the Chicago Tri-State Metro-Region has brought with it a significant number of green-sector jobs.[1] The Chicago Tri-State Metro-Region is among the top five Metro-Regions in the US for a range of green sectors jobs, demonstrating the diversity of the Metro-Region's green economy. The Chicago Tri-State Metro-Region is home to more jobs in air and water purification technologies than any other metro area in the US, and is the second-largest employer in the fields of green chemical products, green architecture and construction, and public mass transit. The Chicago Tri-State Metro-Region is also home to a comparatively large number of jobs in the sectors of lighting, professional energy services, green consumer products, recycling and waste management (Brookings, 2011) (Table 5.1).

The number of green jobs in the Chicago Tri-State Metro-Region is growing, but the pace varies by subsector. In the Chicago Tri-State Metro-Region, there were roughly 45 000 clean economy jobs in 2010 (excluding public transit and waste management jobs, which would add roughly 34 000 jobs). This represents a 20% increase over the nearly 38 000 jobs in this sector in 2003. To allow for comparison with future government studies, Brookings (2011) relied on a job-category system recently devised by the U.S. Bureau of Labor Statistics. Because other local green economy studies in the Chicago Tri-State Metro-Region employ broader definitions of energy and waste-related jobs, this report presents an alternative categorisation method. Under this more expansive category definition of energy jobs, for example, job growth occurred more slowly in building-related activities than in activities related to energy or water and air.

Building-related activities account for 36% of all green jobs in the Chicago Tri-State Metro-Region (excluding public transit and waste management jobs) and comprise the largest share (Table 5.1). It is notable that employment in the most-specialised building-related activities (Professional Energy Services, Lighting, Green Architecture and Construction Services, and HVAC and Building Control Systems) grew more slowly over the past seven years than in other building-related activities that are less specialised, such as Energy-saving Building Materials (35%) and Green Building Materials (30%). Both of those subsectors may have seen their market expand as the number of buildings in the region pursuing LEED certification expanded. Energy-related activities account for the second-largest share of the green sector (11%), and include nuclear energy, biofuels/biomass, wind, battery technologies, smart grid, solar photovoltaic, renewable energy services, solar thermal, geothermal and fuel cells. If public transportation were included in this count, at nearly 20 700 jobs in 2010, it would represent the largest share of green jobs in the Metro-Region (Brookings, 2011).

Although growth in building-related sectors has been slower than in those related to energy and water/air, according to recent studies conducted in the Chicago-area labour market, building related-sectors are estimated to add the highest number of green jobs over 2009-20, followed by the energy sector (Table 5.3). Going forward, building retrofits are estimated to be responsible for the highest number of new jobs over 2009-20.

Table 5.3. **Green job forecasts**

Sector	Estimated new jobs	Specific activity	Area covered	Time Period	Source
Buildings	3 770	Retrofitting	City of Chicago	2009-20	Schrock (2009)
Buildings	400	Green roofs	City of Chicago	2009-20	Schrock & Sundquist (2009)
Energy distribution and supply	2 000	Smart grid	City of Chicago	2011-	Val Jensen, Com Ed, July 2011
Energy distribution and supply	Hundreds	CCAP renewable energy goals	City of Chicago	2009-20	Schrock & Sundquist (2009)
Transport	Thousands	Construction jobs for new train line expansion	RTA service area	2009-20	Schrock & Sundquist (2009)
Water / wastewater	2 000	Water/wastewater system upgrades	City of Chicago	2009-20	Schrock & Sundquist (2009)
Solid waste, reuse and recycling	920	Per each 10% increase in recycling	City of Chicago	Unknown timeframe	Schrock & Sundquist (2009) citing Chicago Department of the Environment
Open space (green infrastructure)	2 800	Green infrastructure	Cook County	2004-14	Schrock & Sundquist (2009) citing Illinois Department of Employment Security

Source: Schrock (2009); Schrock & Sundquist (2009); Val Jensen, Com Ed, July 2011; Chicago Department of the Environment, Zero Waste Strategy Report, Section 8 "Business Opportunities and Job Creation; Illinois Department of Employment Security, Occupational Employment Projections.

5.2. Sectoral opportunities for green jobs, green firms and urban attractiveness

Although addressing the built environment should be a top priority, other specific activities within sectors exhibit strong potential for green growth in the Chicago Tri-State Metro-Region as well. Green building design and energy-efficiency retrofits can increase green jobs and strengthen the Chicago Tri-State Metro-Region's specialisation in green building and energy services. Green roofs and permeable alleyways can enhance urban attractiveness while reducing potential future costs of climate change impacts. Wind energy attracts headquarter functions and smart grid technologies present opportunities to improve ageing electricity structure and lower energy costs. Congestion charges could provide a much-needed source of financing that would reduce road congestion and enable the public transit system to better respond to commuters' needs. The most important water technology sector in the country has developed in the Chicago-area 21-county region. The green growth potential of each of these activities will be considered based on their impact on jobs, regional green firms, and the Metro-Region's attractiveness.

Boosting jobs and a regional specialisation through energy-efficiency building retrofits and design

The built environment in the Chicago Tri-State Metro-Region presents both an important environmental challenge and green growth opportunity and should be a top priority for a green growth strategy. In terms of the challenge, building energy consumption accounts for well over half (63%) of the metro region's greenhouse gas emissions and imposes comparatively high costs on energy consumers (CNT, 2009). Buildings in the Chicago Tri-State Metro-Region tend to use far more energy than even comparable buildings in the Midwest, in part due to their age and lack of insulation. In terms of the opportunity, retrofitting of existing buildings to increase their energy-efficiency involves a relatively high demand for low and semi-skilled labour and strengthens the local cluster in professional energy services. Design and construction of new green buildings calls for medium-to-high skilled labour and can enhance the Metro-Region's green architecture and construction services sector. Green roofs and permeable

services can expand landscaping and road working job opportunities and increase the city's attractiveness in part by reducing vulnerabilities to potential climate change impacts. These activities would go far in reinforcing the Chicago Tri-State Metro-Region's image as a green urban area.

Energy efficiency retrofitting

Energy efficiency retrofits are needed to reduce existing buildings' energy consumption, but they face financing and information obstacles. Energy efficiency technologies need to be retrofitted on to existing buildings in order to reduce their energy consumption. Retrofits require up-front investments, which can be recovered over time through energy savings. However, many building owners do not have access to financing for the required investment or lack the information necessary about potential energy cost savings to justify such an investment. To address these obstacles, the Center for Neighborhood Technology in the City of Chicago established the Energy Savers program, which leverages government funds, utility grants, and charitable foundation support to conduct energy efficiency audits, provide technical assistance, and offer low interest energy retrofit project financing to the owners of multi-family dwellings serving low income populations. In 2010, CMAP and the cities of Chicago and Rockford sought to increase retrofits region-wide by establishing Energy Impact Illinois, which seeks to increase the pace of retrofitting across all property sectors by increasing access to financing and information (Box 5.2).[2]

Box 5.2. **Energy Impact Illinois**

CMAP, the City of Chicago and the City of Rockford established Energy Impact Illinois in May of 2010, out of recognition that the current energy efficiency market in the region is fragmented and still in the beginning stages of growth, facing impediments like multiple and incomplete information sources, inadequate financing products that do not meet market needs, and a lack of trained workers being connected with appropriate jobs. The program was started with USD 25 million in funds from the US DOE's Better Buildings Neighborhood Program, which is authorised through the American Recovery and Reinvestment Act (ARRA) of 2009.

Rather than directly fund retrofit projects, Energy Impact Illinois seeks to remove the key institutional barriers preventing more widespread investment in retrofits. Most of the program funds (USD 15.75 million) are for improving access to finance across the multifamily, single-family residential and commercial building sectors. This activity is accomplished mostly through creation of Revolving Loan Funds and/or credit enhancements like Loan Loss Reserves that have allowed the program to secure commitment of USD 128.5 million in private investment leverage from multiple financial institutions nationwide.

An additional USD 6.5 million is dedicated to increasing public access to information, through a broad-based marketing campaign, a web-based information system and on-line building energy tools to help consumers understand their home or building's greatest energy savings potential. Finally, USD 200 000 of grant funds is committed to development of a workforce intermediary, which looks to align the workforce with the jobs created through EI2 and other energy efficiency programs in the region.

It is expected that over the three-year life of the ARRA funds (2010-13), approximately 6 000 residential units and 10 million square feet of commercial space will be retrofitted, resulting in the creation of an estimated 2 000 jobs.

Source: CMAP (2009a), Energy Impact Illinois – Program Summary, CMAP, Chicago.

Long-term funding sources for energy-efficiency retrofit programmes are still needed. This is especially true since the ARRA funds for Energy Impact Illinois will end in 2013, leaving the programme without a reliable source of funding. Energy service companies (ESCOs) are a private-sector solution to the problem of funding up-front retrofit costs, but they have not been widely used for residential retrofitting project. ESCOs guarantee minimum energy savings and frequently structure the deals in ways to eliminate any out-of-pocket costs by the building owner, instead recovering their costs through the owners' energy savings. In July 2011, the City of Chicago announced a new initiative whereby the City will partner with one or more ESCOs to complete energy retrofits on up to 100 public buildings around the city. Under the terms of the agreement, ESCOs selected by the city will perform audits of targeted buildings, secure private financing for all appropriate upgrades, and then carry out the retrofit. Savings would be guaranteed to the City, and are expected to amount to USD 4-5.7 million annually. This work is projected to generate 375 new jobs (of unknown duration) and USD 40 million in construction work (Public Building Commission of Chicago, 2011). While ESCOs have been filling the need for commercial and institutional energy retrofits, they have been involved in comparatively few residential retrofitting projects. The City of Berlin overcame this problem by partnering with investment banks to provide loans for retrofits by residential property owners and tenants (Box 5.3).

Box 5.3. **The City of Berlin energy efficiency retrofit program**

The City of Berlin has worked with the German public investment bank Kreditanstalt für Wiederaufbau (KfW), the principal financial institution in Germany that finances retrofits, and Investionsbank Berlin to provide private buildings owners, tenants and housing corporations with access to loans. Since 1991 over EUR 4 billion has been invested in retrofits that save roughly 631 000 tons of CO_2 every year (City of Berlin, 2011). The refinancing of those loans is in principle done via rent increases up to 11%, a model that applies particularly well in a city like Berlin where a large part of the housing stock consists of rented flats, much as in other German cities. The higher rent in renovated buildings is balanced through the savings that tenants have on their heating and electricity bills. As a result of various KfW program since the early 1990s, around one third of the residential buildings in Berlin have been retrofitted, including 273 000 prefabricated apartments, for which energy consumption was reduced by 50% (City of Berlin, 2011).

Source: City of Berlin (2011), Climate Protection in Berlin, Senatsverwaltung für Gesundheit, Umwelt und Verbraucherschutz, Berlin.

Widespread use of energy audits could support the efforts of Energy Impact Illinois and ESCOs. The European Union's Energy Performance of Buildings Directive, and new requirements imposed by New York City's "Greener, Great Buildings Plan" all seek to use information about a building's energy performance to incentivise its owner to improve the building's efficiency. The incentive arises from the belief that the attractiveness of a building will be influenced by its energy use relative to other buildings. Renters and buyers will take this information into account when comparing new homes, buildings or offices, recognising that less efficient buildings may have cheaper rents or sales prices, but higher monthly energy bills could offset any savings. Research in both the US and Europe has demonstrated the link between certification of lower energy consumption and higher real estate values (Popescu *et al.*, 2011). Policy makers in the

Chicago Tri-State Metro-Region could take this one step further by requiring a full assessment of the viability of clean and renewable energy retrofits any time a commercial or industrial building is sold. The new owner would not be obliged to pursue any specific installation, but ready access to this information could prove compelling in leading them to voluntarily take action shortly thereafter.

Municipalities in the Chicago Tri-State Metro-Region could also lower the cost of building owners' investments in energy-efficiency distributed renewable energy technologies through low-costs loans, but this would require a change in federal legislation. Property-Assessed Clean Energy (PACE) program allow property owners to borrow funds from their municipality to pay for efficiency improvements. The cost of the loan is added to the property tax bill, meaning repayment occurs on a quarterly basis as part of the regular tax payment. This strategy eliminates the problem that property owners who intend to sell their property have little incentive to invest in efficiency upgrades, because PACE passes the repayment obligation on to the new property owner. Under PACE, municipalities establish a funding pool to pay for the upfront installation costs, and the pool is repaid over time, allowing funds to be reused to support additional loans. PACE attracted considerable attention nationally when it was first employed in California, and in 2009, the Illinois Legislature passed a law allowing municipalities to set up these programs. Interest stalled in 2010, however, after the Federal Housing Finance Administration, Federal National Mortgage Association (Fannie Mae), and Federal Home Loan Mortgage Corporation's (Freddie Mac) declared they would not buy mortgages from homes with PACE assessments, citing concerns about the potential risk of default on mortgages involved in PACE program (Speer, 2010). Currently, no municipalities in Illinois have established PACE programs, and this will likely remain true until that time this issue is resolved at the national level (DSIRE, 2011). Legislation to address this problem was introduced in Congress in 2011, but no other action has occurred to date. At the federal level, support for legislation to remove the impediments to PACE project financing could have very beneficial consequences for retrofit activity around the Chicago Tri-State Metro-Region.

New green building design

Green building design standards for new construction are important for ensuring that the future built environment in the Metro-Region will be energy efficient. State and local building codes are contributing to these standards, but more could be done. The Illinois Energy Conservation Code incorporates the 2009 International Energy Conservation Code, which is considered the current global building code standard. Local governments around the state may adopt more-stringent energy codes for commercial buildings, but not residential buildings. The City of Chicago was granted an exception, thus the City of Chicago Energy Conservation Code of 2008 requires residential buildings applying for construction permits to exceed the standards called for by the Illinois Building Energy Code. If other municipalities in the Chicago Tri-State Metro-Region were also allowed to require buildings to exceed state standards, this could give rise to policy innovations and reduce the potential for intra-regional competition caused by differing building standards.

Permitting incentives complement energy efficiency building standards by encouraging property developers to innovate cost-effective green building designs. They also help to address possible added costs in more price sensitive-sectors, such as affordable housing. The City of Chicago provides incentives for green building design through the Chicago Green Permit and Green Homes Program, which expedites the

permitting process of applicants that meet a minimum score on the City of Chicago's "Green Homes green building rating system. As of May 2010, there were 250 homes enrolled in the Green Homes program. Regionally, the Metropolitan Mayor's Caucus, which involves mayors from 273 communities within the Chicago Tri-State Metro-Region, prepared best practice guidance for member communities on municipal energy code compliance and enforcement.

Green building codes and incentives provide an opportunity to strengthen the activities of the Metro-Region's architectural and professional energy services firms. This concentration of green architecture and construction and energy-efficiency expertise can strengthen the Metro-Region's reputation as an international centre for green building design. Green building design codes will require the use of architects and engineers with different skill sets, which the Chicago Tri-State Metro-Region is prepared to meet. The Metro-Region's large architectural and engineering community accounted for more than 39 000 jobs in 2009, including more than 4 000 LEED-certified experts in the City of Chicago alone. There are currently 1 600 members of the Chicago chapter of the US Green Building Council (USGBC-Chicago, 2009).

Green roofs and permeable pavement

The City of Chicago has gone beyond building energy efficiency measures to become a leader in promoting green roofs and green infrastructure strategies that adapt to potential climate change impacts. The City supported the deployment of 72 green roofs over 2005-07, and now requires large new developments to capture the first half-inch of rainfall on site (City of Chicago, 2011e; City of Chicago, 2008b), lessening runoff levels. A unique feature of the City of Chicago Energy Conservation Code is its requirement that buildings seek to minimise solar energy absorbed by building green roofs, which is intended to decrease the energy used for cooling the building and encourage the use of green roofs. To reduce the risk of flooding and wastewater releases during storm events, the City of Chicago transformed more than 100 alleys around the city between 2006-10, replacing the pavement with more permeable surfaces and plantings (City of Chicago, 2011d).

Green infrastructure strategies create job opportunities for the construction trades, firms involved in the supply of trees and plants, and landscape and horticultural design, installation and maintenance firms. It is estimated that there are over 10 000 jobs in Landscaping and Grounds maintenance jobs in the City of Chicago and 21 000 in Cook County (Schrock, 2009). Overall, "moderate job growth" in the landscaping and horticulture field is projected for the region in the coming decade (Schrock, 2009). Schrock and Sundquist (2009) suggest that green infrastructure investments could build on recent increases in the number of landscaping and grounds keeping jobs in the region. Estimates from the City of Washington DC are that the construction of one million square feet (92 900m^2) per year of green roofs would support 400 jobs, 60% of which would be roofing and landscaping jobs, while the balance would require professional design skills. (Schrock & Sundquist, 2009 citing Casey Trees Endowment Fund & Limno-Tech Inc.) Assuming the impact is similar in the City of Chicago, achieving the Chicago Climate Action Plan's goal of 10 million square feet (929 000 m^2) of new green roofs by 2020 would result in approximately 400 new jobs. However, CWIC-CJC (2010) is less optimistic about the level of new job creation that will occur, particularly in the landscaping and horticulture maintenance space, given the large number of trained but currently unemployed workers around the region.

Enhancing the potential of wind and other renewable energies

Renewable energy and smart-grid technologies are still in their infancy, but hold promise for contributing to growth in the Chicago Tri-State Metro-Region. Renewable energy sources represent a very small share of the metro region's energy supply. In March 2010, 46% of the power supply sold within the ComEd service area was derived from nuclear power plants, 40% from coal-fired power plants, 10% from natural gas, and only small amounts of wind power (1%), biomass (1%), hydropower (1%), and assorted other sources (1%) (ComEd 2010). However, wind power is a growing industry that is attracting headquarter functions to the Chicago Tri-State Metro-Region. Opportunities for wind may increase with more aggressive power plant emission regulations currently being promulgated by the US Environmental Protection Agency, which would force coal power plants to invest in new pollution control equipment. Wernau (2011a) estimates that up to one fifth of the state's power generation capacity could exit the market rather than investing in the necessary upgrades, potentially driving up prices for local consumers by 65% and offering opportunities for renewable energy sources. Demand-management program and smart grid investments can reduce energy costs for customers and facilitate the distribution of renewable energy. Given the state of the existing electricity grid, smart-grid investments would contribute to a more attractive, efficient regional energy supply

The Chicago Tri-State Metro-Region shapes up as an important centre for the wind energy industry due to its strategic position for the growing market in the Midwest "wind belt". Together with other Great Lakes states such Michigan and Ohio, the Chicago-area 21-county region has one of the highest concentration of wind energy component suppliers in the US. Thirteen wind industry corporations have set up their headquarters in the Chicago Tri-State Metro-Region, including some of the major international firms involved in turbine manufacturing and renewable project developers, such as Goldwind, Acciona, Suzlon, Nordex or E.On. The Chicago-area 21-county region counts over 60 wind companies, which cover a large part of the supply chain, including turbine and tower makers, manufacturers of gears, couplings, bearings and fasteners, as well legal, financial and engineering consulting and diagnostic software designers (ELPC, 2011). In Wisconsin, the Wisconsin Wind Works, a consortium of suppliers and vendors to wind energy counts 300 companies, with 40 companies joining in 2010 alone, and a high concentration of firms around Milwaukee (Wisconsin Wind Works, 2011). As discussed previously, with 540 jobs in 2010, the Chicago Tri-State Metro-Region ranked 6th among US metro regions for wind industry jobs, having experienced 39.3% annual average growth between 2003 and 2010 (Brookings Institution, 2011a). This strong job growth reflects on the one hand the 39% annual average growth of the US wind energy market over the past five years (AWEA, 2010), as well as the increasing investments into wind energy deployment in Illinois, which ranked the second state after Texas in 2010 in terms of added wind energy capacity (AWEA, 2011c).

Despite the potential for growth, the wind energy sector still relies on state and federal program to be competitive. The Illinois Renewable Energy Portfolio Standard promotes wind energy by requiring that 25% of the state's electricity be provided by renewable sources by 2025, and that 75% of that amount come from wind power. Wisconsin is on track to reach its RPS target of 10% renewable electricity by 2015 and has enough potential, thanks in part to its capacity for wind generation, to reach the 25% aimed for by 2025. While Indiana does not have binding renewable energy targets, the state did enact a voluntary Clean Energy Portfolio Standard, which has the goal of reaching a 10% share of electricity from renewable sources by 2025 (UCS, 2010; FERC,

2011). Growth in renewable energy generation is driven by the federal Renewable Electricity Production Tax Credit, which provides a credit of USD 0.022/kWH for wind, geothermal and closed-loop biomass energy production for the first ten years of operation (DSIRE, 2011). However, this tax credit is due to expire in 2012. Growth in the renewable sector could also be accelerated through public sector purchasing of renewable energy, such as the city of Calgary has done with the "Calgary Ride the Wind" initiative, which provides 100% of the cities' light rail electricity consumption through wind power (Box 5.4).

Box 5.4. **Calgary Ride the Wind**

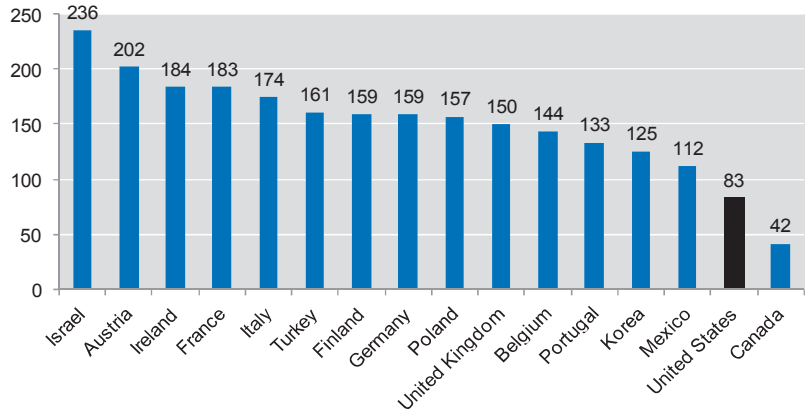
Since 2011, the City of Calgary's light rail "C-train" has operated entirely on wind-generated electricity. It saves approximately 47 000 tons of CO_2 per year and replaces annually over eight million private vehicle trips in the city of Calgary. Through a wind power purchasing agreement with their local energy distributor (ENMAX), the amount of electricity needed to transport 90 000 million people each year with the C-train is provided to the grid by a wind-farm located in Southern Alberta. Calgary *Ride the Wind* is the only public rail system entirely powered by wind-generated electricity in North America (Calgary Transit, 2011). System expansions are planned, which will lead to further CO_2 savings. Calgary Ride the Wind is a key element of the city's overall energy strategy, which aims to purchase 100% of the city's electricity from renewable sources by 2012, and to reduce CO_2 emissions by 80% below 2005 levels by 2050 (City of Calgary, 2010).

Sources: Calgary Transit (2011), "Environment", website of Calgary Transit, *www.calgarytransit.com/environment/environment.html*, accessed 1 December 2011; City of Calgary (2010), *Corporate Environment, Health & Safety*. Annual Report 2010, City of Calgary, Calgary.

Comparatively low energy prices may also be stifling renewable energy innovation. The price of coal-generated electricity in the US is among the lowest in the OECD (Figure 5.1). Wind and other renewable energy sources cannot currently compete with the low cost of coal and other fossil-fuel sources. The impact of low fossil fuel prices depends on the renewable energy source. Given the mobility of solar energy panels and other technologies, manufacturers of solar energy may be able to compete in markets where fossil fuel prices are higher or incentives for renewable energy are greater, such as in some European countries. However, this mobility exposes manufacturers to competition with manufactures from other countries, notably China, where the price of solar energy technologies has fallen dramatically. The size of wind energy turbines requires them to be produced closer to installation sites, which provides opportunities for manufacturers in regions near wind-energy installations, such as the Chicago-area 21-county region. However, demand for wind-energy technologies is more sensitive to regional fossil-fuel prices. A national price signal, such as in the form of a cap-and-trade program or a carbon tax, could make renewable energy sources much more cost-competitive with fossil fuel sources, depending on the baseline price that was established. A further argument for national pricing of carbon is that just as many Metro-Regions price services related to water and waste water – and increasingly power – to reflect the true cost of distributing a scarce resource, a pricing signal for carbon that reflects the negative externalities associated with greenhouse gas emissions, while not perfectly analogous to the water/wastewater example, could nonetheless be based on legitimate policy considerations. The Chicago Climate Exchange (CCX) voluntary carbon market demonstrated the potential of a cap-and-trade program. At its peak, allowances for a ton of carbon were valued at USD 7.40, a price expected to double if the US had enacted a

comprehensive carbon trading scheme. Trading through CCX stopped after it became clear that the US would not enact a carbon trading scheme, however, demonstrating the importance of national pricing signals (Merrion, 2010).

Figure 5.1. **Comparative prices of electricity from coal, 2009**



Note: OECD countries for which data is unavailable are not displayed. Price is shown in USD/MWh.

Source: IEA (2011), "End-use prices: Energy prices in US dollars", IEA Energy Prices and Taxes Statistics (database). doi: 10.1787/data-00442-en (Accessed on 15 November 2011).

Technical assistance is another important way to promote the wind industry, as other Great Lakes states have demonstrated. For manufacturing companies to understand the market opportunities and the needs of the wind industry, the states of Michigan or Ohio provide technical assistance to companies to retool their operations to become wind energy suppliers. For example, The Ohio Energy Office is financing a collaborative project, led by the Great Lakes Wind Network (GLWN) and Ohio's Edison Technology Center, to identify suitable companies for retrofitting of their facilities to produce wind energy components (AWEA, 2010). Strengthening the regional wind energy supply chain in the Chicago Tri-State Metro-Region may require both informing firms about this new business opportunity and connecting these firms with those managing the supply chain. One study has identified particularly strong opportunities for local gear and drive train manufacturers to penetrate the wind turbine component parts market (CMC/JARC, 2009). The Midwest Governors Association also provides a platform for attracting investment to renewable energy producers and their supply chain, across the states of Illinois, Indiana, Wisconsin, Iowa, Kansas, Ohio, Michigan, Minnesota, Missouri, South Dakota. Given the need to manufacture wind turbines relatively close to where they will be installed, working with other states in the "wind belt" can benefit wind-related suppliers and manufacturers in the Chicago-area 21-county region.

The feasibility of distribution of energy from renewable sources depends on the ability of the electricity grid to accommodate inputs from smaller energy generators and to manage peak demand. The Building Owners and Managers Association (BOMA) of Chicago, a leading real estate group, aims to create a 'virtual generator' composed of up to 14 commercial and residential buildings in the downtown area. Using smart grid technology, the participating buildings will monitor usage and PJM Interconnection wholesale prices, automatically scheduling and implementing curtailment strategies based on this information. The ultimate goal of the program is to expand to over 200 BOMA

member-owned buildings in downtown City of Chicago, as they collectively represent 1 000 MW of peak load, and could potentially reduce peak demand by 200 MW under this system (BOMA, 2010). This smart grid pilot is being carried out in collaboration with the Korean Smart Grid Association, with Korean firms underwriting its cost, indicating the presence of a market that smart-grid firms in the Chicago Tri-State Metro-Region could potentially meet. Other smart grid initiatives are being launched by ComEd along the "Smart Grid Innovation Corridor", ten communities where 130 000 smart metres have already been installed. With funding support from the US Department of Energy, Com Ed will test out a variety of system upgrades, including the deployment of an 'intelligent' substation, electric vehicle charging infrastructure, self-correcting power lines, and equipment to more accurately gauge the locational impacts of solar photovoltaic system integration on the grid (GreenBiz, 2010). Smart grid legislation passed in the State of Illinois in October 2011 now sets the stage for large-scale investments to update the electricity grid in that state, but it has been criticised for reducing oversight of electricity rates and its potential to raise electricity rates. (Wernau, 2011b).

Expanding public transportation and reducing congestion to increase jobs and competitiveness

Public transportation is an important factor in the Chicago Tri-State Metro-Region's attractiveness and a key green employer, but investment in the system not kept up with the region's needs, contributing to road congestion and emissions. As discussed in Section 1, OECD work shows that regions with the highest concentration of economic activity tend to have greater endowments of infrastructure and physical capital, thus a higher stock of infrastructure *per capita* that can positively impact productivity. Evidence shows that the Chicago Tri-State Metro-Region's competitiveness is being undermined in part by the growing inadequacy of its transportation infrastructure, which is typified by high rates of road congestion. Road congestion imposes costs and effectively reduces the size of the labour market in the Metro-Region, preventing the Metro-Region for benefitting fully from the potential productivity gains associated with agglomeration economies.[3] Most residents travel by passenger car, resulting in high rates of road congestion and emissions. According to one recent estimates road congestion costs passenger vehicle users in the Chicago Tri-State Metro-Region USD 1 568 per commuter per year in terms of value of travel time delay and excess fuel consumption – the highest figure in the United States (Texas Transportation Institute, 2011).[4]

Despite benefiting from past investments that have given it the second-longest commuter rail system in the US, the Chicago Tri-State Metro-Region's public transit system that not kept up with the needs of a suburbanising population. Public transportation accounts for only 2.5% of daily commuting in the Chicago Tri-State Metro-Region, although this figure rises to 9% of all commuting trips in the seven counties of the CMAP area (CMAP, 2010). One of the causes of congestion is the inability of public transport infrastructure to keep up with suburbanisation patterns, which has left most residents in the Metro-Region unable to reach their jobs by public transport. This has been exacerbated further by recent suburban development being built with low housing and employment densities and auto-oriented standards, resulting in a built environment where provision of transit services is inefficient and cost-prohibitive. This makes extension of transit services difficult or implausible for some areas, leading to greater auto-dependency and congestion.

While the Chicago Tri-State Metro-Region has the second-largest public transportation system in the US, most of the population is unable to commute to work using it. Sixty eight percent of people in the seven-county CMAP region live within one quarter of a mile (400 m) of a fixed-route public transport stop or station and 76% of jobs are located within a quarter mile of transit. However, only 24% of the working population living within three quarters of a mile (1.2 km) of public transport can get to work using public transport within 90 minutes (CMAP, 2010, 294; Brookings, 2011, 35-44). In suburban areas this figure drops to 14%. The Chicago Tri-State Metro-Region's sprawling growth patterns contribute to a disconnect between the location of public transport locations, residences and employment. The region ranked 51st out of 90 OECD Metro-Regions in terms of population density, with 383 people/km^2. Density levels in the Chicago Tri-State Metro-Region are not only below the OECD average for Metro-Regions (671.5 people/km^2), but also well below the densities of Los Angeles (864.8 people/km^2) and New York (795 people/km^2). The Chicago Tri-State Metro-Region is among the top 20 OECD regions in terms of growth of the suburban belt.[5] Suburbanisation of housing has been met by suburbanisation of employment. Between 1960 and 1990 over 96% of new jobs in the region were created outside downtown, resulting in an increase in inter-suburban commuting and "reverse commute" trips from the urban core to the suburban belt (Chicago Council on Global Affairs, 2007, 25; CMAP, 2010, 292). Inter-suburban trips are difficult to accommodate within the existing transport system, which is still organised around a hub-and-spoke pattern.

While expanding the public transit system could reduce congestion and ease mobility, and increase jobs in one of the fastest-growing green jobs sectors, the public transit system barely has enough funding to operate, let alone upgrade or expand. This poses a problem for the Metro-Region's future attractiveness, as public transit access and ease of mobility have been cited as key factors in the region's high rankings among world cities. The Regional Transport Authority (RTA), which serves six counties and 88% of the population in the Metro-Region, has applied most of its funding on operations (over USD 2 billion annually) rather than maintenance or capital investment.[6] This is due in part to the rapid increase in operating costs, which have risen 4.5% annually, outpacing inflation (CMAP, 2010). Approximately half of RTA's operating costs are financed by fares and other system-related revenues (e.g. advertising and concession), with the remainder supplied by an RTA sales tax applied based on proximity, a real estate transfer tax in the City of Chicago, and state matching funds and contributions. Capital funds come primarily from federal and state sources; while federal sources of capital funding are relatively consistent from year to year, annual state funding can vary significantly. In 2007, the RTA lacked USD 226 million to keep all services running, which prompted an increase in the RTA sales tax and real estate transfer tax (CMAP, 2010). The RTA (2007) estimates that investments of USD 7.3 billion would be necessary over a five year period to maintain the transport system, an additional USD 1.1 billion would be needed to enhance it, and USD 2 billion more would be needed to expand it over that time period. The cost of maintaining, enhancing and expanding the system over 2007-37 is estimated at USD 57 billion (RTA, 2007; CMAP, 2010). It is estimated that investments to maintain and enhance the transport system would result in annual benefits of USD 2 billion (Chicago Metropolis 2020, 2007). While extending public transportation is a matter of large public funding, public opinion is in favour of investments to improve the system (95%) rather than for new roads (75%) (CMAP, 2010).

To reverse the decline of the Chicago Tri-State Metro-Region's public transportation system, a long-term, region-wide transportation plan and funding strategy is needed.

CMAP (2010a) provides a comprehensive inventory of transit projects that are possible under both fiscally constrained and unconstrained scenarios. However, the fiscally constrained scenarios prioritise bringing the existing system to a state of good repair. New projects are limited to extension of the CTA Red Line and creation of the West Loop Transit Center to improve system-wide transit connections. The Plan also recommends that expressway extensions and/or lane additions should be planned to integrate additional transit facilities where appropriate (CMAP, 2010a). The unconstrained scenario delivers a wealth of transit projects currently under study, but none of these will be possible without greater funding and hard decisions by the cities and counties of the Metro-Region on funding priorities. The SEWRPC regional transportation system plan for southeastern Wisconsin to 2035 recommends significant improvement and expansion of public transit in the region, centred around Milwaukee. This would include nearly doubling public transit service by 2035, the development a rapid and express transit systems, and improvement of existing local bus transit systems. The NIRPC plan places a priority on transit-oriented development around existing commuter rail stations along the south shore of Lake Michigan, and at regional bus and multi-modal hubs (NIPRC, 2011). While these plans represent an important starting point, there is a need for all 21-counties in the Chicago-area 21-county region to contribute actively to regional transportation planning and funding. One potential model is the New York-New Jersey Port Authority, the first cross-state agency in the US, which plans and manages air, train and water transportation in the New York Metro-Region. A common platform for transportation planning and funding could enable key stakeholders from across the Chicago-area 21-county region to make the case that in so far as state and federal funding currently supports road infrastructure, it might make more sense from a long-term regional economic development viewpoint to place a higher priority on investing in public transit.

Transit-oriented development offers a solution to the disconnect between public transit connections and commuting patterns, but results have so far been limited. Some communities such as Evanston have made significant land use changes in recent decades, increasing density along key thoroughfares near transit hubs, resulting in big changes in local transport patterns (Makarewicz *et al,*. 2006 in CMAP, 2009b). CMAP (2010a) and the Chicago Climate Action Plan (2008b) also places considerable emphasis on public transport system improvements and changes in local land use patterns to promote transit-oriented development. However, overall transit-oriented development has not had a significant impact on public transit and passenger vehicle use in the Chicago Tri-State Metro-Region. Experience from other OECD Metro-Regions points to the importance of creating transit-oriented developments at a large enough scale to provide a sufficient number of public transit customers.[7] For example, the Hammarby Sjöstad neighbourhood in southern Stockholm, developed in the 1990s with the goal of reaching 80% of trips to by public transit, foot or bicycle by 2010, is expected by 2015 to house 20 000 residents in 9 000 apartments.[8] The development was close to reaching its goal by 2008, when the overall share of public transit, walking and bicycle trips had increased to 79%.

New sources of funding are needed for the upgrading and expansion of the public transit system in the Chicago Tri-State Metro-Region, given its important role in attracting businesses to the Metro-Region and providing jobs, and the potential to better connect residents to jobs. While policy makers may be reluctant to raise taxes, it would be worth considering expanding the value capture tax. The base for a value capture tax is an increase in property values arising from public infrastructure development. This increased value results from the increased desirability of the location, better access, and the

potential for higher rents, increased resale value and higher-density development. Value capture taxes have been used to finance transport infrastructure in cities as different as Hong Kong, Miami, Milan and Bogotá. Manhattan is also considering a similar tax, on new construction, only to fund the Subway line 7 extension. A value capture tax can only be applied when the property value increase can be unambiguously attributed to infrastructure investment. Value capture taxes are less useful when property taxes are assessed on a yearly or regular basis, since the annual assessment captures any increases in the property value that might result from public infrastructure investment; this does however not take place in most OECD countries (OECD, 2011).

Congestion charges should be considered as an integral part of a transport funding package. The congestion charge has in some OECD metropolitan areas contributed to the reduction of GHG-emissions. This instrument is similar to toll roads in that it charges for road use, but differs in that it charges exclusively or more intensely during peak traffic periods. Some congestion charges have to be paid when entering a certain delineated area within the city (cordon-based charges), while others charge according to kilometres travelled within an area (OECD, 2010) (Box 5.5). London, where public transportation subsidies are much lower and the proportion of commuters using bus and rapid transit is much higher, have addressed the problem of public transit funding in part through a combination of direct charging for taking an automobile into the city, and competitive contracting out of private bus services. This has enhanced the quality of service offered and significantly reduced cost inefficiencies, leaving more resources for rail systems, some of which are themselves provided under concession, by the private sector (Button background contribution, 2011). Congestion charges on vehicle use have been considered in the Chicago Tri-State Metro-Region, but not yet actively pursued. In 2007, the US Department of Transportation allocated funds to the Chicago Tollway and the Metropolitan Planning Council to investigate the viability of congestion pricing schemes around the region. Their report focused heavily on the tolling highway lanes rather than a scheme focused on limiting travel into the central business district in Chicago. The study found support for this concept among a range of stakeholder groups, although there are concerns about equity issues (MPC/Wilbur Smith Associates, 2010).

While public transit investment should be driven by customers' needs, it is important to note that public transportation is also a very large employer, and employment is growing despite funding constraints. The Brookings (2011a) identified roughly 24 000 public transport jobs in the Greater Chicago Metropolitan Region, an increase of 50% from 2003, although the cause of this increase is unclear. Implementation of the strategies called for by CMAP (2010a) and the Chicago Climate Action Plan (2008b) would likely result in additional employment opportunities, although the size of this impact will hinge on the level and nature of the transit system expansion. Schrock and Sundquist (2009) suggest that if major capital investments in new rail lines were to occur, the construction jobs created could be significant in number. Absent such expansion, however, job impacts in this sector will likely be modest, concentrated in repair and maintenance jobs, with lesser demand for additional train operators, conductors, and yard workers. Chicago Metropolis 2020 (2007) calculates that simply maintaining current spending on public transportation will result in the retention of 11 395 jobs in Chicago, compared to a scenario where transit investments are allowed to decline. Higher levels of transit investment are associated with actual job growth, as reduced traffic levels are presumed to enhance the city's attractiveness as a place to do business.

Box 5.5. **The impacts of congestion charges**

Congestion charging systems vary considerably based in part on when they were initiated and the technology available at the time, the geography of the city involved and the nature of its transportation system, and the political environment under which the scheme operates. In some cases, such as the schemes introduced in Norwegian cities, the primary objective was to raise revenues for infrastructure expansion rather than to control traffic congestion levels. The initial scheme in Singapore simply forced automobile users to show a daily license to enter congested parts of the city, the London scheme involves electronic pre payment to enter the main urban area, where as the more recent schemes in Singapore and Stockholm, and the freeway embrace variable charges by time of day with the congestion price being collected. There are also freeways with variable charging in California and Indiana, and specific facilities with congestion charges; e.g. on the Oakland-San Francisco Bay Bridge.

One of the main concerns of policy makers is that congestion charges will be unpopular. Congestion charges tend to poll more favourably after their introduction than before, however. For example, in Stockholm, residents elected to maintain the congestion charge after a nine-month trial period. Measures can be taken to address concerns before establishing a congestion charging system. In London, for example, concerns about "political" use of congestion charge revenues was largely removed by national legislation that made it obligatory to use such revenues for regional transportation improvement over the decade of the scheme (Leape, 2009).

The costs of operating the different types of scheme have fallen as technology has improved. For example, while the relatively crude original London scheme cost roughly USD 4.10 per vehicle in operational costs, the electronic Singapore system costs USD 0.12 per vehicle.

The success of congestion charges depends in part on their joint implementation with other policies, such as policies to improve alternatives to car use. For example, congestion fees worked well in London in part because they were combined with improvements in management of the road network and substantial enhancements in bus service. Congestion charges can also be subject to the risk of "rebound effects" (with more people willing to take the car if congestion charges manage to actually de-congest traffic) if not accompanied by other policies, such as parking fees

Congestion charges have been associated with environmental benefits. For example, it has been estimated that the Stockholm scheme reduced CO_2 emissions by 10%-14% in the inner city area and by 2%-3% in the surrounding area, although there was little impact on noise levels, while the London charging scheme produced an annual USD 6 million benefit in terms of reduced CO_2 emissions, and USD 30 million in lower accident costs.

The effects of major urban road pricing schemes

City	Traffic effects	Congestion effects	Public transport effects
Singapore, 1975-1998	-44%; -31% by 1988	Average speed increased from 12 to 23 mph	Modal Shift, from 33% to 46% trips to work by city bus, 69% in 1983
Trondheim, 1991	-10%	n/a	+7% city bus patronage
Singapore, 1998	-10 to -15%	Average speed increased 12.5 to 19 mph roads, 28 to 41 mph expressways	Slight shift to city bus
Rome, 2001	-20%	n.a.	+6%
London, 2003	-18% 2003 vs 2002, 0% 2004	-30%. 2.6. min/m typical delay 2003, versus 4.2 min/m in 2002	+18% during peak hours bus patronage 2003, +12% in 2004
London, 2005	Small net reductions	-22%. 2.9 min/m typical delay	Bus patronage steady
Stockholm, 2006	+30% 2006 versus 2004	-30% to -50% journey time	+6%

Source: Button, K. and H. Vega (2007), "The costs of setting up & operating electronic road pricing in cities", Traffic engineering & control, Vol. 48, No. 6,; OECD (2010), *Cities and Climate Change, OECD, Paris.*

Fostering the potential of the water and waste sectors

In the Chicago Tri-State Metro-Region, and in particular the City of Chicago, the prices many consumers pay for water and waste services are disconnected from the cost of delivery and impact on the environment. Future water availability is a growing concern and is ill-addressed in the current water-pricing system, which in many parts of the Metro-Region does nothing to discourage water waste. The wastewater system in the Chicago Tri-State Metro-Region faces problems related to ageing infrastructure, including combined sewer overflow events in older systems where storm runoff combines with the sewer system. Solid waste service delivery does not yet encourage recycling, as fees for most customers are low and do not fully reflect the costs of collecting solid waste. In both the water and solid waste sectors, restructuring fees to encourage conservation could reduce the costs of service delivery and increase demand for water-conservation technologies and recycling services, encouraging growth in those activities.

Water and wastewater services

Future water availability is a growing concern in the Metro-Region. The water supply from Lake Michigan, which provides the vast-majority of the Metro-Region's supply, will become limited given the US Supreme Court-imposed limit on the amount of water that can be withdrawn from the lake. As discussed in Chapter 1, the water supply from Lake Michigan is expected to suffice only until 2030, or less than 20 years. Areas that rely on groundwater and inland surface water sources expect to face shortages even earlier. Water users in Chicago and its surrounding suburbs have successfully reduced water consumption by 18% since 1990, despite a 24% increase in population (CMAP, 2010b).

However, water rates for most Metro-Region residents are not currently structured to promote conservation. Although all customers in the Metro-Region pay higher bills as their water usage increases, fewer than one in seven are subject to rates specifically structured to discourage high rates of water usage. Seventy-nine percent of customers in the region are charged according to a uniform rate structure, meaning each additional increment of water consumed is charged at the same rate as the previous increment. Only 9% of customers incur increasing block rates (meaning the price paid for each block of water increases as their total usage increases) while 14% actually receive price discounts as their water usage increases. In the City of Chicago, 321 000 customers lacked water metres as of 2007, meaning the City charged them a flat rate for water service regardless of the amount of water they consume. The City of Chicago hopes to have all customers metered by 2023, and estimates that this could result in water savings of 30 million gallons per day (CMAP, 2010b).

There is a need to restructure water fees to send a more accurate price signal, with the goal of increased efficiency and revenues. By better matching the block rate structure to current (or desired) usage levels, water utilities may be able to cut demand across the system. Full-cost pricing schemes, which separate water charges into fixed charges (which do not vary) and commodity charges (reflecting actual water usage and provision costs) send a pro-conservation message to water consumers. Most water systems in northeastern Illinois do separate the charges, but in some areas minimum charges are set at levels higher than actual average usage, thus disincentivising conservation (CMAP, 2010b). In addition, to compound the problem, several hundred thousand customers lack water metres. The current 2023 timeline to install these metres would target just under 25 000 customers per year. Local officials should consider developing a strategy across the Metro-Region to transform the rate structure to one with increasing block rates,

complementing rate structure changes with an expanded customer education program or other efforts designed to reduce water usage. In the City of Chicago, Mayor Emanuel's recent budget proposal goes in this direction, as it aims to double water fees, which are currently among the lowest of any major US City (Belkin, 2011a).

Ageing waste-water infrastructure in the Chicago Tri-State Metro-Region has resulted in treatment facilities ill-equipped to meet needs, and regular incidents of combined sewer overflows (CSOs). CSOs occur where storm runoff and sewer systems were combined, as is often the case in the Metro-Region's older wastewater systems. Large amounts of rainfall can flood the combined sewers, causing raw sewage to be released into the waterways. CSO events occurred once every 7.4 days in 2007 in the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), which serves nearly all of Cook County. In addition, a number of wastewater treatment facilities are nearing the end of their expected operating life, which poses a threat to water quality in communities lacking funds to upgrade them (CMAP, 2008a).

To address CSO and wastewater problems, agencies in the Metro-Region have invested in infrastructure improvements. The MWRDGC has developed a tunnel and reservoir plan that is designed to capture and store sewer overflow until it can be pumped into existing treatment facilities prior to release into local waterways (Landis, 2008 in CMAP, 2008a). A first part of this project has the capacity to capture 2.3 billion gallons of sewer overflows, and a second part, currently still under construction, captures another 17.5 billion gallons, resulting in the containment of a large amount of CSOs (MWRDGC, 2011). In addition, the City of Chicago has invested USD 591 million over 2005-10 to replace aging water infrastructure, averaging 42 miles of water main replacement each year (CMAP 2010, pp 90-91). To address problems associated with smaller wastewater treatment systems, Will County has explored the establishment of a special service district covering several communities as an alternative to each municipality providing wastewater treatment facilities (Farnsworth Group 2008). Green infrastructure is also increasingly seen as a potential option to reduce the level of capital investment on treatment infrastructure, instead relying on natural systems to accomplish many of the same ends.

Gray-water systems would reduce pressure on ageing wastewater treatment and combined sewer systems, but require legislative changes. Gray-water from laundry machines, bathtubs, showers, and bath sinks can be reused in homes for toilet flushing, displacing roughly 30% of the clean water used daily in homes (CMAP, 2010a). Gray-water can also potentially be used for landscaping irrigation purposes. The City of Chicago and other cities around the region might also benefit from a policy similar to that of the City of Melbourne, Australia, which requires the use of "Class A" recycled water for toilet flushing, car washing, and landscaping irrigation purposes in certain buildings (OECD, 2010) (Box 5.6). CMAP (2010a) has also suggested the establishment of tax credits for homeowners installing these systems. Gray-water use requirements would be easiest in areas closest to water treatment facilities, as the cost of distribution of treated water from these facilities to the ultimate point of use would be reduced. In Wisconsin, the Uniform Plumbing Code allows the installation of gray-water and stormwater systems, and the Department of Safety and Professional offers advice and regular installations education on Private Onsite Wastewater Treatment Systems (POWTS) (WIDC, 2011a, 2011b). Wisconsin has over 65 approved stormwater use and wastewater reuse plumbing systems (WIDNR, 2011). For gray-water systems to work in Illinois and Indiana, those states would need to establish rules permitting the installation of gray-water reuse systems.

Box 5.6. **Water recycling in Melbourne**

In response to repeated severe droughts, the City of Melbourne developed water infrastructure that allows for the distribution of Class A recycled water. Class A water has close to drinking water quality and can be used for various water intense applications and activities such as watering vegetable or other gardens, irrigating open spaces, toilet flushing, car washing, construction or fire fighting. It is delivered by a purple pipe system that runs alongside existing water pipes and brings recycled water to homes, businesses or public facilities. The city of Melbourne has already achieved its first target to recycle 20% of its wastewater, and is upgrading its Eastern Treatment Plant (which treats about 40% of Melbourne's wastewater) over 2012 to allow it to produce 100 billion litres of Class A recycled water per year (DSE, 2011a). The state of Victoria's *Our Water Our Future* action plan includes recycled water in its Sustainable Water Strategy for the region around Melbourne (DSE, 2011b). Current development projects in Victoria that build infrastructure for recycled water are under way for the Werribee Plains, the Cascades on Clyde, Eynesbury, The Hunt Club, Mariott Water and Aurora (DSE, 2011c, Purplepipe, 2011). In the Werribee Plains 8.5 billion litres of Class A recycled water per year will be used, and almost 60% of water used by Eynesbury households is Class A water delivered via purple pipes. Together the current projects will provide over 40 000 people with Class A water (DSE, 2011b; Savewater, 2009). Five additional purple pipes projects are envisioned in the state of Victoria, as well as several more in three other Australian states, New South Wales, South Australia and Queensland.

Sources: DSE (Department of Sustainability and Environment of the state of Victoria) (2011a), "Recycling", DSE website, *www.water.vic.gov.au/programs/recycling*, accessed 1 December 2011; DSE (2011b), "Sustainable Water Strategies", DSE website, *www.water.vic.gov.au/programs/sws*, accessed 1 December 2011; DSE (2011c), "Werribee Irrigation District Recycled Water Scheme", DSE website, *www.water.vic.gov.au/programs/recycling/werribee*, accessed 1 December 2011; Purplepipe (2011), "Australian Recycled Water Communities", Purplepipe website, *www.purplepipe.org.au/_/Communities.html*, accessed 1 December 2011; Savewater (2009), "Western Water wins national 2009 savewater! Award",Savewater website, *www.savewater.com.au/news-media/?newsid=345*, accessed 1 December 2011.

A wide range of potential funding sources can support local water planning efforts and system upgrades (CMAP, 2010b). Municipalities can tap into Federal Clean Water Act funding, which is funnelled through the Illinois EPA in the form of revolving loan funds. CMAP (2010b) also highlights financing strategies used in other states, such as water infrastructure bond funds that can be used to implement water supply and metering projects, or one-time user fees that charge property owners/developers for the contribution their property makes to storm runoff problems. Such user fees both provide new funding sources and incentivise developers to allow for on-site water containment or the downsizing of impermeable surfaces.

Opportunities for job growth exist in a range of occupations, but depend on whether policies emphasise on infrastructure investment or demand-side management. Water system upgrades can result in opportunities for job creation in the construction trades, metre installation, the manufacture and sale of water efficient devices and appliances, and firms involved in the development and installation of advanced water treatment technologies. Previous estimates by the Chicago Department of Water Management suggest that the installation of new metres and replacement of aging water mains and pumping stations could result in up to 2 000 construction jobs (Schrock & Sundquist, 2009). To support this work, there would be demand for civil engineers, although whether this would result in sectoral growth or simply represent new project opportunities for existing firms is unclear.

Solid waste

Solid waste generation rates are higher in Chicago than in other US areas, contributing to greenhouse gas emission and high waste collection costs. In the City of Chicago, waste collection is twice as costly as in Los Angeles and roughly three times as costly as in Dallas, Phoenix, Miami, San Diego and Houston, in large part due to inefficiently structured waste collection routes (Belkin, 2011b). As the amount of landfill capacity declines in the Chicago Metropolitan Region, more transfer stations are expected to open to help replace this capacity (CMAP, 2008b). There currently one waste-to-energy facility in Ford Heights south of Chicago that burns tire-derived fuel, and there is a proposal in nearby Robbins to reconfigure a now-closed municipal solid waste-to-energy plant as a biomass facility converting wood waste debris into electric power. As discussed in Chapter 1, there are also 18 landfill gas-fired power plants around the region, operating at closed landfills, and 71 construction and demolition recycling and reclamation facilities in Chicago and elsewhere around Cook County (Weber *et al.*, 2009). However, these do very little to exploit the potential for waste-to-energy and landfill gas-to-energy plants in the Metro-Region.

While experiences with waste-to-energy in the Chicago Tri-State Metro-Region and some other US Metro-Regions have been negative over the past decades, other OECD countries are successfully deploying waste-to-energy today. The early generation of waste-to-energy incinerators that were built in the Chicago Tri-State metro region during a period of limited landfill capacity in the early 1970s have proven to be environmentally and financially unsustainable. Tighter federal environmental regulation lead to their closing or to costly retrofitting, such as in Harrisburg, Pennsylvania, and in Ford Heights south of the City of Chicago, where the retail rate law in Illinois ended up incentivising an unprofitable plant that did not in fact burn municipal waste (Sendzik *et al.*, 1996). In contrast, waste-to-energy in Denmark, the Netherlands and Germany has evolved under tight European environmental regulation as a clean and cost-effective alternative to landfill. The Afval Energie Bedrijf plant in Amsterdam's state-of-the-art technology enables it to transform non-recyclable waste, biomass and sewage sludge into electricity, heat, metals and building materials, and thus processes almost 25 % of the Netherlands' annual combustible waste (4 400 tons of waste every day), provides 285 000 households with electricity, 20 000 with district heating and hot water, and generates profits for the municipality that owns the plant (City of Amsterdam, 2011). Horsholm in Denmark recycles 61 % of its waste, incinerates 34 %, sends 4 % to landfill and can handle the remaining 1 % of hazardous waste safely instead of spreading it in landfills (Rosenthal, 2010). The social acceptance of waste-to-energy has been a key to the successful deployment of waste-to-energy plants, which is in turn closely related to the plants' environmental performance, which today results in no more than 10-20 % of the maximum EU standards for air and water discharges.

The City of Chicago and municipalities throughout the Metro-Region have recycling program, but with varying degrees of success. The diversion requirements and collection strategy for recyclable materials are determined by local government, often times in response to local market conditions. Recycling rates in the Chicago metro region currently range from 11% to 52%, averaging 41% overall (CMAP 2008b). In July 2011, the Mayor of the City of Chicago announced a "managed competition" plan to expand the Blue Cart program citywide. Collection responsibilities will be split between the private sector and Department of Streets and Sanitation crews in an attempt to reduce the cost of the recycling program. After six months the program will be reviewed to assess which method is most cost-effective.

"Pay-as-you-throw" (PAYT) or variable-rate pricing schemes could raise revenue from waste fees, increase recycling and reduce waste going to landfill in the Chicago Tri-State Metro-Region. However, variable rate pricing schemes have not been widely applied in the Metro-Region. In 2009, the City of Chicago began working with the private company Recyclebank to offer financial rewards to household based on the amount that they recycle, but this partnership has reportedly been abandoned and will not be expanded citywide (City of Chicago, 2011a). Variable-rate pricing program successfully operate in hundreds of cities throughout the US, in Zurich, and in many municipalities across Germany, among others (Reichenbach, 2008). Variable-rate pricing schemes have proven successful in promoting both recycling and waste prevention efforts (Skumatz 2008). In most program, households are not charged for recycling services, while waste collection service is charged based on the level of waste generated (either by volume or weight).[9] Households thus have an incentive to maximise the amount of recyclable material diverted to their recycling program. This program model can lead to an increase in the incidence of illegal dumping, as some households might seek to avoid the cost of waste disposal, so some additional enforcement may be necessary.

The Metro-Region may also benefit from a comprehensive inventory of the types and volumes of recyclable materials currently or potentially diverted from the local waste stream. Many communities, including the City of Chicago, have conducted a waste composition inventory at some point in the past, and this provides a helpful benchmark, but recycling and reuse business ventures will generally prefer more up-to-date information documenting the total quantity of recoverable materials available locally that could serve as feedstock for any reuse program or reprocessing venture. Such an inventory could also serve as a starting point for common recycling standards across municipalities, which would help expand the volume of materials available locally. Currently, smaller municipalities may target different types of recyclable materials than larger communities, as the volume of material captured will influence the relative value of this material to commodity markets and the cost effectiveness of its collection. The statewide Eco-Point database is helpful at directing waste generators to outlets for specific commodities, but that does not help program operators or entrepreneurs fully understand how much materials is available locally. The development of waste composition studies – like that prepared by the City of Chicago in 2010 – can help state and local economic development officials working with industry experts to promote business development that capitalises on these available materials.

While performance in recycling in the City of Chicago and in places in the Metro-Region may be lacklustre, the City of Chicago stands out for its recycling of construction and demolition (C&D) waste. A 2005 ordinance requires general contractors to recycle at least 50% of the construction and demolition debris generated at larger construction or demolition projects, which are defined as new residential buildings of four units or more, or new non-residential buildings of more than 4 000 square feet. Compliance is monitored through voluntary reporting. The City of Chicago also provides expedited permitting through its Green Permit program for projects meeting certain green building requirements, including the on-site recycling of construction and demolition waste, although this step is not enough alone to earn an expedited permit. The reuse of building materials can also earn a mixed-income housing development project points towards eligibility for the Illinois Low-Income Housing Tax Credit Qualified Allocation Plan (Weber *et al,*. 2009).

Because construction and demolition debris constitutes such a sizable portion of the local waste stream, the Metro-Region could also benefit from common C&D recycling

and deconstruction policies. C&D debris remains the largest component of the local waste stream, and local policy makers must decide whether they want to impose more aggressive C&D deconstruction or recycling requirements on property owners retrofitting their buildings. The deconstruction sector has yet to prove itself capable of handling a dramatic increase in business, either on the supply side, or in terms of finding economic markets for the materials removed from buildings. Nonetheless, these businesses can divert significant amounts of material, and there may be value in growing this sector regionally because of the employment pathway it creates for low skilled workers. Business development efforts to support new reuse or recycling businesses will generally follow traditional patterns, as there do not appear to be any special state or local funds dedicated to waste sector business start-ups. Non-profit organisations have been active in starting or promoting building materials exchanges and the Waste-to-Profit network, and these organisations typically benefit from state or local government grant support. It may be possible to expand the amount of grant funding available for such purposes through an increase in demolition permit fees, with additional funds devoted to supporting deconstruction programs or buildings materials exchanges. State and federal support for these programs could take the form of tax credits for those donating the building materials, thus giving them a financial incentive to maximise the amount of materials recovered through deconstruction efforts (Weber *et al.*, 2009).

While the recycling and reuse sector has experienced a large increase in jobs over 2003-10, new job growth potential in this field is considered rather limited. According to the Brookings-Battelle study, there are approximately 6 200 recycling and reuse sector jobs in the region as of 2010, a 73% jump from 2003. Another 1 500 workers are involved in the manufacture of recycled content products, and some 16 000 jobs exist in the waste management and treatment sector, although the latter figure may be misleading as it also includes jobs related to wastewater treatment. Net job growth is limited, however, because most jobs are likely filled by currently unemployed workers or training programme graduates (CWIC 2010). However, an analysis prepared for the Chicago Department of the Environment estimated that a 5% improvement in the local recycling rate would yield direct employment gains of 230 jobs and a comparable amount of indirect job gains (Schrock & Sundquist, 2009).

5.3. Making workforce and innovation policies work for green growth

Workforce training

The current worker training situation in the Chicago Tri-State Metro-Region may be insufficient to meet green sector labour demand. This is particularly true for energy efficiency retrofits. Job growth related to energy efficiency retrofits ranges from low-high skilled jobs, some of which will require training. In the case of residential retrofit projects, for instance, most tasks will involve the installation of insulation and window replacement, both of which tend to be more labour intensive tasks than the heating/ventilation/air conditioning (HVAC) or electrical work likely to occur on retrofit projects in large commercial buildings (Schrock, 2009; Schrock & Sundquist, 2009).[10] Insulation jobs are relatively low skilled, while window replacement jobs involve semi-skilled carpentry experience. Regardless, on-the-job training may suffice, as formal credentials in carpentry training are usually not required. By contrast, electrical and HVAC workers will likely need to attend accredited training programs at community colleges or through their local trade union. For example, to support the transition to green jobs, in 2008 the Mechanical Contractors Association of Chicago established a green

construction institute, to providing training to local building contractors, apprentices, and journeyman of United Association of Pipe Fitters Local 597 (MCA, 2011). According to one analysis, 2 200 jobs will be created by full implementation of the retrofit program called for by the Chicago Climate Action Plan (Schrock, 2009), but given that this is a small fraction of total construction employment in the region, and because there is currently a large volume of skilled trades people currently unemployed (CWIC 2010), it is likely that current training program will suffice.

The renewable energy workforce ranges from high to low skilled jobs, but the need in the Chicago Tri-State Metro-Region is stronger for the higher skilled segment. Renewable energy development creates jobs primarily in sales, finance, operations and engineering, the latter being also critical for design and implementation. Medium and lower skilled workers are needed for the installation and maintenance of renewable energy technologies. The training of engineers is done most effectively if in connection with actors operating in the renewable energy sector, such as at the Energy Resources Center at the University of Illinois at Chicago (Schrock, 2009). In regards to wind turbine manufacturing, the existing efforts to inform and retool local manufacturers should also include skill upgrades of the manufacturing workforce as necessary for working for original equipment manufacturers (OEMs) of wind turbines. To this effect, the work done by the Chicago Manufacturing Center, Jane Addams Resource Corporation and the Chicago Manufacturing Renaissance Council is leading the way, but could improve if complemented with a stronger workforce training component (Schrock, 2009).

Smart grid projects will tend to require a highly skilled workforce, both in their design and installation. At the development level, projects can involve those trained in electrical and mechanical engineering and computer science. Firms designing component parts for the smart grid – be it switches, battery storage devices, or building energy control systems, will similarly tend to require advanced knowledge obtained at the university or post-graduate level. Chicago is well positioned in this regard, with respected programs at the University of Chicago, Northwestern, the University of Illinois-Chicago, IIT, and other top colleges in the area. Argonne National lab and IIT are engaged in leading edge research on battery storage devices and micro grid development, and to the extent these efforts can serve as the hub of greater business development in the region, these universities may find it helpful to expand their offerings, including in the area of executive education programs. On the implementation side, ComEd's unionised workforce of trained linesmen and other private electricians would be responsible for installing new technology on the grid itself or in homes and businesses, which may require some modest skill upgrades.[11]

As the skills in the recycling sector vary greatly, it poses challenges for workforce training. Schrock (2009) notes there is no typical recycling job, ranging from jobs involved in the collection, sorting, and remanufacturing activities. Some jobs involve construction and deconstruction skills, while others involve more traditional retail sales functions. Depending on the commodity being targeted, semi-specialised skills may be required, such as those involved in the removal of ozone-depleting refrigerants from old appliances. Other jobs may involve safety hazards, such as the sorting of glass jars and bottles passing by on a picking line, or the removal of valuable building materials from homes and businesses with asbestos or lead paint. There are a few training programs in the region that touch on recycling/reuse issues, and organisations that provide on-the-job training through their building material reuse stores (Schrock, 2009).

Given the worker training needs of the green sector, green growth policies have implications for workforce development policies. Even the green jobs at the lower end of the skills spectrum will require specific training, calling for an engagement by both the public and private sectors. It is important that workforce incentives be built into new environmental policies and green industries are taken into account in workforce development services. Necessary resources are available for example through the *21st Century Workforce Development Fund*, which prioritises green industry workforce development, and the Illinois Green Energy Network (CGCI, 2009) (Box 5.7). Job growth is seen as being largest in the sectors of buildings and transport. A comprehensive and standardised workforce development strategy is needed to develop and co-ordinate related training programs. Such a strategy should offer training for multiple entry points into the sector, and pay particular attention to the potential of local hiring, "first source" agreements with publically funded development organisations, and the actual need of contractors. The transportation sector may not require a new approach to workforce development, as much of the skills associated with upgrading or expanding the public transportation network do not represent a change from past skill sets.

Box 5.7. **Illinois Green Energy Network (IGEN)**

The Illinois Green Energy Network was launched in 2008 as a consortium of all 48 Illinois community colleges dedicated to the training and education of a green workforce and deployment of energy conservation and green technology. With financial support from the Illinois Governor's Office and Illinois DCEO, IGEN works continuously to leverage the strengths and contributions of individual colleges to benefit all colleges and their communities. IGEN combines community colleges education and training capabilities with research and technical expertise from universities and green businesses. IGEN partnerships focus on the critical problems associated with the green economy that can be solved together, but not alone. The mission of IGEN is to establish best practices in greening communities and campuses, promote energy efficiency, and drive growth of the green economy. It's strategic goals include:

1. Green Campus – Enabling colleges to serve as sustainability demonstration sites by making sustainability a guiding principle for all institutional practices, promoting initiatives that reduce energy use and the environmental impact.
2. Green Curriculum – Providing assistance and training to college faculty and staff to integrate sustainability and green economy content into most disciplines and in general education programs.
3. Green Careers – Identifying, developing and expanding quality green job/career training for students and workers, effectively informed by community and employer partnerships (balancing demand/supply).
4. Green Communities – Serving as regional and sector partners for mobilising community and employer engagement, fostering community education, and supporting action for environmental sustainability.

The 18 community colleges of IGEN in the Chicago region are partnering to bring training in energy efficiency, building codes, energy auditing, and green construction. In October 2011, IGEN received a USD 19.3 million grant from the Department of Labor to develop 33 stackable curricula in green career fields such as architecture, local agriculture, bioenergy, renewable energy, and advanced green manufacturing. The materials developed through this grant will use the Department of Energy open source platform for national training for energy.

Source: Illinois Green Economy Network, *www.igencc.org/about-us.*

Fundamental problems in early education and a strong ethnic divide in educational attainment and in the workforce limit the potential of human capital in the region. High dropout rates and below average performance in STEM skills are typical for deficient performance of many local schools. These problems increase in low-income neighbourhoods, which are dominated by ethno-cultural minorities. The educational backlog is reflected both in high unemployment rates of Afro-Americans and Hispanics and divide in occupation among sectors, following ethnic groups. While important low-skilled sectors are declining (e.g. some manufacturing), demand becomes stronger for higher skills, and increasingly, the workforce needs to adapt to changing specifications, many people are not equipped to upgrade their education or enter into a more flexible career path, and thus, a large part of the region's talent pool stays untapped. A focus of the public sector on providing basic literacy, numeracy and non-cognitive skills, regardless of income and neighbourhood, is needed to build up a young workforce that is able to profit from advanced training and skills development and be able to respond to increasing demand of new skills and higher skilled sectors.

A general challenge for the Chicago Tri-State Metro-Region presents the current skill mismatch of local workforce with the skill demand of local industries. This is due to *i*) the region's weakness to attract of high-skilled labour, *ii*) insufficient alignment of training services with business needs, and *iii*) a fragmented workforce development infrastructure. While the higher education infrastructure in the Chicago Tri-State Metro-Region is of high calibre, a lot of the young well educated workforce migrates after graduation. This is partly due to weak regional job creation, but it is also connected to a lack of information from the private sector to orient freshmen and graduates towards existing needs and opportunities in the region. This gains importance given that a large part of investment into education is private, coming directly from students. Aligning skill demand with supply thus means aligning the skill demand of the private sector with the demand of those funding major parts of the education, the students. Therefore, public authorities need to strengthen existing institutional mechanisms to intensify a more comprehensive region-wide dialogue between training service providers and the private sector. The resulting gain of information is crucial for a better co-ordination of the currently highly fragmented workforce development infrastructure, which would allow a more efficient allocation of scarce resources to the large number of training services and providers. This should be central to the articulation and the implementation of a strongly needed coherent region-wide workforce development strategy that should also include systematic monitoring and evaluation of costs and benefits.[12]

Innovation

The Chicago Tri-State Metro-Region and the Chicago-area 21-county region both have strong green research and development (R&D) assets that contribute to green innovation. Existing research laboratories in the Metro-Region are already contributing to green firms' R&D. For example, the 1 200 researchers at Argonne National Laboratory, a US Department of Energy-funded research laboratory operated by an academic consortium, undertakes a range of research useful to green firms, including research related to climate science, pollution remediation, impacts of energy production, vehicle efficiency and batteries, environmental technology, alternative fuels and carbon sequestration.[13] There is a long history of research at Argonne being commercialised by industries around the region or as new ventures. NextGen is one of the most recent technology spinoffs emanating from the lab's energy division, focused on the use of conductive liquid nanoparticles as the substrate for a new type of thin-film solar

technology (Clean Energy Trust, 2011a). Argonne has also recently licensed technology to a local smart grid software firm and battery technology to General Motors for use in its new Chevy Volt electric vehicle (Clean Energy Trust 2011b). Other licensing or collaborative research opportunities exist in several key green growth areas, including grid security and infrastructure and recycling (Argonne 2011). In the Chicago-area 21-county region, the Milwaukee Metro-Region is home to the largest water-technologies cluster in the US. This is thanks in no small part to the Milwaukee Water Council, which convenes firms and relevant research institutions, including the University of Wisconsin at Milwaukee's Great Lakes Water Institute and the School of Fresh Water Sciences (Box 5.8).

Box 5.8. **Milwaukee Water Council**

The Milwaukee Water Council advances the interests of more than 150 companies and research institutions located in the greater Milwaukee region, all of whom produce goods, services, or research that relates to water in some way. Formally established in 2009, the Council grew out of an analysis launched by officials from the Milwaukee 7, a non-profit economic development organisation focused on the seven-county region around Milwaukee, Wisconsin.

The Milwaukee 7 identified a wide range of firms in the area that had at the core of their business an interest in water quality, water supply and distribution, water recreation, or water engineering. Some of these firms have been in the area for hundreds of years, but until the Council was created, few know that these firms were located nearby or recognised that they shared a common interest. The region also had a huge asset in its midst in the form of the Great Lakes Water Institute at the University of Wisconsin at Milwaukee, which uses land secured by the Council to test and showcase cutting edge water treatment technologies.

Milwaukee 7 water companies

Category	Within 7 Counties	Outside 7 Counties
Water/Wastewater Treatment Systems	15	5
Industrial Water Process Systems	6	11
Water System Products: Non-mechanical	7	4
Water System Products: Mechanical	31	2
Water System Components	36	17
Chemical/Biological Treatment Producer	7	6
Engineering/Planning/Software Services	19	13
Maintenance Equipment & Services	4	2
Distributor	9	3
Well Equipment & Services	5	0
General Consumer Products	10	2
Miscellaneous Product Manufacturers	3	2
Total	152	67

Source: White, S. (2011) Data provided in personal communication on 25 July 2011 by Professor Sammis B. White, University of Wisconsin Milwaukee, School of Architecture and Urban Planning, Milwaukee, WI, US.

An early census of the water-related firms in the area found their core business operations are quite diverse, with half of the firms involved in the manufacture or distribution of various water components (metres, pumps, valves, filters, monitors, heaters) used by government, businesses, or homeowners. Twelve percent of firms are solution providers working all over the world to satisfy water supply or treatment needs of cities and regions (White & Lenze 2009). The economic activity driven by these firms is sizable, as collectively they employ roughly 20 000 people in the immediate area. Five of the eleven largest water firms in the world have operations in the Milwaukee region, with their local operations doing USD 10.5 billion in business annually, the equivalent of 4% of the total global water market.

Box 5.8. **Milwaukee Water Council** *(cont.)*

The Water Council has launched a venture fund to provide capital to water start-ups and begun work on business incubator. The Council worked with University of Wisconsin at Milwaukee and the City of Milwaukee to procure land adjacent to the School of Fresh Water Sciences for testing and showcasing cutting-edge water treatment technologies.

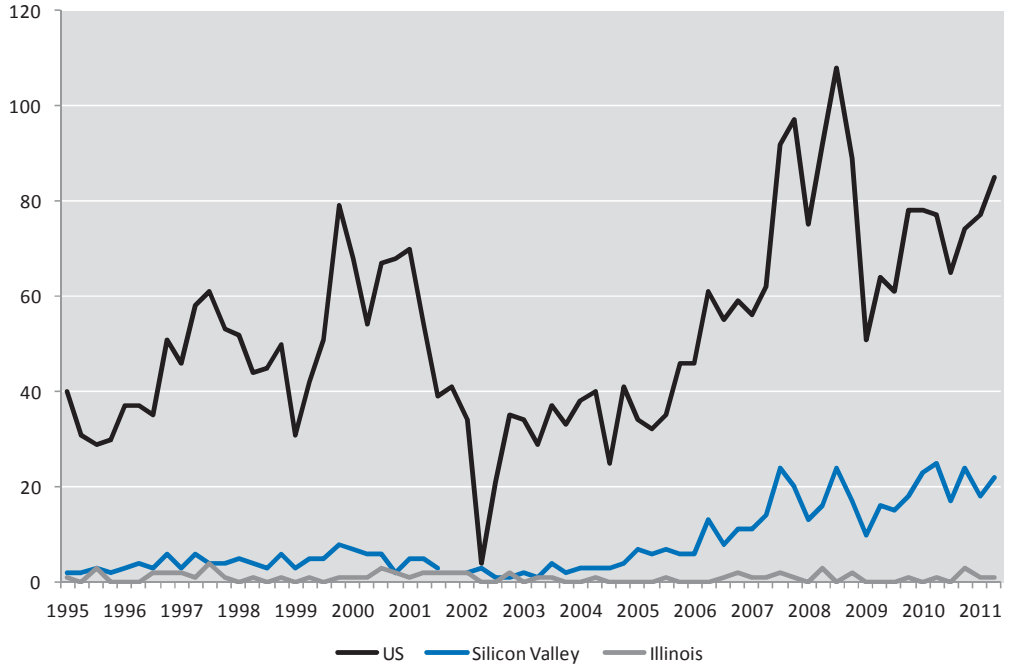
The world has also taken note. Milwaukee was selected as one of 14 Global Compact Cities, deliberately chosen for the region's focus on water quality issues. Universities around the world are now in conversation with University of Wisconsin at Milwaukee about research partnerships, while the National Science Foundation has awarded UW-M and Marquette USD 675 000 for research on seven different projects over the next five years. The Council helped arrange another USD 1.5 million in private sector donations to supplement that amount.

To drive R&D and further exploit the potential of existing assets, stakeholders in the Tri-State Region need to act more proactively in building and sustaining inter-university strategic alliances. While different forms of ad hoc co-operation occur among the region's laboratories and universities, a more deliberate, strategic focus for their joint actions is needed. The University of Chicago and Northwestern University, among the region's most prominent research-intensive universities, are reported to have relatively ad hoc relationships. However, some university officials are beginning to think more strategically about regional strengths.[14] There are multiple examples of more strategic consortiums of universities in a region with the goal of creating greater critical mass together to compete for national resources and global recognition. Examples include the Georgia Research Alliance in the US, the N8 Research Partnership in the North of England. In those cases the consortia help co-ordinate research and encourage partnering with industry to maximise the impact of the research base (OECD, 2008). The Illinois Science and Technology Coalition (ISTC) and the Wisconsin Technology Council are well placed to trigger such collaboration and act as "honest brokers" with the different universities across the Tri-State Region given that many local higher education institutions are partners in the coalitions.

Despite these green research assets, R&D in the region has dropped and venture capital for energy-related start-ups remains low. While local research institutions do engage in research that benefits local green firms, venture capital for industrial/energy start-ups is still largely focused on the coasts. Total regional employment in the R&D sector declined by roughly 40% between 2000 and 2009 (CMAP, 2010a). Investments in the industrial/energy sector in Illinois are significantly lower than in the Silicon Valley of California, particularly in the past several years as venture capital levels have rebounded (PWC/NVCA, 2011) (Figure 5.2).[15] Between 1995-2011, the industrial/energy sector in Silicon Valley attracted an average of 13 deals/year, compared to 3.6 deals/year in Illinois. The deal value is also widely divergent, with deals over the 1995-2011 time frame totalling USD 7.7 billion for Silicon Valley-based industrial/energy start-ups, as compared to USD 414 million for Illinois-based firms and USD 26.5 billion for the US overall (PWC/NVCA, 2011). Firms in the Tri-State Region are reporting that they are being asked by VC funds to move to the coast to receive funds, and that funds for start-ups and major investments are more readily available than for the middle range of VC investments.[16] CMAP (2010a) suggests there is some evidence that start-ups hatched in the Chicago region often end up relocating to either the east or west coast as a precondition to the receipt of venture capital, indicating how important it could be to develop a strong venture capital base that prioritises business investments in the region.

Figure 5.2. **Number of venture capital deals in the industrial/energy sector**

(Q1 1995-Q2 2011)



Source: PWC/NVCA (PricewaterhouseCoopers and National Venture Capital Association) (2011), Money Tree Report (Historical trend data for the Industrial/Energy sectors 1995-2011). Data provided by Thomson Reuters, *www.pwcmoneytree.com/MTPublic/ns/nav.jsp?page=historical*, accessed 28 August 2011.

Two organisations in the state of Illinois seek to support clean technology business development by focussing on breakthrough technology that can be commercialised. The Illinois Science and Technology Coalition (ISTC), a membership-based organisation established in 2009 and supported by the State of Illinois and 75 other public and private sector partners, currently focuses energy and energy storage as one of four priority areas. In the energy sector, the ISTC has partnered with the State of Illinois, the City of Chicago, several universities, the state's energy regulator, several energy companies, and a leading real estate organisation to examine ways to facilitate smart grid deployment around Illinois. The ISTC played a key role in supporting an Illinois Institute of Technology application for USD 12.9 million in stimulus funds focused on smart grid workforce training. A key goal is to focus on areas where Illinois businesses and universities can both fill a market gap and gain distinction with the marketplace, enhancing the state's overall reputation as the ideal home for science and technology companies.[17] The Illinois Clean Energy Trust, a non-profit clean energy business accelerator, conducts parallel but complementary work by connecting researchers with entrepreneurs and financiers to help commercialise new energy-related business opportunities. The Clean Energy Trust was founded in 2010 by a group of local venture capitalists and market experts interested in expanding the clean tech market in Illinois and the larger Midwest region, with seed funding was provided by the US Department of Energy (Box 5.8). An issue for policymakers is the extent to which these initiatives align with other green growth efforts around the region. For example, several clusters identified thus far by RW Ventures as good candidates for growth overlap with the sectors targeted by the ISTC. Co-ordination between these green growth efforts will improve their outcomes.

Box 5.9. **The Illinois Clean Energy Trust**

The Clean Energy Trust partners with several local universities and labs, charitable foundations, corporations and venture firms, and trade groups to provide business development support to start-up firms. The most promising ideas may be eligible for grant, loan, and equity finance support

One of the Trust's first major initiatives was a USD 130 000 Clean Energy Challenge, which attracted 70 applicants from across the state who vied for a USD 100 000 early stage business prize or USD 30 000 concept-stage funding prize. Of the fifteen finalists, five firms focused on different types of solar technology, while three firms focused on different energy efficiency technologies. Three firms also specialise in smart grid technology. Finalists received mentoring prior to their pitches to top venture capitalists, corporate investors, and business leaders (Clean Energy Trust, 2011). The second annual Clean Energy Challenge will give away USD 200 000 in cash prizes in early 2012, with eligibility broadened to include early stage firms located in Illinois, Wisconsin, Michigan, Indiana, and Ohio.

The Trust has also begun focusing on the next generation of entrepreneurs in the region, hosting a week-long Summer Institute on Sustainability and Energy in August 2011. Fifty graduate students and college undergraduates attended lectures, panel discussions, and participated in tours of energy facilities. Students were also divided into teams to tackle projects on water management, building retrofits, smart grid, and electric vehicles. Industry experts met with the teams to provide feedback on their proposed solutions, followed by a networking reception. (Clean Energy Trust, 2011)

Source : Clean Energy Trust (2011c) Clean Energy Trust Announces Finalists for the First Clean Energy Challenge; USD 130,000 in Prizes to be Awarded March 3. 25 January 2011. Viewed 28 August 2011 at *http://eon.businesswire.com/news/eon/20110125006948/en/Clean-Energy-Trust/entrepreneur-competition/business-competition;* Clean Energy Trust (2011) Clean Energy Trust Co-Produces UIC Summer Institute on Sustainability and Energy. 15 August 2011. Viewed 28 August 2011 at *www.cleanenergytrust.org/press*

For green growth clusters, it is thus important to focus on a range of interconnected sectors rather than restrict efforts to narrowly defined sectors. There is evidence that increasingly innovations are achieved through the convergence of scientific fields and technologies. This convergence requires spaces for interaction and cross-fertilisation of different knowledge domains. The concept of an *innovation ecosystem* is important:[18] innovation is a product of the interaction between a series of public and private actors, both individual (entrepreneurs) and institutional (universities, research centres, big firms, small start-ups, governments) in a given geographic space; *innovation networks* usually sustain these linkages and extend them to related actors in other ecosystems beyond the boundary of the given geographic space (see Box 3.1). The Milwaukee Water Council demonstrates the value of thinking in terms of an innovation ecosystem, as it operates under the premise that gains in one aspect of the water sector (e.g. water distribution and treatment) could have significant knock-on benefits in other related business sectors (e.g. pump and pipe manufacturers) and even areas where there might be a much more tangential relationship (e.g. water-related toys/recreation). Similarly, one could imagine in the buildings sector a situation where the Energy Impact Illinois program is expanded to serve as a convening mechanism bringing together architects, engineers, financial institutions, university researchers, energy technology firms, and installers to systematically examine how retrofit projects could promote made-in-Illinois technology or building materials. All would theoretically benefit from a comprehensive strategy

promoting new green building construction or building retrofits, but the level of growth in any individual sector would obviously depend on the particular green building policies that are pursued.

Private-sector intermediary organisations, such as the Milwaukee Water Council and the Illinois Clean Energy Trust, can be considered "brokers", as they help articulate research expertise and business needs that are critical for maximising regional "ecosystem" linkages. The most effective brokers often come from the ranks of business service professionals—individuals who have strong networks and relationships among inventors, transformers, and financiers. Economic development practitioners are less likely to play the broker role because they are expected to provide marketing, recruitment, information collection, technical assistance, or other services. Brokers act as facilitators; they help identify current and potential sources of innovation in a region. They help connect innovators to other key actors in the innovation ecosystem often by facilitating collaboration, thereby contributing to the acceleration and expansion of innovation activity in the region. In the Tri-State Region, key institutional players, whether in the universities or the private sector, should seek to identify and maximise the role of innovation brokers to enhance innovation capacity in priority business clusters region-wide.

A comprehensive strategy for a regional approach to green growth clusters in the Tri-State Region needs further analysis, since the needs of each cluster is different and green growth clusters are only emerging. There are significant variations in the nature of technologies or innovations, product lifecycles, skills gaps and other factors that are cluster specific. Only through the identification by cluster actors themselves and associated studies can more clear recommendations be addressed by the cluster members themselves or through public policy efforts. The recommendations by both the Chicago Metropolitan Agency for Planning (CMAP), in its *Go To 2040* report and others such as The Chicago Community Trust to further explore cluster needs are important for taking different components of the innovation system to the next level.

5.4. Multi-level governance mechanisms to increase green growth

Increasing green growth in the Chicago Tri-State Metro-Region calls for a more intentional, co-ordinated effort on the part of municipal and regional institutions. The Tri-State Regional planning agencies could deepen their existing partnership to co-ordinate more deliberately across jurisdictional boundaries. The leaders of these organisations have, by law, limited geographic mandates, but should nonetheless meet and collaborate regularly where possible. A 2002 multi-state accord between NIRPC, SEWRPC, and CMAP, amended in 2008 to include the Southwest Michigan Regional Planning Commission, already exists and has been described as an "historic agreement in which the planning agencies have committed to work together as they consider major environmental and economic issues, enabling planning at the watershed or aquifer scale without the limitation of traditional political boundaries" (NIRPC, 2011). The accord originally led to research and projects related to regional water resource management, for example, the establishment of the Southern Lake Michigan Regional Water Supply Consortium in 2005 (CMAP, 2010a). More recently, the directors of the four constituent regional planning agencies have discussed co-ordination of projects to develop regional trails, with progress described by CMAP (2010b) in its report on regional greenways and trails in northeastern Illinois.

One important step would be a region-wide effort to track progress on green growth goals. This could build off MetroPulse, a regional indicators system designed CMAP and the Chicago Community Trust to help track implementation of the GoTo2040 Comprehensive Regional Plan.[19] Thirty-seven of the key performance indicators in the MetroPulse database that can help decision makers gauge the effectiveness of different greening or green growth development efforts. The vast majority of these are transport related, providing insights into the effectiveness of transit-oriented development planning efforts or public transport system operations. Other green growth-related KPIs look at air and water quality issues, energy use, green infrastructure development, and waste and pollution issues. However, few MetroPulse indicators track the growth of green firms or clusters, and would thus need to be complemented with additional data. In the case of one of the sectors identified as a specialisation in the Chicago Tri-State Metro-Region, electric vehicles, tracking the number of electric vehicles registered with the state Department of Motor Vehicles or the number of EV recharging stations deployed around the region – would provide very clear indicators of progress in this sector. For the building energy efficiency sector, it would be valuable to collect data on the number of certified green buildings in the region, or the number of green alleys or green roofs installed around the city. Tree planting figures (or tree census data) is another readily definable metric, as is the total number of distributed power systems (e.g. solar PV, small wind, CHP, etc.) deployed on the local grid. The latter might need to be provided by ComEd, or could be tracked through building permit data.

There is no shortage of individuals or institutions in the Tri-State Region engaged in measuring performance in various policy areas, but the capacity to harness this information and to present it in a rational, integrated fashion that "tells the region's story" coherently is lacking. Therefore, MPOs, key private-sector and not-for-profit stakeholders should consider establishing and funding a *university-based research centre* in the Tri-State Region whose mandate would be to network with existing researchers and university responsibility centres to collect relevant academic research, data and indicators with the aim to provide a sound, up-to-date evidence base for the development and implementation of policies designed to address the strategic issues facing the Tri-State Region as a whole, and green growth in particular. This research centre could link with the local, county, State and Federal authorities responsible for the policies and program that affect economic development, workforce development, innovation and green-growth capacity and transportation and logistics in the Tri-State Region. Sharing key data and indicators on an on-going basis with all levels of government decision-making institutions that materially affect policy outcomes and economic performance in the Tri-State Region is of vital importance to ensuring that the policies and programming being delivered in the region truly reflect the reality on the ground in the region and can respond effectively to the challenge faced by the region. The research centre could also maintain regular on-going relationships with key public, private and community stakeholders in the region to share information, monitor progress in the development and implementation of key region-wide strategic plans and recommend changes to these plans where changes are warranted.

Beyond data collection on green targets, regional institutions such as CMAP in northeastern Illinois, SEWRPC and the Milwaukee 7 in southeastern Wisconsin, and NIRPC in Northwestern Indiana, have an important role to play in regional co-ordination to value and promote the green firms and investments in the Chicago-area 21-county region. In the short-term, this could take the form of a much-needed inventory of green financing resources and a strategy for pursuing funding opportunities on a 21-county

region-wide basis. In the longer term, a regional institution may be needed to provide a convening role for key public and private-sector actors to make difficult decisions across state lines on priorities for infrastructure investment. As the labour market extends across the Metro-Region, regional information collection on green sector training needs would also be an important step to determining the scale of green training needed. The interdependence between economic development and workforce development planning – and region-wide data and performance indicators to measure success in the implementation of this planning, will necessitate on-going, sustained two-way information exchange between key stakeholders implicated in both exercises.

Attracting and supporting green firms is essential to fostering further regional green growth. Current differences in regulation and competition in state taxes on corporate income, personal income, sales, and property, as well as unemployment insurance (payroll) taxes in the three states make it difficult to imagine a region-wide uniform tax policy. But there are examples of initiatives leading towards greater co-ordination among public sector agencies and through public-private partnerships. In Wisconsin, the City of Milwaukee has recently completed a comprehensive plan to guide policy, land-use and development decisions in the city,[20] while the private sector has taken the lead in the co-ordination of a multi-county – yet, again, exclusively intra-State – regional economic development strategy around Milwaukee, through the formation of the Milwaukee 7. Formed in 2005 and composed of private sector representatives from the seven counties of southeastern Wisconsin, the Milwaukee 7 aims to assist businesses seeking investment opportunities in the region. The Council is designed to offer a "single point of service" for firms who wish to relocate, expand, or otherwise enter the area. Milwaukee 7 has played an active role in educating local economic development officials about the benefits of co-ordinated development plans, thus building awareness among these professionals about the benefits of less parochial pursuits of business activity and investment. Another example is the Milwaukee Water Council (Box 5.7) that brings together multiple stakeholders from both Wisconsin and Illinois to the table around a common area of interest and expertise, and has convened academic researchers, the business community, and civic leaders to leverage the 21-county region's freshwater assets in view of establishing Milwaukee as the "World Water Hub" for water research, economic development, and education.

Transportation is a key sector for which region-wide planning and co-ordination is crucial to improve the performance of the regional transport system, a main component of green growth. To facilitate regional co-ordination on transportation, the Tri-State Region would benefit from a long-term, cross-border regional transportation plan. Local officials understand the need to work with their counterparts in nearby municipalities, counties, and states, to maintain and improve the region's transportation infrastructure and services. These officials must build on successful instances of intergovernmental co-operation and apply lessons learned to more difficult conflicts and issues. The expertise of institutions like CMAP, NIRPC, SEWRPC and the other Metropolitan Planning Organizations responsible for regional transportation planning will be essential – all the more so, given these institutions' ability to engage in long-term planning for the range of social, economic and environmental issues that will determine the region's long-term viability and attractiveness.

Transportation investments will require greater vertical co-ordination and reforms at the state and federal level, with priority given to projects with the greatest region-wide return. Regional stakeholders, including elected officials, business leaders, and policy makers, should renew efforts to reform state grant funding allocations to ensure that the

Chicago metropolitan area, which is the economic engine, gets a commensurate share of transportation and other infrastructure funding. At the federal level, more efforts could be made to allocate scarce dollars to projects producing the greatest value, with a preference for multi-modal and multi-jurisdictional infrastructure projects (transit systems, bridges, roads, etc.). Similarly, grant program could contain financial incentives to local governments to collaborate and co-ordinate funding and program requests, particularly across state borders. At the state and local level, projects should be prioritised based on expected returns and benefits at the regional level, so that the most effective and value-generating projects are undertaken.

National policies have a direct impact on many aspects of green growth in the Chicago Tri-State Metro-Region. The funds for renewable energy companies that were available through the US stimulus bill of 2009 are set to end. Much has been made of the US federal government's loans to renewable energy firms that later went bankrupt, defaulting on the loans. However, the US federal government has an important role in providing the conditions that would support long-term green private sector growth. First, the US government can play a crucial role in funding research and development in the green sector, including in the Argonne National Labs. Second, there are key federal legislative decisions that are needed, particularly to resolve the question about priority of repayment of tax-based loans (also known as senior-lien status), which for now stands in the way of any PACE program to allow building owners to repay loans for energy-efficiency or renewable energy technologies through their property taxes. Finally, the green sector would be significantly more attractive to venture capital and other private-sector investment if a price on carbon were established, either through a cap-and-trade system, carbon tax, or other mechanism.

Notes

1. For the discussion of green firms and green jobs, we have used the definition in Brookings (2011b Methodology): "The clean economy is economic activity – measured in terms of establishments and the jobs associated with them – that produces goods and services with an environmental benefit or adds value to such products using skills or technologies that are uniquely applied to those products."
2. For more information see *www.energyimpactillinois.org*.
3. Agglomeration economies occur when firms enjoy increasing returns to scale (IRS) in a particular place. The presence of IRS also induces other firms to locate there, as people come in search of higher wages, job opportunities and cultural values. This self-reinforcing process contributes to, *inter alia*, the formation of deeper, more efficient factor markets and more active generation and dissemination of knowledge. The result is that urban agglomerations to tend to generate higher levels of productivity and output. For an over view of the many mechanisms involved, see Duranton and Puga (2004).
4 . The Chicago IL-IN region here corresponds to the US census definition of urbanised area, which is smaller than the Chicago Metro-Region: *www.fhwa.dot.gov/planning/census_issues/metropolitan_planning/faqa2cdt.cfm#q24.*
5. Comparison based on 51 OECD Metro-Regions.
6. RTA serves Cook, DuPage, Kane, Lake, McHenry and Will counties.
7. The Regional Transportation Authority (RTA) also has also historically managed a Community Planning Program to assist municipalities in planning for transit-oriented development, particularly around Metra stations. RTA has recently partnered with CMAP to provide an expanded program. A map of RTA's previously-funded and current TOD plans is located at: http://rtams.org/TODViewer. Program descriptions are at *www.cmap.illinois.gov/lta* and *http://rtachicago.com/community-planning/community-planning.html*.
8. See *http://webarchive.nationalarchives.gov.uk/20110118095356* and *www.cabe.org.uk/case-studies/hammarby-sjostad.*
9. There is a cost for the recycling program, of course, but the cost may be offset by the sale of commodities captured by the recycling program. Costs may also be covered as part of the fee for waste collection services.
10. Schrock & Sundquist (2009) note that a USD 1 million investment in single-family dwelling retrofits yields 8.3 job-years of work, versus six job-years for multi-family dwelling projects and 5.4 job-years for commercial retrofit projects.
11. Personal communication with Val Jensen, Vice President, Marketing and Environmental Programs, ComEd, June 30 2011.
12. These issues are addressed more fully in Chapter 2 on Workforce.

13. See *www.anl.gov/Science_and_Technology/index.html* for more information about the various research initiatives underway at the lab.

14. Per interviews during OECD mission 21-25 March 2011.

15. OECD analysis of PWC/NVCA (2011). The Industrial/Energy sector is defined as, "Producers and suppliers of energy, chemicals, and materials, industrial automation companies and oil and gas exploration companies. Also included are environmental, agricultural, transportation, manufacturing, construction and utility-related products and services." *www.pwcmoneytree.com/MTPublic/ns/nav.jsp?page=definitions.*

16. Per interviews during OECD mission 21-25 March 2011 and 20-24 June 2011.

17. Personal communication with Matthew Summy, Executive Director, ISTC. June 2011.

18. The concept of an innovation ecosystem is discussed more fully in Chapter 3 on Innovation and Entrepreneurship.

19. For more information see *www.metropulsechicago.org*.

20. Public Policy Forum (2011) "Assembling the Parts".

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Chapter 6

Effective institutional arrangements in the Tri-State Region

This chapter focuses on the effectiveness of region-wide governance. The region faces challenges associated with articulating and implementing region-wide plans to address workforce development, innovation capacity, transportation and logistics and green growth. At issue is how to go about developing and implementing these action plans effectively, and how to monitor progress and measure success over time. Main challenges include institutional fragmentation and the region's limited capacity to think and act regionally. These challenges make interstate, region-wide co-ordination difficult, leaving little energy or political capital for focusing on long-term issues. These challenges hinder the ability to appreciate the true nature of the region's competitors, both international and domestic. This chapter proposes a road map to encourage more effective, on-going Tri-State collaboration to drive growth.

Key Findings

- *The region faces challenges associated with articulating and implementing region-wide plans to address workforce development, innovation capacity, transportation and logistics and green growth. All key public and private stakeholders know what needs to be done and why it needs to be done if the region is to sustain its role as a driver of national growth and of global competitiveness. At issue is how to go about developing these action plans in a meaningful way, how to put them into place effectively, and how to monitor progress and measure success over time.*

- *These challenges compel all key public and private actors in metropolitan areas across the OECD to address public policy issues together. In the Tri-State Region, the sheer range of public and private stakeholders with a vested interest in seeing them resolved dictates that policy advice be directed at this broader set of public and private actors operating on behalf of the Tri-State Region's residents. Key to the successful articulation and successful implementation of region-wide plans will be the ability of all public and private stakeholders to engage in genuine collaboration instead of in petty, harmful competition for increasingly scarce resources and scale assets in a way that recognises that only the Tri-State Region will be able to compete effectively in a global marketplace.*

- *The main challenges facing the region include institutional fragmentation - the region contains over 1 700 distinct units of government, different systems of local government, duplication of service, disparities in fiscal capacity, efficiency and co-ordination challenges, especially for projects or programs that have are truly pan-regional in nature, and the region's limited capacity to think and act regionally. These challenges make inter-state, region-wide co-ordination and co-operation difficult, leaving little energy or political capital for focusing on long-term issues. These challenges hinder the ability to appreciate the true nature of the region's competitors, both international and domestic.*

- *This chapter proposes a road map to encourage more effective, on-going Tri-State collaboration to drive growth. It proposes cross-jurisdictional collaboration and underscores the need for coherent, integrated, region-wide planning for green economic development, workforce development and region-wide, inter-modal transportation. The chapter suggests that to articulate and implement the vision, region-wide institutional capacity and political engagement ought to be strengthened by generating the regional research networks required to build the evidence base to benefit the Tri-State Region and engage civic and political leaders more effectively to address the region's policy challenges on an on-going basis.*

The Chicago Tri-State Metro-Region faces various policy challenges associated with articulating and implementing region-wide plans to address key issues related to workforce development, innovation capacity, transportation and logistics and green growth in the Tri-State Region. All key public and private stakeholders are keenly aware of *what* needs to be done to address these issues effectively, as well as *why* it needs to be done if the region is to sustain its role as a driver of national growth and of US global competitiveness. At issue is *how* to go about developing these action plans in a meaningful way, how to put them into place effectively, and how to monitor progress and measure success over time.

While the challenges associated with emerging successfully from the crisis compel all key public and private actors in metropolitan areas across the OECD to address public policy issues together, the specific challenges in the Tri-State Region – and the sheer range of both public and private stakeholders with a vested interest in seeing them resolved for the benefit of the region as a whole – dictate that policy advice be directed at this broader set of public and private actors operating on behalf of the Tri-State Region's residents. In this spirit, key to the successful articulation, implementation and success over time of region-wide plans will be the ability of all public and private stakeholders to engage in genuine collaborative action instead of in petty, harmful competition for increasingly scarce resources and scale assets and talent in a way that recognises that it is only the Tri-State Region that will be able to compete effectively in a global marketplace in the future.

This chapter will focus on the institutional arrangements required to articulate, implement and monitor region-wide development strategies in an *integrated* and *mutually-reinforcing* fashion for the benefit of all residents across the Tri-State Region while ensuring that the region can continue to contribute effectively to America's national and international economic performance. The chapter will:

- *Section 1*. Identify specific institutional challenges that hinder stakeholders' ability to define the Tri-State Region as a truly functional metropolitan area, including divisive intra-regional competition for scarce resources and institutional fragmentation that hinder effective collaboration and pooling of scarce resources to achieve region-wide benefits;
- *Section 2*. Propose new roles for stakeholders to achieve genuine region-wide partnering to achieve common economic, workforce and inter-modal transportation objectives;
- *Section 3*. Suggest which stakeholders might be best placed to lead, catalyse and otherwise corral existing public and private actors across the region to develop and implement a strategic vision based on clearly-identified region-wide interests through collaborative, region-wide action in order to achieve true region-wide benefits.

6.1. Main challenges

Institutional fragmentation

As with most OECD metropolitan areas, the institutional framework in the Tri-State Region is characterised by a high level of fragmentation. The Tri-State Region alone contains over 1 700 distinct units of government, each with its own set of revenue and

service provision responsibilities and authorities. Local government is divided into three categories, i.e. general purpose governments (e.g. county, municipal and township governments), special purpose governments (e.g. airport authorities, the Chicago Transit Authority, conservation districts, fire protection districts, water and sewer commissions, etc.), and school districts.[1] Special function governments and school districts often encompass multiple municipalities. The Chicago-area 21-county region includes over 2 000 local governments (Table 6.1). The state of Illinois alone has the nation's largest number of local governments, at 6 994.[2] By international comparison, the Paris Metro-Region, which is known to be one of the most fragmented metropolitan areas in the OECD, includes a regional authority in addition to 1 281 cities and over 100 inter-municipal bodies. By contrast, in Greater London, local authorities are composed of the Greater London Authority, 32 London boroughs, and the City of London. The Greater Toronto Area consists of one large one-tier municipality (the City of Toronto), four regional municipalities, and 23 lower-tier municipalities.[3]

Table 6.1. **Number and types of local governments**

	Chicago Tri-State metro region	Chicago-area 21-county region
General purpose	572	755
Special purpose	784	947
School districts	367	453
Total	1 723	2 155
GDP (2010, current USD)	USD 532.3 billion	USD 623.6 billion
Population (2010)	9 461 105	11 437 337

Source: Census of Governments, 2007, Government Integrated Directory (*http://harvester.census.gov/gid/gid_07/options.html*); U.S. Bureau of Economic Analysis, GDP by Metropolitan Areas (News Release: GDP by Metropolitan Area, Advance 2010, and Revised 2007–2009; September 13, 2011); U.S. Census Bureau.[4]

Adding to the sheer volume of units of government is the different *systems* of local government in Illinois, Indiana and Wisconsin. While Illinois accounts for the greatest number of governments in most categories (notably because of its 300-odd school boards in the Tri-State Region alone), the township form of government[5] is used in Illinois and Indiana but not in Wisconsin; the village form of municipal government is used frequently in Illinois, rarely in Wisconsin, and never in Indiana. The region also presents a wide variety of special-purpose governments, which are typically responsible for delivering a specific set of services, such as airport management, public transportation, public utilities, civic services (museums, zoos, etc.), or environmental management. The number of special-purpose authorities varies dramatically depending on the nature of the purpose; for example, while there are many parks and recreation, library, and fire-protection authorities, there is only a handful of mass-transit or solid-waste management districts, consistent with the efficient-service argument (Tables 6.2, 6.3 and 6.4).

Table 6.2. **Number and types of general purpose local governments in the Chicago Tri-State Metro-Region**

Chicago Tri-State Metro-Region				
Type	Illinois	Indiana	Wisconsin	Total
City	58	10	1	69
County	9	4	1	14
Town	2	29	7	38
Township	158	46	0	204
Village	243	0	4	247
Total	470	89	13	572
Chicago-area 21-county region				
Type	Illinois	Indiana	Wisconsin	Total
City	60	12	25	97
Civil township	0	4	0	4
County	10	5	6	21
Town	2	38	45	85
Township	175	63	0	238
Village	260	0	50	310
Total	507	122	126	755

Source: U.S. Bureau of the Census (2007).

Table 6.3. **Number and types of special purpose governments**

Function	Chicago Tri-State Metro-Region	Chicago-area 21-county region
Air transportation	5	7
Electric Power	1	1
Fire Protection	155	170
Housing and Community Development	24	47
Libraries	135	145
Other and Unallocated	8	9
Other Health	15	15
Other Multi-Function	23	25
Other Natural Resources	6	33
Parks and Recreation	199	206
Public Mass Transit Systems	9	10
Regular Highway	7	7
Sewerage	47	68
Sewerage and Water Supply	9	15
Solid Waste Management	10	12
Water Supply	12	13
Water Transportation and Terminals	3	3
Other	116	161
Total	784	947

Note: "Other" category includes codes: 2, 9, 40, 51, 63, 86, 88 (primarily school building construction authorities and natural resource conservation districts)

Source: U.S. Bureau of the Census (2007).

Table 6.4. **Number of school districts in the Chicago region**

	Illinois	Indiana	Wisconsin	Total
Chicago Tri-State Metro-Region	327	27	13	367
Chicago area 21-county region	340	35	78	453

Source: U.S. Bureau of the Census (2007).

Having such a large number of jurisdictions brings both advantages and disadvantages to a metropolitan area like the Tri-State Region:

- On the one hand, public economics theory (Tiebout, 1956) underscores that efficiency gains can be generated when competition between local governments yields an efficient provision of public services and residential location, as households "sort" themselves into jurisdictions that provide the bundles of services that they value most highly at the best tax rates. From this perspective, the Tri-State Region benefits because its governments are attuned to residents' needs and provide efficient levels of service and taxation;

On the other hand, institutional fragmentation also creates a complex policy environment in which public services can be duplicated; and region-wide consensus is difficult to reach on medium- and long-term goals. Moreover, in an ever-tighter fiscal environment, the tax-dollar expense associated with multiple single- and multi-purpose administrative structures operating in a single functional region can become a public policy issue given the increasingly scarce public resources available to deliver public services efficiently and effectively.

In the case of the Tri-State Region, the fractured nature of the region's institutional arrangements may affect its competitiveness, growth, and economic vitality. At least two important challenges can be highlighted:

- Duplication in public service delivery, higher tax burdens, and reduced accountability and transparency;
- Limited co-ordination capacity, especially relating to economic development, workforce development and transport; and
- Limited ability to focus on region-wide planning objectives.

Examples of *duplication of service*, over-taxation, and inefficiency are numerous in the Tri-State Region, and the region's policymakers have had limited, if any, appetite for encouraging consolidation, merger, and/or actual dissolution of local governmental units. One example of a successful dissolution comes from Cook County, where in 1947 the Suburban Cook County Tuberculosis Sanatorium District was created. Over time, the need for the District's services diminished and inefficiencies emerged. In a 2003 report, the Civic Federation estimated that the cost per tuberculosis case treated by the District was USD 36 870, compared to only USD 15 665 to cases treated by the City of Chicago. The Civic Federation recommended at that time that the District be dissolved and its assets and responsibilities be transferred to Cook County. Several years later, the Illinois General Assembly passed Senate Bill 2654 (Public Act 94-1050) to do so, effective July 24, 2006 (nearly sixty years after its creation).

Multiple general purpose governments in a region may also raise *efficiency and co-ordination challenges*, especially for projects or programmes that are truly regional in

nature. Government officials in Illinois, with its 1 432 townships, have recently signalled a growing interest in this issue, driven in part by the serious budgetary pressures faced by governments throughout the state. For example, the township of Evanston, in northern Cook County, shares boundaries with the city of Evanston, and city council members there (acting in their capacity as township trustees) recently directed city staff to prepare draft referendum language for a March 2012 public vote on whether Evanston Township should be dissolved and its responsibilities transferred to the City. Estimated budgetary savings from such a move range from USD 500 000 to USD 700 000 on an annual basis; certainly not a huge figure, but meaningful to local elected officials facing a significant city budget deficit (Bullington, 2011a and 2011b).

The legal mechanics of dissolving a township in Illinois are not well-understood or developed, as it appears that while the state constitution gives individual townships the right to dissolve, Illinois statutes require that the request to dissolve a township within a county must be put to the voters of the entire county, not just the requesting township. In fact, a state legislator has introduced legislation that would give individual townships the right to call for eliminating their township highway commissioners and property assessors. The proposed legislation has not moved forward yet, but its very existence suggests that at least some local elected officials sense that the multiplicity of governments in the region is a liability, not an asset.

The region's complex governance structure also engenders a *limited capacity to think and act regionally*. It hinders the ability to appreciate the true nature of the Tri-State Region's competitors, which are international as well as domestic. Elected officials at the state and local levels, public stakeholders in economic development throughout the region and even some private-sector actors often do not recognise their interdependence within the region, nor that competitive pressures will come from metropolitan regions outside the United States. Instead, local decisions tend to be made based on a narrow sense of self-interest, with at best an inconsistent "buy-in" from other regional actors to the proposition that the overall economic development and vitality of the region can best be enhanced if efforts are co-ordinated across municipality, county, and especially state boundaries. Tri-State Region examples include the following:

- In 2011, Canadian National Railway Company (CN Rail), one of the largest railway companies in North America, announced plans to relocate a portion of its operations from Markham, Illinois, across the State border to Gary, Indiana. This relocation will likely benefit the recipient community, yet does little to increase economic activity or employment in the Tri-State Region as a whole. The move nevertheless received the enthusiastic support (along with the provision of financial incentives) of public officials in Indiana,[6] underscoring a tendency for local economic development efforts to focus on redistributing economic activity within the Tri-State Region as opposed to increasing the value of economic activity overall.[7]
- A proposal to extend Chicago's North Line Metra commuter rail service from Kenosha to Racine and Milwaukee (KRM) and to link KRM service with the Chicago Transit Authority's existing North Line service was developed and received significant support from the local business and planning communities. Better and more frequent rail service had long been advocated by policymakers and would serve to integrate more fully the market for goods, services, and workers across county and state lines. Southeast Wisconsin leaders seemed particularly cognisant of the rich employment and business growth opportunities

along this north-south corridor.[8] Despite these arguments – and significant local support for the project – in July 2011 the State of Wisconsin dissolved the Southeastern Wisconsin Regional Transit Authority, which had been created in 2009 to develop commuter rail service in Kenosha, Racine, and Milwaukee Counties. In addition, Metra leadership has not been very receptive to the project and it was discontinued with little indication of future reconsideration by officials in Wisconsin or Illinois (Sandler, 2011). Extra-regional opposition to the project was significant, as elected officials in Wisconsin from outside the Tri-State Region feared taking on a significant financial burden, while policymakers in Illinois were unable to generate adequate support for the project.

In both of these examples, the most difficult boundary to cross seems to have been the state line. As will be developed later, co-ordination and co-operation *within* each state seems to be effective, at least in some instances, while engagement *across* state lines seems to be more difficult, at least for public sector entities. These sometimes parochial approaches to economic development imply that less time, energy and resources are being devoted to "growing" the region as a way to attract physical, financial and human resources from around the world. Indeed one estimate (Munro, *et al.*, 2011)[9] suggests that little job growth at the state level comes from intra-regional business relocations, while "more than 95% comes from the expansion of existing businesses (nearly 42%) and the birth of new establishments (roughly 56%)."

Fiscal constraints

The impact of the differences in the structure of local governments in Illinois, Indiana, and Wisconsin on region-wide visioning and policy-co-ordination capacity is magnified by the need by the state governments to address their operating deficits on a pressing basis, making inter-state, region-wide co-ordination and co-operation even more difficult. Lawmakers in Illinois and Wisconsin in particular are presently preoccupied with addressing their states' fiscal challenges, leaving little energy or political capital to spend addressing more long-term issues. This is especially true for large-scale infrastructure projects and workforce development strategies. Currently, all three states, to one degree or another, face significant operating deficits and high structural debt, as do most of their local governments:

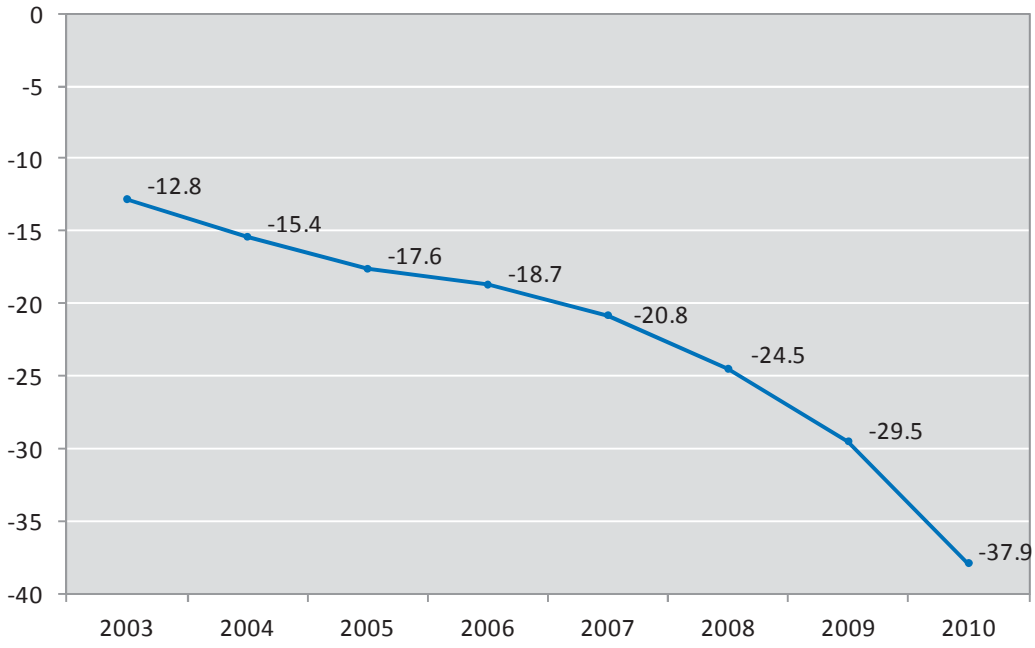
- *Illinois* continues to struggle with structural deficits caused in large part by underfunded pensions, with little political will to address fiscal problems. The state's yearly operations budget (USD 33 billion in FY 2011) has included a general operating-fund deficit that reached USD 9.4 billion in FY 2010. In fact, a recent audit of the state's financial condition[10] reported that its debt (excess of accrued liabilities over assets) reached nearly USD 38 billion in the fiscal year ending June 30, 2011 (Figure 6.1), a figure that is likely *understated* because of the treatment of future pension payment obligations (Novy-Marx and Rauh, 2011a).
- *Indiana* also faces a budget deficit for FY 2012, albeit a modest one due to recovery in the automotive industry and to tough spending cuts enacted in 2009, when revenues began to deteriorate (McNichol *et al.*, 2011; Ketzenberger, 2011). Indeed both the executive and legislative branches of state government have been able to work together to cut spending and avoid running large deficits.
- *Wisconsin's* fiscal condition lies between those of Illinois and Indiana. In early 2011, Wisconsin's new governor faced a USD 137 million deficit and a projected

USD 3.6 billion deficit in the following two-year budget cycle, which led to contentious budget negotiations between the governor and the state legislature over proposed budget cuts and changes to the state's collective bargaining laws.

In the case of Illinois, which among the states in the Tri-State region faces the most significant fiscal constraints, the state's budget challenges pre-date the recent crisis. A 2010 study by the National Conference of State Legislatures found the Illinois' financial situation to be the worst among any state in the US (National Conference of State Legislatures, 2010). Lawmakers have for some time been struggling to correct the structural mismatch between revenues and expenditures. A study by the Pew Center (2009) indicates that Illinois has run deficits every year since the last recession in 2001; the State's short-term responses to address the budget gaps have relied heavily on delaying payments, notably to Medicaid providers, and skimping on the State's annual pension plans.[11] In 2011, the state passed (temporary) increases in its personal and corporate income tax rates, with the personal rate rising from 3% to 5% and the corporate rate rising from 4.8% to 7.0%.[12]

Figure 6.1. **State of Illinois deficits for net assets of governmental activities (fiscal years 2003-10)**

In billion USD



Note: Numbers reflect restatements.

Source: State of Illinois, Office of the Auditor General, "Statewide Financial Statement Audit Report for the Year Ended June 30, 2010.

It is not surprising then that Illinois' local governments, in addition to those in Indiana and Wisconsin, also face serious financial pressure. Following the 2011 local elections in Chicago, the incoming City administration inherited a substantial operating deficit, projected at USD 635.7 million for FY 2012 (City of Chicago, 2011). Similarly, the incoming Cook County Board recently released preliminary FY 2012 budget estimates showing a USD 315.2 million deficit in the County's operating budget. Underfunded

pension and other post-employment obligations also represent enormous burdens on these local governments (Novy-Marx and Rauh (2010)). The local business community is well aware of the underfunded-pensions problem that has plagued the State since the mid-1990s and has advocated for substantial reforms to state and local government pension plans and funding commitments (Pew Center, 2009; Commercial Club of Chicago, 2010).[13] In Indiana, caps on property taxes have drastically reduced municipal and school district budgets, leading to budget cuts and layoffs,[14] while part of Wisconsin's strategy for handling the budget crisis has involved cutting aid to local governments, reducing aid to municipalities by USD 59.5 million and to counties by USD 36.5 million in 2012.[15]

These fiscal constraints are worsening in a context where all three states have sizeable unmet infrastructure needs. As Chapter 1 underlined, transit infrastructure alone is significantly underfunded: Cook County's Regional Transit Authority (2007) estimates that investments of USD 7.3 billion would be necessary over a five year period to maintain the transport system, an additional USD 1.1 billion would be needed to enhance it, and USD 2 billion more would be needed to expand it over that period. The cost of maintaining, enhancing and expanding the system over 2007-37 is estimated at USD 57 billion (RTA, 2007; CMAP, 2010).

Illinois and, to lesser extent, Indiana and Wisconsin have yet to plan and implement adequate funding arrangements for state employee pension plans (Table 6.5). State tax revenues have rebounded of late (Table 6.6), most sharply in Illinois due to its recent rate hikes, but the funding demands are significant. The most recent infrastructure "report cards" prepared by the American Society of Civil Engineers to measure the current state of infrastructure show overall "grades" of D+, D+, and C-, all well below-average marks, for Illinois, Indiana, and Wisconsin, respectively, indicating serious deficiencies in bridges, roads, water infrastructure, and other key public sector capital assets (American Society of Civil Engineers, 2010). On the pension front, Novy-Marx and Rauh (2011b) estimate that *annual* tax increases of nearly USD 2 000 per household are needed in Illinois for state plans to reach fully funded status over the next 30 years.

Table 6.5. **State pension plan measures**

	Funded ratio, FY (Pew, 2009)	Conservative funded ratio, FY 2009 (Novy-Marx and Rauh, 2011)
Illinois	0.51	0.41
Indiana	0.67	0.54
Wisconsin	1.00	0.69

Source: Pew (2010), Novy-Marx and Rauh (2011a).

Table 6.6. **Percent change in state tax revenues**

2010 Q1 to 2011 Q2

	Personal income tax	Corporate income tax	Sales tax	Total
Illinois	16.1%	31.2%	8.8%	12.1%
Indiana	16.2%	38.3%	5.5%	7.3%
Wisconsin	10.2%	6.0%	4.7%	7.6%

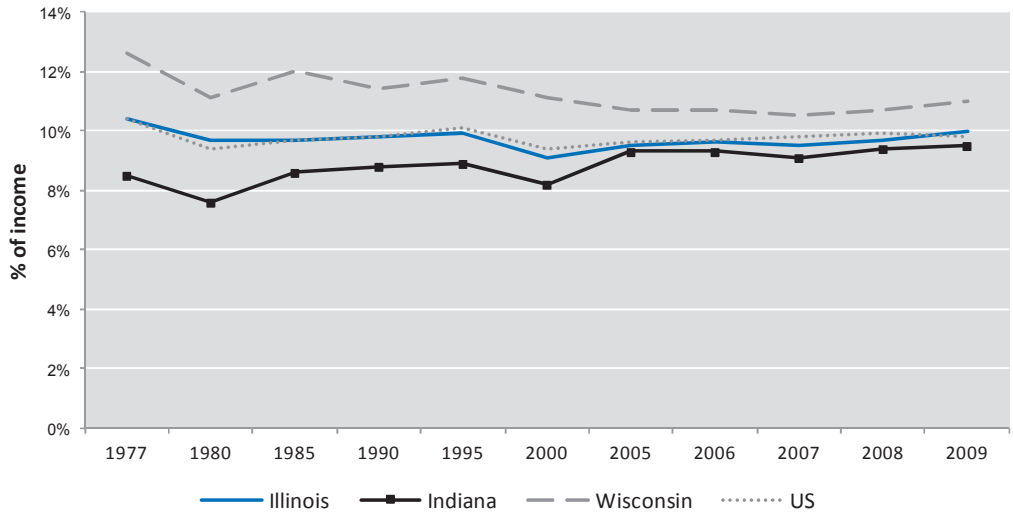
Source: Dadayan (2011).

Tax competition

In the context of sustained spending pressures, the states' different tax-policy responses to address deficits can influence where companies locate, further affecting "region-building" efforts. While taxes are unlikely to be the only factor affecting business decisions about where to locate, they are often an important component in those decisions. Illinois, Indiana, and Wisconsin rank differently by several measures related to tax burden and business tax climate:

- According to the Tax Foundation, which constructs a business tax climate index for each state, Indiana ranked 10th in terms of best business climate, Illinois ranked 23rd (*before* the State raised its rates) and Wisconsin ranked 40th. The Tax Foundation's index reflects state taxes on corporate income, personal income, sales, and property, as well as unemployment insurance (payroll) taxes. Corporate rates, in particular, are highest in Illinois, with a rate of 9.5%, with Indiana close behind at 8.5% and Wisconsin at 7.9% (Tax Foundation (2011)).[16]
- A recent review of corporate tax rates (Hodge, 2011) indicates that the combined federal (at 35%) and state corporate tax rate in all 50 states now exceeds that of France, whose (combined national and regional) rate of 34.4% is 3rd highest among OECD countries. It appears that federal tax policy, not just state tax policy, will affect the overall business climate in the Tri-State region, though inter-state differences in corporate tax rates may remain the primary regional motivator for businesses deciding where to locate within the Tri-State region.
- The overall combined state and local tax burden in Illinois, Indiana, and Wisconsin has evolved over the last 35 years, with Wisconsin's rates ranking consistently higher than the US average, Illinois at about the US average and Indiana slowly converging toward Illinois (Figure 6.2). The near convergence of the index values in Indiana and Illinois in 2009 seems to dispel the commonly-held view (in Indiana) that Illinois business taxes are significantly higher than those in Indiana.

Figure 6.2. **State and local tax burdens, 1977-2009**



Source: Robyn and Prante (2011), "State -Local Tax Burdens Fall in 2009 as Tax Revenues Shrink Faster than Income".

Inter-jurisdictional competition within the Tri-State Region also occurs with respect to tinkering with local sales-tax rates in Illinois (with low-tax jurisdictions actively luring businesses to move there, another example of re-arranging economic activity within the region without increasing it). Localities within the Tri-State Region also differ dramatically with respect to property-tax rates, reflecting local differences in property values along with differences in preferences and costs regarding the provision of local services such as schools, parks and recreation, social services, and public safety. Municipalities often compete against others to attract business development and expansion, using tax rebates, tax credits, and other financial incentives, not only creating rivalry between neighbouring jurisdictions but generating revenue concerns for other, non-municipal governments such as school districts. This squabbling across municipalities and between municipalities and other public stakeholders in the Tri-State Region does nothing to increase the overall level of investment and economic activity in the region.

Addressing fiscal constraints

All stakeholders in the Tri-State Region need to address the serious fiscal challenges faced by the states and local governments. The region's international competitiveness requires a fair and efficient local tax system, one with transparency, accountability, and revenue adequacy, so that the region can fund the transportation, infrastructure, and other services needed by its residents and businesses to compete nationally and internationally:

- Residents face a complex, inefficient, and often inequitable tax system that cannot raise the revenues needed to pay for needed maintenance and upgrades, let alone expansion, of transportation and municipal infrastructure and other public services.
- Businesses face a complicated and unbalanced property tax system. The tax system now in place too often pits one locale against another. And municipalities too often offer financial incentives such as tax breaks or credits to attract firms who might have located or expanded there without such incentives.

There is thus a need in the Tri-State Region to:

- pursue *budgetary and tax reform* at the state and local levels; and
- explore municipal service-delivery consolidation.

Sales tax reform is a particularly difficult policy challenge. The state of Illinois currently levies a 6.25% tax on sales, along with municipalities with home-rule status. Thus, in the Tri-State Region, some residents only pay the state sales-tax rate, while others – notably residents of Cook County face combined rates ranging from 8.25% to 9.75%, depending on the municipal jurisdiction. The combined rate in the City of Chicago is 9.5%.[17] Possible reforms might entail broadening the sales tax base, for example by including more services, which would likely raise the progressivity of the tax, improve its revenue adequacy, and even permit a lowering of the sales tax rate, or revising the current revenue-sharing arrangements to limit the incentives of localities to compete intra-regionally for sales tax revenue-generating activity. The multiplicity of northern Illinois' taxing jurisdictions and the complexity of the revenue allocation rules present a challenge to creating an efficient and equitable system, one that enhances, not damages, the competitiveness of the region. Not only have local businesses threatened to move across county lines in search of lower tax jurisdictions, but some firms have apparently found ways to route their sales transactions through operations in smaller

jurisdictions with lower tax rates, saving substantial tax expenses (Bergen, Sachdev, and Cancino, 2011).[18]

Budgetary reform will be necessary at both the state and local levels. As noted by CMAP, these reforms are needed to enhance the efficiency, transparency, revenue adequacy, and fairness that the region requires to thrive in the 21st century. The *Go To 2040* plan recommends undertaking careful review and, where appropriate, reform of sales, property, and income taxes and of state and local revenue-sharing arrangements. A Regional Tax Policy Task Force is currently working on such a review, and its work is intended to be complete by early 2012. Illinois should be open to the recommendations that may emerge from the task force, whose work will continue into 2012. Furthermore, officials should continue to reform state and local government pensions and to develop funding plans to make up for years of underfunding their plans.

In the Tri-State Region, local governments should continue to *collaborate* across boundaries in pursuit of *more efficient service delivery*. Both the City of Chicago and Cook County have established a committee to investigate service consolidation, collaboration, or in some instances specialisation (Joint Committee on City-County Collaboration, 2011). The committee recommended pursuit of numerous efficiency-enhancing opportunities in purchasing, IT services, fleet management, and other areas. If these proposals are successful, direct efficiency and/or budget gains may be significant, and rules-based protocols and agreements for working together could result, thus building trust among stakeholders along with the regulatory apparatus needed for sustaining collaboration over the long term.[19]

Similarly, the Tri-State Region's Metropolitan Mayors' Caucus (MMC), described in the next section, has undertaken a Service Delivery Project to investigate the feasibility of consolidated municipal service provision. A report on the municipal police and fire services, for example, identified numerous opportunities for co-ordination and improved efficiencies short of complete consolidation or outsourcing to neighbouring jurisdictions (MMC, 2009). Stakeholders can look to several out-of-state examples: the City of Miami and Dade County (with joint purchasing agreements and a combined 311 call centre) and the City of Pittsburgh and Allegheny County (with similar arrangements).

At the state level, policymakers have the constitutional authority to alter the "rules of the game" for local governments, defining their legal rights and responsibilities, home rule status, bonding and taxing authority, and so on. The three state governments in the Tri-State Region should consider making changes to increase efficiency, transparency, and competitiveness by encouraging (or legislating) consolidation or the dissolution of some units of government. The state of Indiana recently considered ways to streamline local government and service provision (Indiana Commission on Local Government Reform, 2007). In turn, the governor has recommended numerous reforms to local government, including the transfer of some responsibilities from townships to counties or other units of government and a minimum size for school districts (1 000 students). These proposals are in line with those currently under review in other US states, such as New York and Michigan, which are revisiting their structure of local governments to increase efficiency (Box 6.1). That said even with cost-saving measures and pension and other structural reforms, state governments in the Tri-State Region need to invest in creating new sources of revenue, principally through the facilitation of widespread business expansion of existing firms and by increasing the number of successful start-up businesses. One observer notes that:

"Most discussions about Illinois' deficit focus on cutting waste and reforming the pension system… unless we couple cost reduction and other structural deficit remedies with a new economic development strategy that dramatically increases the number of new and high wage jobs, we will never crawl out of this hole." ("Look to private sector for recovery", *Daily Herald*, December 19, 2010).

Box 6.1. **New York and Michigan: toward consolidation and joint service delivery at the municipal level?**

New York State recently reviewed its local government structure and prepared lengthy recommendations, including government consolidation and joint service delivery (New York State Commission on Local Government Efficiency and Competitiveness, 2008). Similarly, the Citizens Research Council of Michigan has hosted symposia and published papers related to the structure of local governments in Michigan, at one point going so far as to recommend a substantial decrease in the number of such governments and eliciting defensive responses from local government officials (Citizens Research Council, 1999; Michigan Townships Association, 1999 and undated). At present, however, Michigan seems to have focused its efforts on encouraging more collaboration and joint service provision among its local governments (Citizens Research Council of Michigan, 2008; State of Michigan, Michigan Shared Public Services Initiative, 2011; and Klaft, 2010).

Source : New York State Commission on Local Government Efficiency and Competitiveness, 2008; Citizens Research Council, 1999; Michigan Townships Association, 1999 and undated; State of Michigan, Michigan Shared Public Services Initiative, 2011; and Klaft, 2010.

6.2. Tri-State collaboration to drive growth

Despite the complexity of local governance and the sometimes fraught institutional relationships in the Tri-State Region, stakeholders have already successfully undertaken some projects requiring extensive collaboration and co-ordination across multiple agencies and jurisdictions. Regional leaders should therefore build on these successes and extend their reach in a manner consistent with an integrated vision of the region as a dynamic, competitive metropolitan area driving America's national economic growth and international performance:

- The non-profit ***Metropolitan Planning Council*** (MPC), for instance, has been instrumental in assisting local governments in the development of collaborative, inter-jurisdictional grant proposals. MPC partners with groups from the private, civic, and governmental sectors to develop research, advocate solutions, and implement regional policies; it also works with local leaders to ensure that local plans are consistent with the region's overall plans, CMAP's *Go To 2040* plan and NIRPC's 2040 plan for northwest Indiana. It has a long history of involvement in the areas of transportation and housing, which are issues that are best tackled regionally: MPC has long supported comprehensive regional transportation strategies and projects, such as the recently signed legislation permitting the use of public-private partnerships to fund new transportation infrastructure, the Illinois Tollway Authority's 2011 comprehensive capital plan to expand and upgrade its toll ways and to move toward congestion pricing, and several Bus Rapid Transit (BRT) projects for the City of Chicago. It has also been successful in providing technical assistance to local governments in the

development and implementation of inter-jurisdictional agreements for housing, allowing these groups to take advantage of incentives to promote inter-municipal collaboration (MPC, 2011).

- Building consensus on a common way forward sometimes means making a concerted effort to put aside divisive issues. This strategy was key to the success of the ***Metropolitan Mayors Caucus,***[20] which explicitly chose to work on matters of mutual concern, while deferring issues on which conflicts were deep and pervasive (e.g. expanding O'Hare vs. building a south suburban airport). Similarly, officials in Illinois and Indiana have worked successfully together over an extended period to rebuild and widen the Kingery and Borman Expressways, aiming to improve travel times and increase safety along this crucial east-west corridor. This experience should make the next joint project, the proposed Illiana Expressway, easier to plan, design, and implement. More importantly, these experiences may lay the groundwork for undertaking other, more ambitious and possibly more contentious projects in the future.

Stakeholders should therefore focus on building region-wide dialogue using *existing regional institutions* to address the region's challenges. They need not create *new* regional institutions over top an already complex and fractured system of local governments, and the numerous business, non-profit and public planning organisations which already possess a wealth of technical expertise and political capital. Furthermore, efforts must be consistent with the overall regional plans already developed and should be flexible and responsive to the specifics of a given situation. Some projects will require co-operation of a small number of governments and agencies, while others are larger in scope and will need co-ordination of a larger group.

Cross-jurisdictional collaboration to drive growth: the need for Tri-State level planning

While some stakeholders take a dim view of the very notion of a Tri-State Region – reinforced by the region's many jurisdictional boundaries – there are nevertheless several core representative organisations from the business, non-profit and governmental sectors that have demonstrated a substantive understanding of the region and the challenges and opportunities it faces from globalisation. For planning purposes, the functional geography of the Tri-State Region is covered by the area's three Metropolitan Planning Organizations (MPOs) which are ideally placed to contribute substantially to the creation of a Tri-State Regional vision/agenda:

- The Chicago Metropolitan Agency for Planning (CMAP);
- The Southeastern Wisconsin Regional Planning Commission (SEWRPC); and
- The Northwestern Indiana Regional Planning Commission (NIRPC).

Each is responsible for engaging in integrated planning in the areas of transportation, housing, land use, open space, and economic development within their state-mandated metropolitan jurisdiction and has recently been engaged in developing metropolitan plans (Box 6.2). These regional planning agencies offer several advantages, as they are equipped with a comprehensive, multi-sector vision of their jurisdiction, including both the challenges faced in a given domain (transportation, housing, land use), as well as the potential complementarities and trade-offs between these issues. They also possess a wealth of regional quantitative data in a variety of areas pertinent to urban and

metropolitan development, along with solid experience in engaging citizens to help shape a regional vision.

Box 6.2. **Three metropolitan planning agencies, three regional plans within the Tri-State Region**

Within the Tri-State Region, three major metropolitan planning agencies – one from each state – exist and are tasked with developing a comprehensive plan for their jurisdiction:

- The Chicago Metropolitan Agency for Planning (CMAP) is the official regional planning organisation for the seven counties in north-eastern Illinois: Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. CMAP developed *Go To 2040 (*CMAP, 2009), a comprehensive regional plan that offers a blueprint for the seven counties and 284 communities in north-eastern Illinois on how to address the Chicago region's needs in the areas of transportation, density and land use, human capital, natural resources, and governance. This plan, which builds in part on an ambitious and wide-ranging plan prepared by the Commercial Club of Chicago in 1999 (Johnson (1999)). In terms of governance, the plan singles out three specific issues: (i) reforming state and local tax policy; (ii) pursuing co-ordinated investments; and (iii) improving communications.
- In the Milwaukee area, the Southeastern Wisconsin Regional Planning Commission (SEWRPC*)* is the official Metropolitan Planning Organization (MPO) for the seven counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha in Wisconsin. The Commission's comprehensive plan for southeastern Wisconsin includes co-ordinated plan elements of land use, housing, transportation (including public transit, bicycle and pedestrian facilities, systems management, demand management, arterial streets and highways, and airports); water supply, water quality management, including sanitary sewerage facilities and non-point source runoff, flooding mitigation; parks and open space; and natural resource preservation. SEWRPC was also actively involved in the recently discontinued initiative to provide commuter rail service between Kenosha and Milwaukee (the KRM project, described above).
- The portions of northern Indiana within the Chicago Tri-State Region (Lake, Porter, and LaPorte counties) are served by the Northwestern Indiana Regional Planning Commission (NIRPC). NIRPC has developed a draft of its Comprehensive Regional Plan 2040, which, like CMAP's *Go To 2040*, lays out an overall vision for land use, transportation, the environment, and economic development in the region. Indiana's plan articulates several governance-related goals, such as "efficient and co-ordinated local government." Specific objectives include: "Facilitate the consolidation of redundant local government services; Promote co-ordination of land use and corridor planning across jurisdictional boundaries; Foster better communication, co-operation, and co-ordination to better leverage resources; Promote the sharing of benefits, burdens and costs among governments."

Source: NIRPC (2011).

The Tri-State Regional planning agencies could deepen their existing partnership to co-ordinate more deliberately across jurisdictional boundaries. The leaders of these organisations have, by law, limited geographic mandates, but should nonetheless meet and collaborate regularly where possible. A 2002 multi-state accord between NIRPC, SEWRPC, and CMAP, amended in 2008 to include the Southwest Michigan Regional

Planning Commission, already exists and has been described as an "historic agreement in which the planning agencies have committed to work together as they consider major environmental and economic issues, enabling planning at the watershed or aquifer scale without the limitation of traditional political boundaries" (NIRPC, 2011). The accord originally led to research and projects related to regional water resource management, for example, the establishment of the Southern Lake Michigan Regional Water Supply Consortium in 2005 (CMAP, 2010a). More recently, the directors of the four constituent regional planning agencies have discussed co-ordination of projects to develop regional trails, with progress described by CMAP (2010b) in its report on regional greenways and trails in north-eastern Illinois.

Examples of interstate co-operation that reflects the functionality of a region that straddles state boundaries elsewhere in the United States could be helpful here. For instance, the two-state Greater Philadelphia Area offers an example of interstate co-ordination that could be an interesting model for the Tri-State Region. The Delaware Valley Regional Planning Commission is the agency charged with land use and transportation planning in this area, which includes nine counties (Bucks, Chester, Delaware, Montgomery and Philadelphia in south-eastern Pennsylvania; and Burlington, Camden, Gloucester and Mercer in southern New Jersey). The DVRPC has prepared a strategic plan, *Connections 2035*, which addresses land use, environmental policies, and transportation within the region. Like the plans created for the Chicago Tri-State Region, *Connections 2035* emphasises how the region's economic competitiveness depends on making comprehensive and co-ordinated investments in transportation and other infrastructure, transit systems, and the like.

Implementing these plans in Delaware/Pennsylvania required stakeholders to identify cross-boundary issues of mutual concern, which can only be addressed efficiently through partnerships that transcend jurisdictional borders – in these cases transportation infrastructure and the need for people and goods to be able to move seamlessly across state lines within the functional metropolitan region. Stakeholders recognised, either implicitly or explicitly, that solving these challenges would be of mutual benefit to all jurisdictions involved. This implies building trust between and among the stakeholders. Leaders from government, business and the non-profit sectors need to learn from their experiences in consensus-building to generate the trust, legal framework, and inter-jurisdictional agreements needed to tackle more contentious or difficult region-wide challenges.

At issue is *how* this planning co-operation should be broadened and deepened in the Tri-State Region. Several possibilities can be considered:

- The three State legislatures could pass legislation, or enact a Compact (analogous to the arrangements governing water management across the great lakes (see Box 6.1) mandating each of the MPOs to integrate their plans across state lines to recognise fully the functionality of the region in key priority areas under their responsibility;
- Since there is nothing in their enabling legislation or in their regulatory framework that *prevents* inter-state co-operation, the MPOs themselves could take the initiative to meet and agree to integrate their plans over time. They could seek resources from Foundations and the private sector to support this integration;
- Interested foundations across the Tri-State Region, in partnership with the private sector, could drive a process to ensure that the MPOs integrate their spatial plans.

Box 6.3. **Great Lakes Water Compacts**

Great Lakes water management in the Chicago Tri-State region benefits from institutional arrangements based on co-ordination and collaboration across multiple governments that have become the norm: Federal, state, and local officials co-operate routinely to plan and implement policies related to the environment, water usage, and other aspects of the Great Lakes. Processes and institutional frameworks developed over several decades offer real promise in two important ways. First, the long-standing needs of clean-up, restoration, and protection of the Great Lakes are being seriously addressed by regional stakeholders, with meaningful support and co-ordination from the federal government. Second, the process offers a model on how other issues of regional importance may be addressed in a collaborative and co-ordinated fashion. Some of the institutional arrangements include:

Great Lakes Congressional Task Forces

The Great Lakes Congressional Task Forces are bipartisan groups formed by selected members of the Northeast-Midwest Congressional and Senate Coalitions. These task forces were established in the 1980s to encourage co-operation in the task of enhancing the environmental and economic health of the Great Lakes (Northeast-Midwest Institute, 2011). The task forces advocate for federal policies, legislation, and funding to promote these goals.

Great Lakes Regional Collaboration (GLRC)

The GLRC was officially established in December 2004, following President Bush's May 2004 signing of Executive Order 13340, which established the Great Lakes Interagency Task Force and directed the Cabinet to "promote a 'Regional Collaboration of National Significance' for the Great Lakes" (GLRC, 2011). This directive was intended to foster "collaboration among the US federal government, the Great Lakes states, local communities, Tribes, and other interests in the Great Lakes region as well as Canada" (GLRC, 2004). The GLRC identified nine issues of concern and in 2005 developed a strategy and action plan to protect and enhance the Great Lakes, laying out a plan with estimated cost of USD 26 billion for full implementation (Austin *et al.*, 2007a). On parallel track to this partnership of federal, state, and local governments and agencies, the Brookings Institution established its Great Lakes Economic Initiative in 2005 and has since sponsored substantive and on-going research and policy development efforts related to the GLRC Strategy, resulting in a 2006 framing report (Affolter-Caine and Austin) and a 2007 cost-benefit analysis of the Strategy (Austin *et al.*, 2007b).

Great Lakes Basin Compact

This interstate compact, established by joint legislation of the member states in 1955 and confirmed by Congress in 1968, includes eight US states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) with the Canadian provinces of Ontario and Quebec as associate members. This compact established the Great Lakes Commission, which administers the compact in such a way as "To promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin" (Great Lakes Commission, 2011). In 2009, the federal government approved the establishment and funding of the Great Lakes Restoration Initiative, a multi-year programme to help restore the Great Lakes (Great Lakes Commission, 2010).

Great Lakes-St. Lawrence River Basin Water Resources Compact

This second interstate compact for management of Great Lakes issues was established more recently, in 2008. The purpose of the compact is to bring the states together to manage the Lakes' water resources, including usage and diversions, which was one of nine issues initially identified by the GLRC when it began its work in 2003 and 2004.[21] Through the Council of Great Lakes Governors (CGLG), the leaders of member states work together to ensure the region's freshwater resources are protected and used wisely.[22]

Under a scenario in which either the private sector and foundations, or the MPOs themselves, lead a process to integrate the region's planning, the long-term policy objective should be to demonstrate to the three State governments that such integration is not only warranted, but key to the long-term competitiveness of the functional region and that therefore this co-operation should be sanctioned in legislation or Compact-type agreements. However, the State governments will only see it in their interests to engage in developing this type of Compact arrangement for integrated economic development planning in the Tri-State Region if the region itself can demonstrate that because it will benefit so too will the three states. It is up to the Tri-State Region's key stakeholders, therefore, to prove that the State governments have an interest in supporting region-wide integrated planning and should therefore act to enhance the Tri-State Region's capacity to engage in it.

At issue as well is the *focus* of integrated planning for the Tri-State Region: *what* would the MPOs work together to achieve *where*? CMAP and the other MPOs have suggested in their long-term planning exercises that planning should be integrated and multi-sector, focusing on economic development, community liveability, workforce development and region-wide mobility for people, goods and services. Integrated planning in the Tri-State Region should focus on the clusters of policy issues that speak to the Tri-State Region's functionality. In this regard, spatial scalability is also an issue: where it makes sense, the spatial footprint of the integrated planning can in fact extend to the 21-county region, particularly with respect to transportation/logistics planning and economic development more broadly. So, the focus of integrated planning should consider the spatial scale along with the relevance of pursuing multi-sector policy objectives at that scale. In other words, region-wide planning if necessary but not necessarily region-wide planning, at the Tri-State or 21-county region of coverage.

Integrated, region-wide targeted planning could focus on:

- *Economic Development*, including cluster building, business productivity and innovation capacity in legacy and emerging clusters, particularly in the green economy, international market projection and branding, and attracting foreign direct investment and technological advancements into the Tri-State Region;
- *Workforce Development*, including human capital formation, attraction and retention, matching skills supply with demand across the Tri-State Region at all levels of economic activity, enhancing labour productivity and innovation capacity across the Tri-State Region;
- *Transportation and Logistics Development*, including integrated, intermodal, region-wide plans aimed enhancing the fluid, seamless mobility of people, goods and services into, through and out of the Tri-State Region.

Community liveability and attractiveness is as much a spatial issue at it is an economic one: spatial concentrations of poverty, access to transit, education and basic human services and the spatial and economic integration of at-risk groups represent challenges to social cohesion across the Tri-State Region as much as to the ability of the region to attract highly qualified people, investment and technology. Greening the region's environment and reducing its carbon footprint are as much an economic as a social challenge. Hence, these are horizontal, cross-cutting issues than should be addressed in each of the region-wide plans.

Of course, the MPOs cannot engage by themselves in developing and implementing this type of region wide plans. Indeed, as will be highlighted in the next section, in some

cases it might make sense for the private foundations in the Tri-State Region to lead; in other cases, it could be that the chambers of commerce or the sector-based business associations should broker interstate partnering in the Tri-State Region. Moreover, as noted above with respect to community attractiveness issues, cross-walks exist between these three planning subject-areas, with different public and private actors across the region involved depending on the policy area under consideration. Therefore, the MPOs (or foundations, or business groups), where it makes sense, should act as facilitators – table-setters – to enable dialogue between key relevant stakeholders from across the Tri-State Region and facilitate the monitoring of progress toward achieving the outcomes defined through the integrated planning process. In some cases, it might be the private sector – either through chambers of commerce or sector-specific business organisations – that acts as facilitator; in other cases, it might be public actors like the county or State governments, which play this role. In all cases, however, it is *existing* stakeholders using *existing* institutional arrangements that are best placed to enhance planning capacity and the achievement of policy outcomes effectively to meet the interests of the Tri-State Region as a whole.

Integrated, Tri-State, region-wide economic development

Attitudes towards economic development differ dramatically across areas within the Tri-State Region. As previously discussed, in many instances, officials tend to promote their own localities or jurisdictions over those of their neighbours, even if it implies little or no change in total economic activity in the region. Some progress has been made in building intra-state partnerships among local governments to enhance regional economic development;

- In Illinois, economic development efforts are concentrated in Chicago, headed by World Business Chicago (a public-private partnership established by the City of Chicago and the Chicagoland Chamber of Commerce). Their intention is to position Chicago as a global business destination, with the implication of private and public sector leaders. World Business Chicago (WBC) acts to attract businesses and economic activity to Chicago and connects businesses with incentive programmes, site selection assistance, and so on. WBC currently has several initiatives intended to accelerate economic development. For example, WBC's Universities Initiative targets five of Chicago's top graduate business schools, with a goal of leveraging the schools' faculty and professional resources to raise the city's profile in the international business community.[23] Another initiative focuses on tech company start-ups, aiming to connect entrepreneurs and innovators with resources, financial and otherwise, needed to succeed.
- In Indiana, while promising regional economic development efforts have been initiated by some local governments to join forces to attract business and economic activity, potential for inter-state co-operation has been limited, hindered in part by explicit efforts at the State level to draw economic development from neighbouring states to Indiana. For example, economic development authorities in LaPorte County and Michigan City, Indiana (one of LaPorte County's principal cities) established LaPorteCounty.biz as a joint marketing venture to attract businesses to the county, avoiding direct competition between Michigan City and other cities in LaPorte. The Northwest Indiana Forum is a larger, more policy-oriented group that includes businesses in Lake, Porter, and LaPorte counties in northern Indiana and works towards creating a stable and attractive climate for business. These examples of intra-state regional co-operation stand in stark

contrast to the position of the State regarding interstate collaboration for business attraction and development. In particular, analysts have noted the ambitious efforts on the part of the state's economic development office (Indiana Economic Development Corporation, or IEDC) to encourage the relocation of Illinois-based businesses to Indiana. A recent editorial (*Northwest Indiana Times* (2011) described an advertising campaign funded by the IEDC and the Northwest Indiana Forum with messages such as "Illinnoyed by Higher Taxes?" as counterproductive. Indeed, the IEDC campaign did not go unchallenged. The work and vision of the Indiana Times Media Co. publisher and its Executive Editor is a good example of what civic/business leadership can do to bring about fundamental change within a state, focussing on harmonising divergent interests among municipalities. The "One Region One Vision" project introduced in September 2008 focuses on enhancing collaboration and improving the quality of life and the business climate in Northwest Indiana. The initiative generated partnerships between the public and private sectors, augmented by "coalitions" that brought together leaders with common backgrounds "to tackle issues and challenges in northwest Indiana". One of the groups formed as a result of this effort is the coalition of northwest Indiana mayors, which meets every other month to discuss common goals and solutions.

- In Wisconsin, the City of Milwaukee has recently completed a comprehensive plan to guide policy, land-use and development decisions in the city,[24] while the private sector has taken the lead in the co-ordination of a multi-county – yet, again, exclusively intra-State – regional economic development strategy around Milwaukee, through the formation of the Milwaukee 7. Formed in 2005 and composed of private and public-sector representatives from the seven counties of southeastern Wisconsin, the Milwaukee 7 aims create a co-operative economic development programme and retain, attract and grow businesses and jobs in the region. The Council is designed to offer a "single point of service" for firms who wish to relocate, expand, or otherwise enter the area. Further, the group has identified strategic strengths of the region as a way of guiding its business development efforts: power, automation, and electronics; food and beverage; water technologies; financial services; information technologies; and medical technology and bio-medical. Milwaukee 7 has played an active role in educating local economic development officials about the benefits of co-ordinated development plans, thus building awareness among these professionals about the benefits of less parochial pursuits of business activity and investment.

Despite these developments in intra-state co-operation, inter-state co-operation in the interest of the Tri-State Region remains limited at best. Inter-state co-operation on regional economic development needs to become a priority. That said the economic interdependence of the three states has been acknowledged to some extent already:

- Among the key strengths of the Milwaukee region cited by the Milwaukee 7 in its assessment of south-eastern Wisconsin's strengths is the area's access to northern Illinois markets for goods, services and labour.
- The Milwaukee Water Council,[25] a public-private partnership, builds on the strong regional assets, both public and private, in terms of freshwater research and water-related economic, bringing multiple stakeholders from both Wisconsin and

Illinois to the table around a common area of interest and expertise. The Council has convened academic researchers, the business community, and civic leaders to leverage the 21-county region's freshwater assets in view of establishing Milwaukee as the "World Water Hub" for water research, economic development, and education.

The MPOs (or the lead convener-stakeholders) across the Tri-State Region should therefore consider "leading the charge" to build more effective inter-state planning to pursue the Tri-State Region's economic development objectives. They could consider convening regular stakeholder meetings to enhance, monitor the implementation of, and monitor progress on, integrated regional economic development planning. Stakeholders in the Tri-State Region's economic development include the chambers of commerce, the business associations and their related non-government organisations, state and local governments, in particular the State departments of Commerce, research institutions and federal research laboratories in the region. All have a vested interest in the long-term economic health and dynamism of the Tri-State Region, and should be called upon to play their part in maximising its potential, using national and international experience. For example:

- The business-led Metro Denver Economic Development Corporation (EDC) has had success in pursuing cross-border regional economic development through the development of targeted sectors in which the region presents a comparative advantage, such as aeronautics and clean energy. The Metro Denver EDC co-ordinates economic development on behalf of 70 cities and 9 counties (seven-county Metro Denver and two-county Northern Colorado). The group is an affiliate of the Denver Metro Chamber of Commerce and is funded with both the public and private sectors. Metro Denver EDC's approach specifically puts the economic health of the Metropolitan Region above those of individual communities: "Each of the Metro Denver EDC's economic development partner organisations is committed to the economic vitality of the entire region. As an ambassador for the area, each is ready and able to communicate the benefits of Metro Denver first and individual communities second."[26]
- The states of New York and New Jersey work together in several structured arrangements to provide, plan, and co-ordinate transportation and transit services in New York City and northern New Jersey. The Port Authority of New York and New Jersey manages the bridges and tunnels, PATH (northern New Jersey's commuter rail service), marine terminals, ports, and airports of the region. Interstate co-ordination is essential in managing these services and infrastructure, and it is possible that this co-ordination has been easier to achieve because of a broad consensus about the goals of service: safe, efficient transport of goods and people throughout the region.
- The Øresund region is one of the most dynamic regions in Europe and generates a quarter of the total GDP of Sweden and Denmark (Øresund, 2011a). It comprises the Danish island of Zealand, Copenhagen, Denmark's capital, and the Swedish Skåne region, including Malmö, Sweden's third largest city. Long standing cross-border co-operation in the region has been formalised politically and significantly facilitated through the Øresund Committee, established in 1993, and has strongly improved since the completion of the Øresund Bridge in 2000, which connects the two countries via road and rail and currently counts 20 400 commuters crossing the bridge for work every day (Øresundbron, 2010). The Øresund Committee consists of 18 Swedish and 18 Danish members and works on the cross-border

integration of the regional labour market, on infrastructure development, and on various projects in research, environment, culture, education and communication (Øresundkomiteen, 2008).

Groups like World Business Chicago could consider sharpening their focus on key future-oriented business clusters that truly reflect the Tri-State Region's abundant assets. The group's current strategy for attracting business to the area, which relies on the provision of an unsystematic (and potentially fiscally unsustainable) set of financial incentives, is an insufficient approach to business development (Munro *et al.*, 2011). World Business Chicago is currently developing a new Economic Growth Plan for the City of Chicago and a new strategy may emerge in 2012. A more focused approach to business development, including the development and implementation of targeted international branding strategies, could facilitate the attraction of venture capital and R&D activities to the region, making further regional development more likely and successful. Regional leaders should continue to leverage the assets of the major universities to develop a more robust and dynamic business culture. For example, several Chicago-area universities have programmes in innovation and entrepreneurship: the Polsky Center for Entrepreneurship at the Booth School of Business at the University of Chicago, with connections to the venture capital and clean energy sectors; the Farley Center for Entrepreneurship and Innovation at Northwestern University, with a focus on engineering; and Kellogg Graduate School of Management's Entrepreneurship and Innovation program at Northwestern University. These programmes, faculty, and students are tremendous resources that can support a focused economic development strategy for the Tri-State Region.

Box 6.4. **The Øresund region as an inter-state economic development strategy**

In 1997, the Øresund University Network was created to co-ordinate co-operation between 12 universities in the two-country Zeeland-Copenhagen-Malmö-Skane region, which today count 165 000 students and 10 000 researchers, with a mandate to facilitate information sharing, research collaboration, network activities and cluster building (Oresund, 2011b). At the same time the Øresund Medicon Valley Academy (MVA) was created to co-ordinate, network and promote local research and business in the human life sciences in the region in order to improve knowledge exchange and innovation between the private and public sector and to make the region attractive to foreign stakeholders. In recent years the MVA has shifted its focus from academia towards business and today Medicon Valley is recognised as one of the most attractive bioregions in the world.

An important first step for the cross-border region's success was its branding as the Øresund Science Region (ÖSR). Oriented by a 'double triple-helix' model that involved regional authorities, businesses and universities in both countries, the Øresund University Network acts as the umbrella organisation for seven research and innovation platforms that bundled research and innovation co-operation in the sectors of health and pharma (MVA), IT, environment, food, logistics, digital entertainment and nano-technology. The University Network:

- Took over the co-ordination of 8 higher education institutions in the trans-border region and admits students to any of the Øresund Network institutions enabling them to move and take part in the many educational opportunities offered by the other institutions without physical and administrative hindrances.

Box 6.4. **The Øresund region as an inter-state economic development strategy** *(cont.)*

- Enabled researchers and teachers to share knowledge, tools and ideas with colleagues in cross-border networks; enabled technical staff and administrators to compare practices on how to address challenges in inter-university collaboration.
- Some of the Network's innovation platforms include the following:
  - *Øresund IT* is a non-profit organisation that provides knowledge and contacts among ICT actors in the Øresund Region. Its goal is to brand the ICT cluster of the region to attract more investments, talent and research, and to deliver a unique value by combining Swedish and Danish best-practices. Partners include 90 ICT companies, education and research institutes, and companies with large IT-departments that benefit from the network, as well as other members providing various services and investments to the industry.
  - *Øresund Logistics* is a Danish/Swedish non-profit network organisation developing and supporting logistics in the Øresund Region. Øresund Logistics works with the "Double-Triple Helix"-model, working cross borders for the purpose of bringing regional authorities, industries and universities together in an in-depth co-operation. It identifies initiates and co-ordinates research and development projects in the Øresund Region; facilitates network activities, seminars, workshops and conferences for the interested stakeholders; disseminates knowledge on advanced logistics and supply chain management; acts as a knowledge provider for branding the Øresund Region as a hub for efficient, innovative and environmentally sustainable logistics- and transport processes.
  - The *Øresund Materials Innovation Community (ØMIC)* is a triple helix partnership established to ensure the best possible support for research and innovation in and around the scientific facilities, and to make Northern Europe the central hub for research and innovation in hard, soft and biological materials with a focus on Grand Challenges (from clean tech, green energy and supercomputing to structural biology and pharmaceuticals). It focuses on optimising collaboration and co-ordinating activities in community development, education, early business planning, knowledge sharing in sciences parks, regional branding, bibliographical investigation, and future planning, grounded in the Øresund region but open to Northern Europe, Europe and the World.
  - *Øresund Environment* provides a regional forum for businesses, universities and local governments for networking and knowledge exchange, and facilitates and promotes new sustainable ideas and projects within energy, building processes, clean-tech, eco-mobility, green healthcare, CSR and environmental leadership education.
  - *Øresund Entrepreneurship* is a cross-border organisation that promotes entrepreneurship education in higher education and focuses on a thematic approach towards entrepreneurship at universities.

Source: Streijffert, B. (2008), "Øresund Science Region: Cross-border triple helix collaboration", Briefing to the European Commission, Øresund University, Lund; *www.oresund.org; www.mva.org.*

The Øresund example mentioned above might be instructive here regarding the development and implementation of a comprehensive region-wide economic development strategy straddling (in this case national) borders, in that it brought together

the three stakeholder-groups in the "triple-helix" leadership role – universities, the private sector and governments – and focussed on identifying key business sectors and developing a targeted branding strategy for the region aimed at attracting talent and people into the region as well as maximising export market opportunities for the region's products and services. Indeed the branding issue takes on added importance for metropolitan regions that compete against each other in a global marketplace. The Chicago Tri-State Region is no exception. Existing metropolitan-area stakeholders, including World Business Chicago, the Chicagoland Chamber of Commerce and other local chambers, the Milwaukee 7 and the Northwest Indiana Forum, could convene key private and public stakeholders to build a set of branding strategies tailored by priority business-clusters in the Tri-State Region and by foreign market. All branding tools should be harnessed to maximise these strategies: from market testing aimed at measuring development potential to focus-group testing of messages. Branding strategies should focus on outbound as well as inbound objectives: branding can be used to increase foreign-market consumption of export-ready goods and services as well as to attract FDI and talent into the Tri-State Region.

Coherent Tri-State, region-wide workforce development

Key to sustaining innovation-driven economic performance across the Tri-State Region is human capital, as chapter 3 makes clear. At issue in the region are the challenges associated with matching skills supply to demand, coupled with ensuring that businesses in the main legacy manufacturing sectors innovate to a degree that their skills needs match those of their counterparts across the country. Additionally, training service providers are not sufficiently co-ordinating curricula and training services offerings to meet business needs in the emerging innovation-driven clusters. Basic skills for both children and youth and for adults in stressed neighbourhoods across the region are also not being met effectively.

This is both a resource-allocation and a governance issue. Addressing them effectively requires the development and implementation of integrated, targeted, region-wide plans to match skills supply and demand across all levels of economic activity, enhance labour and business innovation and productivity capacity to develop, attract and retain talent and investment in the region and maximise the region's competitive advantages in the global marketplace. This also implies that in an ever tightening fiscal environment, all efforts must be made to reduce overlap and duplication in the provision of basic and advanced education and training services across the region and pool increasingly scarce public training resources effectively by significantly enhancing intra- and inter-state co-ordination of training service delivery across the region along with planning capacity between the private sector, public funders at all levels of government and service providers to address the Tri-State Region's workforce development interests effectively.

Facilitation – the lead-role function – could be undertaken by the sector-specific industry associations, by the chambers of commerce or by the workforce investment boards themselves. Whichever lead stakeholder(s) "sets the table" will need to invite the other key public and private actors from across the Tri-State Region to develop, implement and monitor success on an on-going basis region-wide workforce development plans tailored to meet the basic and advanced skills need of business and individuals by industry cluster in the Tri-State Region. These actors include:

- Private stakeholders, from industry associations to key large firms and start-up entrepreneurs;
- Not-for-profit actors, from workforce investment boards to community workforce interest groups to foundations;
- Key public and private education and training service providers, including universities and research institutions, community colleges and the local and state actors managing workforce development incentives;
- State departments responsible for workforce development policy and State employment agencies; and
- Federal actors in workforce development. It will be important in this respect for regional stakeholders to work together to maximise federal workforce-development funding opportunities of region-wide interest.

The MPOs (or the other lead conveners) will need to ensure that key information on the workforce development plans for the region, including their metrics of success, is shared with the stakeholders engaged in the development and implementation of region-wide economic development planning prescribed above – and vice-versa. The interdependence between economic development and workforce development planning – and region-wide data and performance indicators to measure success in the implementation of this planning, will necessitate on-going, sustained two-way information exchange between key stakeholders implicated in both exercises.

Integrated, Tri-State, region-wide, inter-modal transportation planning

Chapter 4 highlighted the dearth of vision-defined, outcomes-driven, inter-modal region-wide planning to enhance the fluidity of movement of people, goods and services into, out from and within the Tri-State Region. The reasons for this are multiple: the state line represents as much a psychological barrier as it does an administrative one to integrate the multi-modal transport plans now mandated by state legislation in all 50 states to reflect the functionality of the Tri-State Region. Petty competition for federal infrastructure funding sometimes hampers interstate collaboration to submit joint applications for Tri-State infrastructure needs. The federal Department of Transportation has not engaged in developing or implementing with its state-level interlocutors comprehensive region-wide inter-modal strategies – a missed opportunity of national significance given the importance of the logistics hub to national competitiveness – but perhaps an understandable situation given the absence of political will on the part of Tri-State area public and private stakeholders to engage in interstate, intermodal integrated planning to maximise the performance of the transportation and logistics networks in the Tri-State Region.

As discussed in Chapter 4 as well, the dearth of inter-state planning integration reflecting the functionality of the Tri-State Region has led to a piece-meal approach of current infrastructure financing. First, in the Tri-State Region as in the US more generally, transportation has historically been financed by dedicated revenue streams to single transport modes, limiting the ability of sub-national authorities to take a holistic, cross-modal approach to transportation development. Furthermore, dwindling public funds at every level put even greater constraints on regional transportation development. While the Tri-State Region is hardly the only region in the US, or among OECD Metropolitan Regions, to face this challenge,[27] it is nevertheless a case that should be

given special attention by the federal government, given its constitutional responsibility for interstate commerce and the region's role as a national transportation and logistics hub. Second and intimately related to the first issue, despite a handful of inter-state and cross-boundary projects, transportation development has yet to be addressed from a regional, holistic perspective. The failed KRM project mentioned near the start of the chapter offers a cautionary tale, for example, when stakeholders in multiple jurisdictions are unable to rally the necessary support.

So, to maximise the logistics hub's potential, key public and private stakeholders that need to be involved in developing, implementing and monitoring success in the implementation of integrated, intermodal, region-wide plans include, in no particular order: the region's public transit agencies; Airport authorities; Railway companies; Airlines; Trucking firms; Logistics firms; Toll authorities and operators; Local port authorities; State departments of transportation; and Federal agencies responsible for planning and regulating transportation (DoT, Maritime, Aviation, Highway and Rail agencies).

The actors in the Tri-State Region that are best-placed to convene this process are the MPOs. That said the MPOs could jointly convene a planning process with key municipal, county, private-sector and State-level actors. Whoever leads should focus on building upon local successes in inter-state planning in the Tri-State Region, as well as in other Metro-Regions in the US. For example, the Illiana Expressway[28] is a joint project between the states of Illinois and Indiana which would connect Interstate-55 from south of Joliet, Illinois, to Interstate-65 near Lowell, Indiana, thus offering an alternative route to the highly congested Interstate-90/Interstate-94 corridor. The goals of the project include decreased travel times and less congestion, allowing for more efficient movements of goods and people across the region. It is possible that the recent experiences of widening and rebuilding the Kingery (in Illinois) and Borman (in Indiana) expressways (I-80/94) ultimately caused officials in both states to realise the need for the Illiana Expressway and to accumulate much-needed experience in working across state lines with multiple agencies, jurisdictions, and funding sources. Collaborating on this project may give Illinois and Indiana a much-needed boost in working together on a project to serve regional interests, not parochial ones. Moving forward, it will nevertheless be important to prioritise public transit options, such as rail or bus networks, which can achieve both regional economic development and environmental objectives.

To facilitate regional co-ordination on transportation, the Tri-State Region would benefit from a long-term, cross-border regional transportation plan. Local officials understand the need to work with their counterparts in nearby municipalities, counties, and states, to maintain and improve the region's transportation infrastructure and services. These officials must build on successful instances of intergovernmental co-operation and apply lessons learned to more difficult conflicts and issues. The expertise of institutions like CMAP, NIRPC, SEWRPC and the other Metropolitan Planning Organizations responsible for regional transportation planning will be essential – all the more so, given these institutions' ability to engage in long-term planning for the range of social, economic and environmental issues that will determine the region's long-term viability and attractiveness.

Transportation investments will require greater vertical co-ordination and reforms at the state and federal level, with priority given to projects with the greatest region-wide return. Regional stakeholders, including elected officials, business leaders, and policy makers, should renew efforts to reform state grant funding allocations to ensure that the

Chicago metropolitan area, which is the economic engine, gets a commensurate share of transportation and other infrastructure funding. At the federal level, more efforts could be made to allocate scarce dollars to projects producing the greatest value, with a preference for multi-modal and multi-jurisdictional infrastructure projects (transit systems, bridges, roads, etc.). Similarly, grant programmes could contain financial incentives to local governments to collaborate and co-ordinate funding and programme requests, particularly across state borders. At the state and local level, projects should be prioritised based on expected returns and benefits at the regional level, so that the most effective and value-generating projects are undertaken.

6.3. Implementing the vision: ongoing institutional capacity and political engagement

The policy chapters have repeatedly underscored the need for data and indicators to monitor performance and measure progress in the implementation of region-wide strategies and plans. More fundamentally, evidence-based policy design and implementation requires evidence; data to define challenges and metrics of performance to understand whether the strategies are achieving the objectives they were designed to achieve. An evidence base also allows for greater transparency in decision-making and greater public accountability that allows citizens to hold stakeholders accountable for their roles and responsibilities in implementing strategic planning. Finally, data and performance metrics allows stakeholders to change course should the strategic directions not deliver the policy outcomes they were initially designed to achieve.

Building the evidence base to benefit the Tri-State Region

In the Tri-State Region, there is no shortage of individuals or institutions engaged in measuring performance in the policy areas under review. That said the capacity in the region to harness this information and present it in a rational, integrated fashion that "tells the region's story" coherently is lacking. Therefore, the MPOs, key private-sector and not-for-profit stakeholders should consider establishing and funding a *university-based research centre* in the Tri-State Region whose mandate would be to network with existing researchers and university responsibility centres to collect relevant academic research, data and indicators with the aim to provide a sound, up-to-date evidence base for the development and implementation of policies designed to address the strategic issues facing the Tri-State Region as a whole.

This research centre could link with the local, county, State and Federal authorities responsible for the policies and programmes that affect economic development, workforce development, innovation and green-growth capacity and transportation and logistics in the Tri-State Region. Sharing key data and indicators on an on-going basis with all levels of government decision-making institutions that materially affect policy outcomes and economic performance in the Tri-State Region is of vital importance to ensuring that the policies and programming being delivered in the region truly reflect the reality on the ground in the region and can respond effectively to the challenge faced by the region.

The research centre could also maintain regular on-going relationships with key public, private and community stakeholders in the region to share information, monitor progress in the development and implementation of key region-wide strategic plans and recommend changes to these plans where changes are warranted.

Civic and political engagement

The Tri-State Region has traditionally generated significant civic leadership in the private and non-profit sectors:

- The business community in the Tri-State Region has devoted considerable effort and resources to promoting a regional approach and to developing tools, resources, and protocols to encourage more co-operation and collaboration across units of governments, agencies, and other stakeholder groups. Private-sector led institutions, such as the Milwaukee 7, Chicago's Civic Committee, the Council on Global Affairs' Global Midwest Institute, and the Northwest Indiana Forum, may be in a position to continue their outreach and educational efforts, emphasising the competitiveness benefits of thinking and acting in a co-ordinated fashion.
- The Commercial Club of Chicago and the Chicago Council on Global Affairs recognised the importance of thinking regionally and developing plans and goals accordingly. Indeed, building on its Metropolis Project of the late 1990s, the Commercial Club of Chicago established Chicago Metropolis 2020 to address issues of density, affordable housing, sprawl, human capital in a regional context. The approach was explicitly premised on the belief that these issues facing the counties of northern Illinois must be addressed regionally and comprehensively if Chicago was to remain a competitive, preeminent city and region. Metropolis 2020 drew on the resources of the business, civic, and non-profit communities to highlight issues of regional importance in north-eastern Illinois, including land use, transportation, and human capital. Its work, and that of its successor organisation, Metropolis Strategies, laid important groundwork for numerous policy initiatives in the areas of housing, human capital, and economic development. More generally, Chicago Metropolis 2020 (now Metropolis Strategies) was a strong advocate for the creation of CMAP in 2005, reflecting the group's regional vision and mission.
- The Commercial Club of Chicago and its "civic arm," the Civic Committee, comprised of leaders from the business, professional, cultural, and education sectors of the region, have helped to develop a sense of identity for the region as one integrated entity. The Civic Committee aims to make the Chicago region a world-class place to work and to live, based on a view that "the City of Chicago and its surrounding territory constitute a single and interdependent economic region".[29]
- The Chicago Council on Global Affairs**,** another local civic group, has also offered a future vision for the region, building on the expectation that globalisation implies increased opportunities but also increased challenges for Chicago (Chicago Council on Global Affairs, 2007). The Council ultimately made recommendations in several areas, including transportation and infrastructure; human capital; and global engagement. This latter category included several items intended to focus on international business and tourism opportunities, mainly through city and mayor's office efforts. The Council's plan also included a commitment to undertake educational outreach to business, academic, and public sector leaders as a means to deepen a sense of regional identity and mission. To that end, the Council has established the Global Midwest Initiative, a policy think-tank active in discussions on competitiveness, energy, and venture capital in the Midwest. The Initiative has run conferences and

seminars, published policy briefs and analyses, and more generally acted as a forum for discussing regional competitiveness at a global level. Local officials should build on the Initiative's educational efforts, aiming to increase awareness of the Tri-State Region as an integrated economic entity, especially among local elected and economic development officials.

The Tri-State Region could thus benefit from leveraging its considerable business and civic resources, which have historically articulated the need to increase the region's competitiveness through a region-wide approach. Indeed the top 100 private foundations alone in the Tri-State Region control USD 17 billion in assets and USD 1 billion in giving annually. Business and civic organisations should therefore be further encouraged to continue outreach efforts in educating area policymakers in matters of cross-jurisdictional, regional importance and in advocating policies whose aim should be to make the *Tri-State Region* more liveable, more competitive, and more successful – thereby building a sense of Tri-State Regional identity which should then be integrated into the advanced branding strategies recommended in the economic development section.

Civic engagement can take many forms, but it is essential if the region's residents and key institutional stakeholders are to be in a position to evaluate the challenges they face and judge the merits of the strategies designed to address them. The following suggestions for harnessing civic and political engagement could be considered as integral components in the design and implementation of strategic planning for maximising the economic performance of the Tri-State Region:

- On-going *community outreach* could be directed at neighbourhood organisations, organised labour, philanthropic and not-for-profit institutions and business groups to solicit input to the planning process and participation in monitoring (and measuring) progress in implementing these plans;
- Consideration could be given to expanding the organisations of *mayors and county executives* to encompass all members from the Tri-State Region and ensure that they meet regularly to discuss Tri-State level regional issues and the strategies required to address them; [30]
- Regional stakeholders could recommend that the three s*tate governors* meet regularly - perhaps annually by themselves but at other times with their state secretaries of commerce, transportation and workforce development as well – to focus on Tri-State Region-wide issues and develop and implement integrated cross-boundary strategies to address them;
- At the same time, *state legislators representing districts from across the Tri-State Region* could meet regularly to focus on Tri-State Region-wide issues;
- The region's stakeholders could ask that a *US congressional caucus* of elected officials representing all parts of the Tri-State Region be established to focus regularly on Tri-State Region-wide issues;

Leading by example is key to demonstrating the relevance of the Tri-State Region as a region to state and federal authorities. In transportation especially, but in economic development more broadly, the lack of collaboration between the three state administrations and the lack of attention paid by the US government to the need for high-level strategic planning that recognises the Tri-State Region as a functional, integrated economic engine of the country's national and international economic performance could

evolve into more active engagement once the region's stakeholders demonstrate the economic importance of the region by achieving success in implementing truly integrated region-wide plans to address region-wide challenges. The potential impact on state and federal decision-makers of bottom-up leadership in the Chicago Tri-State Region should not be under-estimated. As Chicago's great city planner Daniel Burnham said, "Make no little plans".

Notes

1. Cook County, for instance, is comprised of 121 cities, 30 townships, 244 special purpose governments, and 152 school districts, for a total of 547 local governments, which is higher than the State average of 67 local governments per county (Office of the Comptroller, 2000).

2. According to several studies, including the 2007 Census of Governments (US Bureau of the Census, 2007),and the *GoTo 2040* plan prepared by the Chicago Metropolitan Agency for Planning (CMAP, 2009)

3. An even larger definition of the Toronto Metropolitan Region, known as the Greater Golden Horseshoe Area, which presents a connected area of industrial activity, is comprised of 110 municipal governments.

4 For more information see *http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_NSRD_GCTPL2.US24PR&prodType=table.*

5. The township form of government is a lower tier of local government. In Illinois, townships are generally responsible for the administration of public assistance, property assessments and maintenance of township roads and bridges; in Indiana, townships administer public assistance programs, assess taxable property, provide funding for fire and emergency protection, and, in unincorporated parts of the county, can provide a range of other public services (e.g. snow removal, senior programs) (Office of the State of Illinois Comptroller, *www.comptrollerconnect.ioc.state.il.us/Office/LocalGovt/TWHistory.html;* Indiana General Assembly, *www.in.gov/legislative/ic/code/title36/)* .

6. Notably, the Governor of Indiana was quoted as saying, "Whether it's bringing dollars back from overseas or from right next door, finding new investments and jobs is always job one for us" (Indiana Economic Development Corporation, 2011).

7. A *Chicago Tribune* article (Wernau (2011)) echoes these points, reporting on several recent instances of firms moving operations out of Illinois and into Indiana. The article quotes an Illinois economic development official as arguing that Midwestern states need to work together more, not less, to make the region attractive to international visitors and businesses, saying "An approach that focuses solely on picking off a neighbouring state's business is short-sighted; it's a losing strategy for our region."

8. The local regional planning organisation, SEWRPC (Southeastern Wisconsin Regional Planning Commission), emphasised KRM's likely positive impact on jobs and economic development, noting that nearly 1 million jobs lie within one mile of the proposed KRM and Metra lines). "The KRM project will link workers and jobs into a unified economic chain along the shore of Lake Michigan, as well as opening the growing employment centres in north-eastern Illinois to a greater number of Wisconsin workers", (p. 1-16, Southeastern Regional Transportation Authority, 2010,).

9. Munro, et al derives this from: Jed Kolko, "Business Relocation and Homegrown Jobs," (Sacramento: Public Policy Institute of California, September 2010), (*http://www.ppic.org/content/pubs/report/R_910JKR.pdf*).

10. State of Illinois, Office of the Auditor General, 2011

11. The Pew study notes, furthermore, that unfunded pension liabilities have been a problem faced by the Illinois legislature since 1995.

12. Illinois' total corporate rate includes a 2.5% personal property replacement tax rate, so that the full rate rose from 7.3% (4.8% + 2.5%) to 9.5% (7.0% + 2.5%) with this legislation.

13. The Commercial Club's recommendations included the creation of defined contribution plans; raising retirement ages; reducing benefit accrual rates; limiting cost-of-living adjustments (COLA's); calculating pension benefits on base salary only up to the Social Security Covered Wage Base (currently USD 106,800); ending pension "abuses" such as double-dipping; and increasing annual contributions to the funds.

14. See the New York Times article dated 23 June 2011, "The Indiana Exception? Yes, but…", *www.nytimes.com/2011/06/23/us/23indiana.html?pagewanted=all.*

15. See the New York Times article dated 23 March 2011, "States Pass Budget Pain to Cities," *www.nytimes.com/2011/03/24/us/24cities.html?_r=1*, and the Wisconsin State 2011-2013 budget, *www.doa.state.wi.us/debf/pdf_files/bib1113.pdf.*

16. Chicago Booth (University of Chicago); Kellogg School of Management (Northwestern University); DePaul University; Loyola University of Chicago; and University of Illinois

17. The combined rate for the City of Chicago was 10.25% in 2010. Cook County has reduced the tax rate in two increments, by .5 percentage points and by .25 percentage points and is expected to reduce it by an additional .25 percentage points by 2013.

18. For example, Channahon, Illinois, in Grundy County, is outside of the RTA jurisdiction and has a combined sales tax rate of 7.25% (A 6.25% state collected sales tax rate which is the sum of: 5.0% to state; 1.0% to municipality; 0.25% to county; and an additional 1% municipal home rule sales tax imposed separately by Channahon), significantly lower than the city of Chicago's current 9.5%. In fact, the city of Chicago and the RTA have begun taking steps to recover some of their foregone revenue, and it seems likely that resolving the dispute will require some reform or clarification of state sales tax revenue allocation rules.

19. The City of Chicago and Cook County should be encouraged to continue their efforts, and cities, towns, and villages throughout the region should pursue similar opportunities where feasible (see Metropolitan Mayors Caucus, 2009). These recommendations have also been echoed by Northwestern Indiana's NIRPC 2040 Comprehensive Regional Plan, as well as by Indiana's Commission on Local Government Reform (2007).

20. The Metropolitan Mayors Caucus, which includes the mayors of Chicago and 272 surrounding municipalities, is known for taking a regional approach to economic development, municipal finances, transportation funding, and other related, border-hopping issues. It advocates for state and federal policies to better support municipalities in the region, such as more funding for transit and transportation; removing barriers to inter-jurisdictional consolidation of services; and public pension

reform. It has also developed into an institution that serves to overcome historical city-suburb tensions in a region characterised by highly fragmented government (Lindstrom, 2010).

21. The other eight issues are directly addressed by the GLRC's Strategy.

22. The governments of Quebec and Ontario are included as signatories to the Compact's companion document, the Great Lakes—St. Lawrence River Basin Sustainable Water Resources Agreement, signed in December 2005 (Council of Great Lakes Governors, 2011).

23. See *www.metrodenver.org/industries-compani.*

24. Public Policy Forum (2011) "Assembling the Parts"

25. The University of Wisconsin at Milwaukee has a School of Freshwater Sciences, which houses the Great Lakes Water Institute, a research facility devoted to increasing knowledge about the Great Lakes and other freshwater resources.

26. See *www.metrodenver.org/about-metro-denver-edc*.

27. See Transportation Research Board, 2009. Furthermore, outside the US, the Paris-IDF region, for instance, has faced difficulties in generating new funding sources to support the development of a new high-speed metro in the region's suburbs, and has yet to secure the necessary funds (OECD, forthcoming Paris GG case study).

28. The two states signed an agreement in 2010 to build the highway. On August 25, 2011, the Illinois Tollway Board approved a USD 12 billion capital plan that includes funding for needed studies for the Illiana Expressway project.

29. See *www.civiccommittee.org/purpose/index.html.*

30. An initial step may be to invite at least the most geographically proximate mayors in Wisconsin and Indiana to join the Metropolitan Mayors Caucus without specifically adopting a formal Tri-State agenda.

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