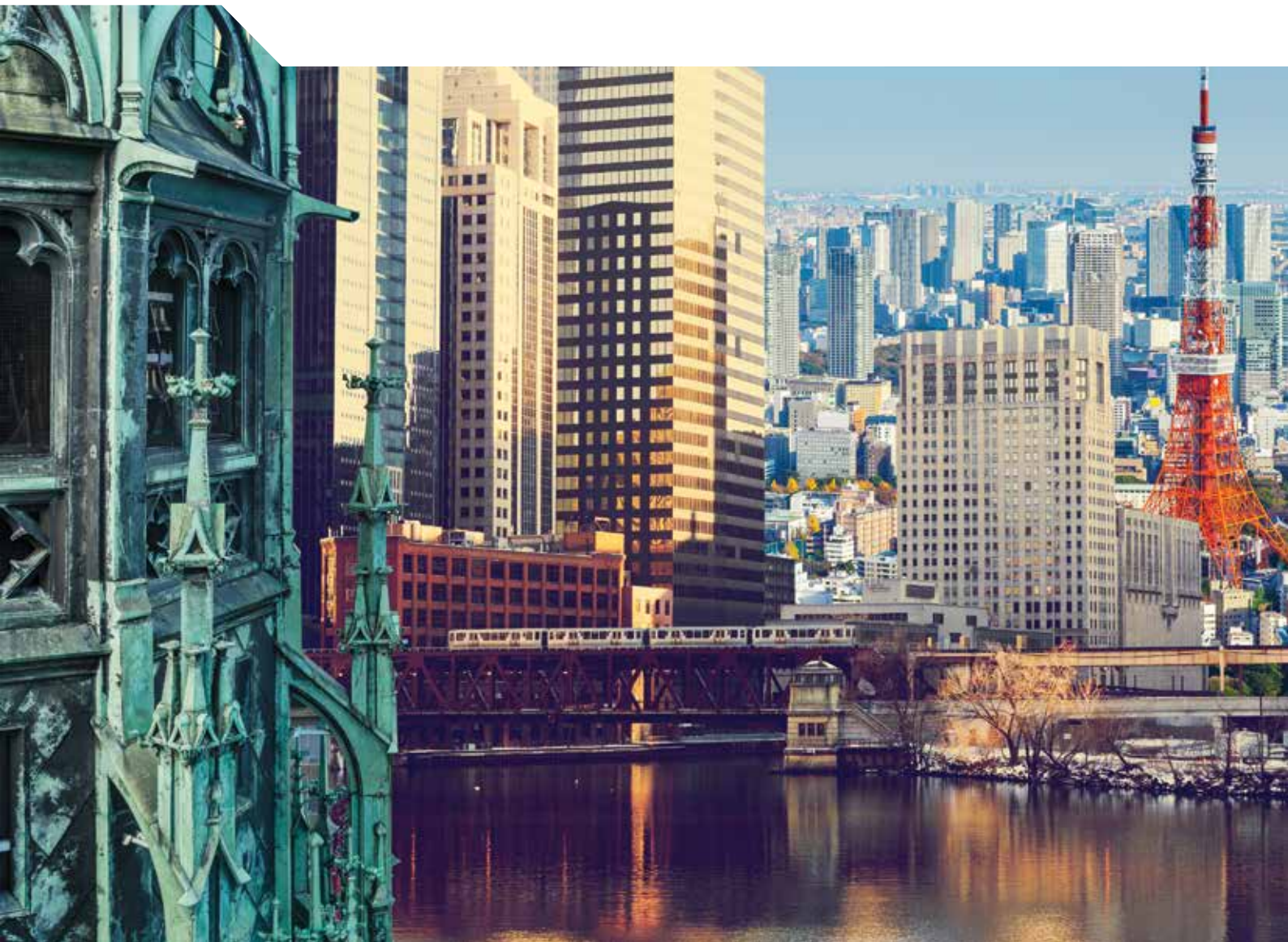




# The Metropolitan Century

UNDERSTANDING URBANISATION AND ITS  
CONSEQUENCES





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AND ITS CONSEQUENCES

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## *Foreword*

Urbanisation is progressing as fast as never before in history. Understanding its causes and consequences is crucial for our ability to shape the process and ensure that it will benefit all citizens. The Metropolitan Century explains why people move into cities and shows that the ongoing urbanisation process promises to improve economic conditions and the well-being of the world's population. Urbanisation is good for residents who move into cities because they benefit from higher wages and the proximity to amenities. It is good for countries because cities tend to be more productive and innovative than rural areas. Last but not least, it is good for the environment because the environmental impact of an urban population can be smaller than the environmental impact of the same population spread out over a large rural area.

The report focuses on OECD member countries, but its analysis and insights are relevant beyond the OECD. Although urbanisation differs from country to country, it is shaped by common forces that are similar all over the world. Cities are growing because they are centres of economic activity and offer their residents opportunities for a better life. Policy makers in every country face the task to maximise the benefits of urbanisation while minimising its downsides. They need to provide services efficiently to residents, ensure that cities can reap agglomeration economies and reduce agglomeration costs. This report helps policy makers to achieve these objectives by providing a better understanding of the mechanisms behind them.

Cities in OECD countries differ from cities in many other parts of the world in one crucial aspect. In most OECD countries, the large majority of the population is already living in cities. Outside the OECD, many cities are still growing rapidly. Policy makers in such fast growing cities have even greater responsibilities than their counterparts in mature cities. How cities are built today will shape how they look and function for a long-time into the future, thereby affecting generations to come.

The Metropolitan Century helps to obtain a better understanding of urbanisation, and can serve as a tool to seize the opportunities provided by urbanisation.

## *Acknowledgements*

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## Acronyms and abbreviations

<b>CBD</b>	Central business district
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>EU</b>	European Union
<b>FUA</b>	Functional urban area
<b>G7/G20</b>	Group of 7/20
<b>GDP</b>	Gross domestic product
<b>GEMSE</b>	General Equilibrium Model of the Space Economy
<b>GHG</b>	Greenhouse gas
<b>IMF</b>	International Monetary Fund
<b>Mercosur</b>	Common Market of the South <i>Mercado Común del Sur</i>
<b>NATO</b>	North Atlantic Treaty Organization
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PM<sub>2.5</sub>/PM<sub>10</sub></b>	Particle matter 2.5nm/10nm (very fine airborne particles that pose a serious health hazard)
<b>SMEs</b>	Small and medium-sized enterprises
<b>UN</b>	United Nations
<b>UN DESA</b>	United Nations, Department of Economic and Social Affairs
<b>WHO</b>	World Health Organization
<b>WTO</b>	World Trade Organization



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## Executive summary

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### *The history of urbanisation*

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By the end of this “Metropolitan Century”, most of the urbanisation on our planet is likely to be completed. The urban population will have increased from less than 1 billion in 1950 to roughly 6 billion by 2050. By 2100, it is likely to reach somewhere around 9 billion, corresponding to close to 85% of the projected total population.

The first truly big wave of urbanisation got underway in the 18th century when the emergence of manufacturing industry created an unprecedented demand for labour in specific locations. Cities of several hundred thousand people emerged quickly near coal mines and ports. From the second half of the 20th century onwards, urbanisation has spread from developed countries to developing countries. During this (ongoing) second wave of urbanisation, it has been proceeding at an unprecedented speed.

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### *The secrets of successful cities: What makes cities rich?*

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Successful cities typically attract population, have high levels of economic activity and are well organised. What are the secrets behind the success of these cities? The economic performance of a city is influenced by a complex set of policies at the national and local level, but one can identify some broad patterns regarding economic performance that hold across most cities. For example, the productivity levels of cities (and thus their gross domestic product, GDP) depend on their population size. Larger cities are generally more productive. A large share of highly educated people also has important benefits for productivity levels. Also the governance structure of a metropolitan area matters. The fragmentation of a metropolitan area into a large number of municipalities is negatively reflected in its economic strength.

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### *What makes cities function well?*

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Often, administrative boundaries between municipalities are based on centuries-old borders that do not correspond to contemporary patterns of human settlement and economic activity. Governance structures that take today’s realities in metropolitan areas into account typically function more effectively. This is particularly important in the fields of land-use and transport planning. Land-use regulations also need to find the right balance between protecting existing neighbourhoods and green spaces and allowing new construction. Integrated public transport systems that provide single pricing schemes and optimised schedules across different modes of transport are more attractive. In the context of transport, it is also important to adjust taxes and fees so that the negative consequences of driving into cities are reflected in the cost of car use.

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*Are large cities good for their residents?*

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The question whether cities correspond to the needs and aspirations of their residents has many nuances, but the fact that many millions of individuals voluntarily choose to live in large cities shows that cities offer more upsides than downsides to their residents.

Big cities raise their workers' productivity and wages, offer a large set of opportunities and allow for an unrivalled access to amenities of all types. The benefits that larger cities provide, however, come with increased costs of living, as well as non-pecuniary cost such as congestion, long commutes and air pollution. These non-pecuniary costs are significantly driven by urban form and transport infrastructure, and hence reflect policy decisions (or the lack thereof).

Large cities are particularly attractive for the well-educated but also attract poorer individuals. Inequality tends to be especially high in large cities and has been increasing over the past decades. High inequality and spatial separation into wealthy and poor neighbourhoods creates the risk of social exclusion for poor residents. A key challenge is to ensure that jobs and services, as well as schools and other education facilities are within reach of all residents.

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*Are large cities good for their countries?*

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Roughly half the population within the OECD lives in one of 300 metropolitan areas – cities with more than 500 000 inhabitants – that account for significantly more than half of the GDP of OECD countries. But the importance of cities goes far beyond simple arithmetic. Cities are hubs of productivity and innovation and goods and service providers for their regions.

While innovation can happen anywhere, it occurs especially in highly urbanised areas. Cities are thus crucial in pushing out the productivity frontier, thereby becoming essential drivers of a country's potential for long-run economic growth. Cities also have positive spillover effects on the economic performance of surrounding regions that is measurable up to a distance of 200-300 kilometres.

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*Are large cities good for the planet?*

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Although cities are important sources of pollution, urbanisation potentially has positive environmental consequences. Spreading city populations over a larger area would not bring any systematic ecological benefits. When taking into account the per capita contributions to soil sealing or climate change, larger cities actually perform better. Overall, the ecological effects of cities depend mainly on how they are organised. The choices made during the current wave of urbanisation will therefore have a huge impact on the environmental sustainability of human activity.

Urban sprawl increases the detrimental effects of cities on the environment, and many countries have the policy objective to limit sprawl. Nevertheless, current policies in many cities actually incentivise sprawl through taxes and regulations. As a consequence, people are pushed further apart than they would otherwise wish to be. Correcting such policies, including via the imposition of realistic carbon prices and congestion charges would make an important contribution towards improved environmental outcomes.

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*The challenges of 21st century urbanisation*

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The important challenges connected to urbanisation may explain why many countries still have policies in place that are aimed at or result in preventing or containing urbanisation. Governments would be better advised to accompany and shape urbanisation to ensure that it results in well-functioning and environmentally sustainable cities. Existing or emerging middle classes all across the globe increasingly ask for cities not only to provide for good jobs and livelihoods, but also to become more liveable. This includes less pollution and congestion, good access to the places where residents need or want to go, and a generally attractive and secure city environment with a good choice of leisure activities. While in most of Europe and Northern America the largest part of urbanisation has already taken place and is embodied in city forms and existing infrastructures, developing and emerging countries currently have an unprecedented opportunity to shape their urban futures. The decisions taken by governments at national, sub-national and city levels now will have consequences for their cities for decades, if not centuries, to come.





## *Introduction:* **The century of urbanisation**

### **The century of urbanisation**

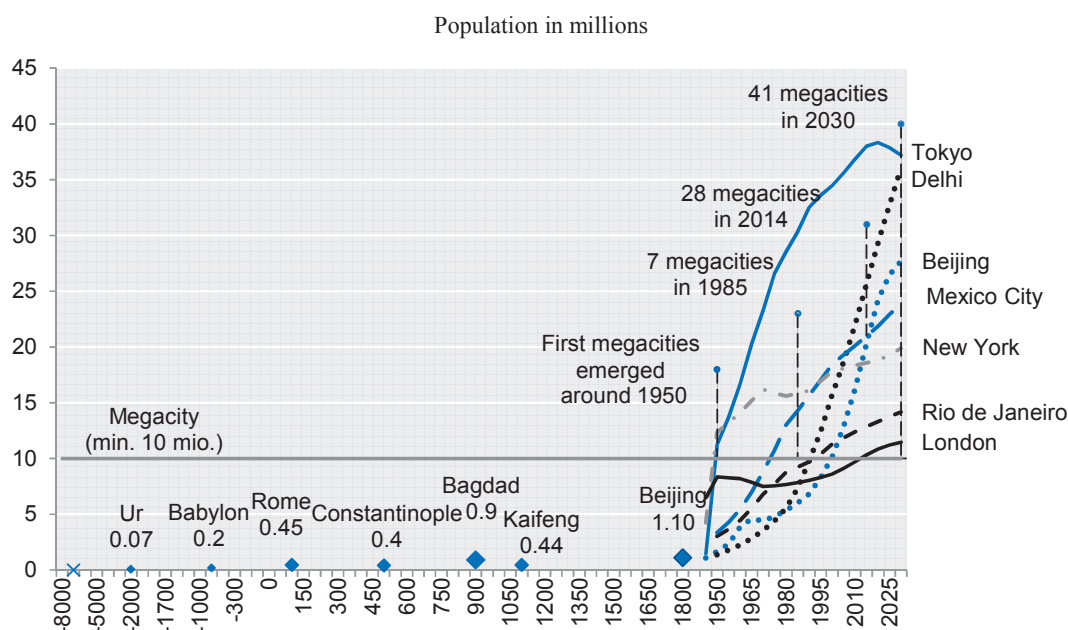
By the end of the 21st century, most of the urbanisation on our planet is likely to be completed. On current projections, the world population is set to expand roughly up to 2100. This growth will be driven largely by increases in urban population, from less than 1 billion to roughly 6 billion between 1950 and 2050. Over 100 years, the share of urban dwellers will have increased from 30% to 66% of the world population.<sup>1</sup> By 2100, the share of the urban population is projected to reach around 9 billion, corresponding to close to 85% of the population (UN DESA, 2013). This period of rapid urbanisation will also have experienced the rise of the megacity (Figure 0.1), which is defined as a metropolitan area with a total population in excess of 10 million people. In 1950, New York and Tokyo were the only megacities, but by 2014 their number had increased to 28 – with metropolitan areas such as Tokyo, Delhi, Shanghai, Mexico City or São Paulo having populations in excess of 20 million inhabitants each. Many OECD countries are already highly urbanised and have stable or declining populations, so the largest share of the current wave of urbanisation is taking place in developing and emerging non-OECD economies, in particular in Asia. It is projected that by 2030, when the number of megacities will have increased to 41, 7 of the world's top ten megacities will be in Asia.<sup>2</sup>

### **Cities and national economies**

Cities in both urban and non-urban regions are key contributors to national socio-economic and environmental performance. For example, across OECD countries, metropolitan areas (defined as urban agglomerations with more than 500 000 inhabitants) cover only 4% of the land, but account for roughly half of the population and close to 55% of gross domestic product (GDP). An even higher share of the population, roughly two-thirds, lives in urban agglomerations with more than 50 000 inhabitants. Asian OECD countries are particularly urbanised, with roughly 80% of the population living in urban agglomerations and around 70% of the population living in metropolitan areas. Similarly, in Latin America, urbanisation levels are at around 80%.

All across the globe, cities are motors of growth. Metropolitan areas and dynamic medium-sized cities have enormous potential for job creation, innovation and green growth, and are the hubs and gateways in global trade and transport networks. Throughout the OECD, productivity and wages increase with city size. Given high productivity levels and their sheer size, large cities have been making large contributions to national growth, reaching a maximum of above 70% in certain countries. In most OECD countries, the contribution to economic growth of metropolitan areas during 2000-10 was well above their initial population share.<sup>3</sup>

Figure 0.1. The rise of the megacity



Source: Kaminker, C. (2014), “The role of long term investors in green infrastructure finance”, presentation given at “The Geography of Urban Infrastructure”, Association of American Geographers’ Annual Meeting, Tampa, Florida, April 2014, unpublished, based on data from Chandler, T. (1987), *Four Thousand Years of Urban Growth: An Historical Census*, Edwin Mellen Press, and UN DESA (2014), *World Urbanisation Prospects: The 2014 Revision*, United Nations, Department of Economic and Social Affairs, Population Division, <http://esa.un.org/unpd/wup/CD-ROM/Default.aspx>.

## The importance of getting cities right

The projected increase in urban population implies that the way our cities are planned and run will not only have huge economic and social implications but will also be of crucial importance for achieving environmental sustainability. In this sense, the current wave of urbanisation – that is likely to be the last great wave on this planet – is both a risk and an opportunity. Urban form lasts, hence urban policy decisions, which rapidly urbanising countries have been, and will be, making over the next decades, will shape their societies and economies for a very long time. Moreover, given the environmental and possibly also social consequences of many of these choices, getting cities right is not only of vital importance for city residents and the countries where the cities develop, but for all of humanity.

## Notes

1. See OECD (2012) for details.
2. See UN DESA (2014) for details.
3. See OECD (2013) for detailed statistics.

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## *Chapter 1*

### **A short history of urbanisation**

*This chapter provides a selective overview of important episodes in the history of urbanisation, starting with the emergence of the first cities around 8 000 years ago. It describes important social, economic and technological advances that have influenced the urbanisation process. First, the chapter discusses the factors that made it possible to build the first cities. Second, it explains why urbanisation increased strongly during the Industrial Revolution. Third, it examines the reasons for continuing urbanisation in the post-industrial age and outlines technological advances in transport and construction that have shaped cities through to the present day. Lastly, it provides an overview of the ongoing worldwide urbanisation process and shows why urbanisation will be virtually completed by the end of this century.*

## Chapter Synopsis

By the end of this “Metropolitan Century”, most of the urbanisation on our planet is likely to be completed. The urban population will have increased from less than 1 billion people in 1950 to roughly 6 billion by 2050, and probably somewhere around 9 billion by 2100.

The origins of urbanisation can be traced back to Mesopotamia, where roughly 8 000 years ago the first cities with several tens of thousands of inhabitants emerged. Over the following millennia, urbanisation proceeded in cycles. The first truly big wave of urbanisation only got underway when in the 18th century – together with strong increases in agricultural productivity and advances in sanitation – the emergence of manufacturing industry created an unprecedented demand for labour in specific locations. Cities of several hundred thousand people emerged quickly near coal mines or ports. During the 19th century, cities grew further as rail transport and steamships made it possible to transport resources from ever larger distances, and underground railways helped to ease congestion, which was already a major problem in large cities. In the early 20th century, new construction methods increased economically feasible heights of commercial buildings by a factor of more than ten and the rise of the automobile made suburban living possible. During the same period, the nature of cities started to change in the most economically advanced countries, as they went from being centres of industrial activity to service hubs.

From the second half of the 20th century onwards, urbanisation has spread from developed countries to developing countries – a process often called the second wave of urbanisation. Since then, urbanisation has been proceeding faster than ever before. By the early 21st century, more than half of the world’s population was living in cities, and this figure is projected to reach 66% by 2050 and close to 85% by 2100. This period will also have experienced the rise of the megacity. In 1950, New York and Tokyo were the only urban agglomerations with a population in excess of 10 million. By 2030, the number of megacities is projected to increase to 41, with 7 of the world’s top ten megacities in Asia.

*“Divine Nature gave the fields, human art built the cities.”*

(Marcus Terentius Varro, 116 BC – 27 BC, “De Re Rustica”, in Barry, 2000)

This chapter provides a brief historical overview of urbanisation. It focuses on what could be called the frontier of urbanisation, i.e. on the innovations and regions that pushed urbanisation to previously unseen levels and created new ways of urban living. This focus should not obscure the fact that throughout history, urbanisation did not proceed in a linear fashion. It advanced in some regions while it stagnated or even declined in others. When lagging regions caught up, the catch-up growth was often driven by a mix of factors that were responsible for contemporaneous and earlier waves of urbanisation. When ancient Rome became the first city with close to 1 million inhabitants, the processes that had created the first cities 6 000 years earlier were still going on in large parts of the world. Likewise, many developing countries today experience a form of urbanisation that is similar to the European experience of the 19th century, even though it is also influenced by modern trends of urbanisation.

### **The emergence of the first cities**

The first cities probably emerged more than 8 000 years ago. They were made possible by a combination of innovations that are often summarised under the term “Neolithic Revolution”. The early phases of the Neolithic Revolution were characterised by the adoption of farming and animal husbandry. As the productivity of agriculture increased, people started producing more food than necessary to sustain themselves and their families. At the same time, technological advances increased the benefits of economic specialisation. Cities provided specialised goods and served as centres of trade for rural areas. In return, the food surplus produced in rural areas could be used to sustain an urban population that was not directly engaged in food production.

However, the existence of a food surplus alone was not sufficient for the emergence of cities. Innovations and discoveries in other fields were equally important for their initial development. Basic transport technologies were necessary to bring the food from the surrounding areas into the cities. Storage methods had to be developed to preserve the food during transport and to protect the cities against fluctuations in the supply of food. In particular, the development of pottery played a crucial role for the emergence of cities, as it was a prerequisite to manufacture bricks for the construction of houses and storage containers for the preservation of food.

While food supply is critical to the division of labour that makes urbanisation possible, it is not the only, or even the most difficult, challenge facing those who founded a city. Management of water and sewage are no less fundamental to urban life. Indeed, efforts to address these problems, which remain important challenges for cities today, have driven important changes in both technology and governance over the centuries (see Box 1.1).

Besides technological advances, institutions in the form of cultural norms, governance structures and economic mechanisms that could organise the lives of several tens of thousands of people in one place were necessary before cities could develop. Among them are codes of behaviour for daily interactions and trading mechanisms that made the division of labour possible and ensured a steady flow of food and other supplies from the hinterland into the city. Governance structures had to be sufficiently advanced to enforce internal rules and to organise the protection of the city against external threats.

Only with those innovations in place could the first cities with populations of more than 10 000 inhabitants emerge. These cities were part of the Sumer culture and were

located in Mesopotamia in the floodplains of the Euphrat and Tigris in today's Iraq. The history of the first cities is not well-known because they left few traces behind. Even after they emerged, they were rare and a rural lifestyle was the norm all over the world. This remained unchanged over the next 6 000 years, although cities started to emerge in other parts of the world, such as the Indus Valley in today's India and Pakistan.

For several millennia, cities appeared in more and more regions across the world, but the size of the largest cities did not substantially exceed that of the earliest cities. This changed only from 1500 BC onwards when Thebes in Egypt might have exceeded 100 000 inhabitants and Babylon reached 200 000 inhabitants in 600 BC (Chandler, 1987). Over the following centuries the sizes of the largest cities of the world increased further and in 100 AD estimates suggest that between 400 000 and 1 million inhabitants were living in Rome. This proved to be a temporary peak in the size of the largest cities. Over the following 1 600 years, many cities in Europe, Asia and the Middle East reached populations of several hundred thousand inhabitants. Some, such as Xian in the 8th century and Baghdad in the 9th century might have exceeded the population of ancient Rome, but none did so significantly.

One of the most important limiting factors to the population size of cities back then was waste and sanitation – an issue that is still of crucial importance in many large cities in developing countries. One of the elements that made Rome's size possible was the elaborated water supply and sewerage system that could provide healthy drinking water to its population.

### Box 1.1. Water and waste

No permanent, compact settlement can grow beyond a certain size unless it can satisfactorily resolve the issues of water supply and sewage management. The need to tackle these problems contributed not only to the emergence of new technologies but also to the evolution of social structures that came, in time, to constitute what we now know as the state.

In ancient Sumeria, set between the Tigris and Euphrates rivers, the maintenance of irrigation networks gave rise to the first large-scale public works projects in recorded history: as irrigation systems and networks of dykes for flood control grew more elaborate, they required continual oversight and substantial commitment of labour. The natural choice to manage these works was an official called the *en*. Sometimes translated to “priest” or “lord”, the *en* was an official chosen by the community's elders to look after surplus food stores and the community's sacred objects. In order to support the work-gangs he managed, the *en* appropriated a share of the surplus food that the community's farmers had produced and stored – in essence, a tax on farmers to support others, whose work made food production possible. Strikingly similar models evolved independently in other “cradles of civilization” along major rivers: the Nile in Egypt, the Indus in what is now Pakistan, the Yellow River in the People's Republic of China and the river valleys of the Peruvian coast. In each case, state structures emerged on the basis of centrally organised labour to construct flood defences and irrigation systems.

As this system took shape, the organisation of other kinds of public works and services became possible, including rudimentary arrangements for waste disposal. The first sanitation systems of which evidence remains date from the third millennium BC. At the Shahr-e Sūkhté site in the south-east of present-day Iran, archaeologists have uncovered an extensive system for water supply and wastewater collection and discharge. The first palaces in Crete relied on an inverted siphon system, along with glass covered clay pipes, around the start of the second millennium BC, and the ancient cities of the Indus Valley civilisation built networks of brick-lined sewage drains from around 2600 BC, with outdoor flush toilets connected to this network. Roman garrisons and cities often relied on networks built from hollowed-out tree trunks. In a number of major cities, including Rome and Istanbul, networked ancient sewer systems still form a part of the collection systems for modernised sewer systems, though the pipes have been re-routed to modern sewer treatment facilities rather than into the sea as in times past.



### Box 1.1. Water and waste (cont.)

Over time, rulers adopted increasingly innovative strategies for addressing these problems, some of which are surprisingly contemporary. Thus, the arrangements used by the Roman authorities to secure water supplies for towns in Egypt relied on a form of what would today be called a “public-private partnership”. Thus, the need to meet these fundamental requirements of urban viability has long been an impetus to innovations in governance.

Despite these early origins, water supply and waste disposal remain among the most difficult urbanisation challenges, and many cities did little to address them until the last couple of centuries. Prior to the Industrial Revolution, most cities did not have functioning sewer systems, relying instead on nearby rivers or rain to wash away sewage from the streets. In many of today’s rapidly urbanising countries, water supply and sanitation are far bigger problems than food supply. In much of the world, only a fraction of urban wastewater is treated and arrangements for solid-waste management are primitive; the public health consequences of this state of affairs are among the major problems facing late urbanisers. Although the scientific understanding of such problems is far more advanced than in the past and the technologies available are far more sophisticated, Angelakis and Rose (2014) emphasise that there is still much to learn from past technologies and practices in terms of design philosophy, adaptation to the environments of specific places and management methods.

*Sources:* Adams, R. (1966), *The Evolution of Urban Society: Early Mesopotamia and Prehistoric Mexico*, Aldine Publishing, Chicago, Illinois; Wilson, P. (1988), *The Domestication of the Human Species*, Yale University Press, New Haven, Connecticut; Wilson, A. (2002), “Machines, power and the ancient economy”, *The Journal of Roman Studies*, Vol. 92, No. 1, pp. 1-32; Blandford, L. and P. Davidson (2009), *Milestones of Civilisation*, New Holland Publishers, London; Angelakis, A. and J. Rose (2014), *Evolution of Sanitation and Wastewater Technologies through the Centuries*, IWA Publishing, London.

The lack of representative and reliable censuses makes it difficult to estimate the population of the world’s largest cities prior to the modern period. Calculating urbanisation levels of countries is even more difficult. Not only are censuses for entire countries even rarer, but there is also no good definition of what constitutes an urban agglomeration in ancient times. Nevertheless, some rough estimates are possible.

The earliest cultures with cities probably had urbanisation levels of only a few percentage points. Several dozens of rural workers were required to produce and transport the food required by an urban worker who was not directly involved in food production. Over time, the size of the sustainable urban population increased and reached a preliminary peak in the ancient Roman Empire. Urbanisation levels were almost certainly above 10% for the part of the empire that corresponds to today’s Italy and might have been above 30%. Such high urbanisation levels could only be sustained by an empire that coercively extracted food and other resources from peripheral areas and transferred them to the core regions of the empire.<sup>1</sup>

Following the decline of Roman Empire, cities spread further across the world but no region reached comparable urbanisation levels for the following 1 500 years. Nevertheless, worldwide population levels and urbanisation levels continued to increase over this time. However, the process was not linear. Typically, changes in urbanisation levels were associated with the blossoming or decline of civilisations. Furthermore, agricultural innovations such as three-field crop rotation in Europe or the invention of the mouldboard plough in China also led to higher urbanisation levels.

## Industrialisation and the first wave of urbanisation

Although important changes to urbanisation patterns occurred between the decline of the Roman Empire and the 18th century, they pale in comparison to the effects of the Industrial Revolution that began in the second half of the 18th century in Great Britain. Just as previous episodes of urbanisation cannot be pinned down to individual factors, the

Industrial Revolution encompassed many processes that led jointly to the substantial increases in urbanisation levels that occurred between 1750 and 1950.

Over the course of two centuries, the so-called “first wave of urbanisation” fundamentally changed the dominant lifestyle in today’s developed countries. In the 18th century, urbanisation levels throughout Europe were mostly in the single-digit or low double-digit range.<sup>2</sup> By the end of the period, the average level of urbanisation for developed countries was above 50%. From 1750 until the end of the 19th century, Great Britain was at the forefront of developments that occurred all over the world and events there were emblematic for the greater pattern of urbanisation during the time.

Strong increases in agricultural productivity driven by a variety of innovations occurred in Great Britain prior to the 18th century and spread to other parts of Europe. They provided the basis for the rapid growth in urbanisation that occurred soon after. As a larger population could be sustained from farming the same amount of land, the number of people that could live in cities increased strongly (Allen, 2009).

The primary driver of urbanisation during the Industrial Revolution was the increased demand for labour at single locations caused by the onset of large-scale manufacturing. Before the Industrial Revolution, people typically worked individually or in small groups. In contrast, factories and mines employed hundreds or even thousands of people at one location. Furthermore, they were often built close to each other in order to minimise transport costs. In particular, the widespread introduction of the steam engine and improvements in iron smelting techniques increased the demand for coal drastically. During the Industrial Revolution, low efficiencies of furnaces meant that between 2.5 and 8 tonnes of coal were required to produce 1 tonne of iron.<sup>3</sup> To reduce transport costs, factories and iron smelters located close to coal mines and, consequently, cities developed rapidly around these sites. Before the invention of rail transport, shipping was by far the most efficient form of transport. As the demand for resources increased during the Industrial Revolution, ports grew in importance. Due to the demand for labour from ports and the trade associated with them, port cities also grew strongly during the Industrial Revolution.

London played an exceptional role in the urbanisation process of the 19th century. Already in the early phases of the Industrial Revolution in the late 18th century London was one of the biggest cities of the world, with close to 1 million inhabitants. It was the centre of the British Empire and the world’s most important trading hub. However, like ancient Rome (and many large cities today), it was suffering from heavy congestion, as only minor innovations in road-based transport had occurred over the previous two millennia and goods had to be brought into the city by animal-drawn carts. This changed in the first half of the 19th century. In 1836, London’s first railway line opened and, subsequently, construction of railways boomed. Within 30 years most of the major train lines and stations that exist in today’s London were built. In some cases, existing housing was demolished and the lines were built into the very centre of the city. In other cases, lines ended where densely built-up areas began (White, 2008).

The construction of railway lines made it possible to bring large amounts of goods into the city. They also drastically increased the distances from which food and other supplies could be economically sourced. Together with the further growing importance of London as the centre of the British Empire, this led to a threefold increase in population between 1800 and 1860, from 1 million to nearly 3 million inhabitants. At the time, London was by far the largest city in the world and the termini stations that were initially built at the city limits were quickly surrounded by newly constructed housing.

The next major innovation in urban transport occurred in 1863, also in London, when the first underground railway line opened as a precursor to most of today's modern rapid transit systems. Overground railway lines can bring large amounts of goods and people into cities, but they are less suited as the basis of a public transport system within cities. They cut through urban space, divide neighbourhoods and disrupt other traffic flows. In contrast, underground lines do not suffer from those disadvantages and quickly emerged as the foremost type of rail transport in cities.

After the opening of the first underground line, around 100 kilometres of new lines were built under London in the following decades. While initially operated on steam, they were electrified from 1890 onwards. Together with horse-drawn omnibuses, which emerged in several cities in the middle of the 19th century, the underground lines provided the world's first comprehensive urban mass transport system. It allowed London to grow even further and reach 6.5 million inhabitants by 1900. At the turn of the 20th century, underground railways were under construction in many other major cities across the world.

The fact that London's rail transport network in large parts still resembles the system designed in the 19th century shows the lasting impact of transport infrastructure decisions. Fast-growing cities today should take this fact into account when planning how to meet the transport needs of their residents. This includes identifying probable future bottlenecks and ensuring that provisions for upgrading and extending them at reasonable costs exist.

Around the turn of the 20th century, new construction technologies started to reshape cities. In particular, the development of steel frame construction and the invention of reinforced concrete had big impacts. For most of the past millennium, church spires with a height of around 150 metres had been the tallest buildings in the world. However, they could bear little weight and provided virtually no usable space. Until late in the 19th century, even the tallest office or residential buildings had heights of only a few dozen meters. This changed rapidly in the beginning of the 20th century. Within decades, feasible heights for office buildings increased almost tenfold and exceeded 300 metres in 1930.

Taller buildings allowed for increased population densities. Whereas until then the only practical way of increasing city size was to build outwards by extending the city boundaries, now it was also possible to build upwards. However, at least initially, increasing building height was costly and therefore only economically viable in the centres of the largest cities, where space was most valuable. Over time, building up became cheaper and high-density neighbourhoods emerged also outside of city centres. However, the centres of very large cities remain the most densely populated places on earth. Estimates suggest that the daytime population density (i.e. daytime residents including commuters) in some of Midtown Manhattan's census districts reaches up to 380 000 people/km<sup>2</sup> (Moss and Quing, 2012). This is around 100 times the density of a typical urban residential neighbourhood in a developed country.

## Post-industrial urbanisation

One of the primary drivers of the Industrial Revolution was labour-saving innovations. Initially, the manufacturing sector grew strongly and employment in it increased. Quickly, however, further labour-saving innovations slowed the growth of employment in manufacturing. In countries that were at the forefront of industrialisation,

the share of employment in manufacturing peaked as early as the first half of the 20th century.

With the relative importance of the manufacturing sector declining, jobs were increasingly created in the service sector and in knowledge-intensive professions. Whereas the location of manufacturing was often determined by locational factors, such as the availability of resources or transport connections, service sector jobs are less closely linked to the factors that were previous drivers of urbanisation. Because the newly emerging jobs had no direct connection to locational factors, it appears natural to think that the shift away from manufacturing entailed de-urbanising trends. However, urbanisation continued despite the decline of employment in manufacturing.

One reason for the continuing growth of cities in the 20th century can be found in the amenities that cities offer. Amenities refer to all the features of cities that might make life pleasant in cities. They can include, among other factors, better healthcare, theatres and restaurants, advanced education facilities and specialised shopping opportunities. It is due to them (and to the vast improvements in sanitation that occurred during the late 19th and early 20th century) that most cities are attractive places to live. Prior to the 20th century, the majority of people had to live wherever they could earn enough to survive. Furthermore, poor hygienic conditions often outweighed the appeal of amenities. This changed with improvements to sanitation at the end of the 19th century. When income levels increased during the 20th century, many people gained the freedom to choose their place of residence based on non-economic considerations and were often drawn to cities.

Despite the emergence of amenities as drivers of city growth, economic factors still played a crucial role for urbanisation in the 20th century. Agglomeration effects ensured that it was beneficial for businesses to be located in cities even if they did not use any particular resources or did not require a good trade network. The term “agglomeration economies” refers to the economic benefits that accrue when many people and businesses operate in close proximity. They arise for several reasons. For example, the rate of innovation increases if many people who specialise in the same field work and live close to each other and can exchange ideas on a daily basis. Another reason behind agglomeration economies is the greater competition that forces businesses to operate more efficiently in larger cities.

Agglomeration economies make businesses more productive. They provide an incentive for businesses to locate in large cities and also explain the emergence of specialised clusters in some cities. As more productive workers earn higher wages, they also make it attractive for employees to move to cities. Agglomeration economies are a complex phenomenon that is crucial for understanding the development of modern cities. They are discussed in more detail in Chapter 2.

Amenities and agglomeration economies are not unique to cities of the 20th century. People in ancient Rome most likely appreciated the entertainment that was offered in the Circus Maximus and some might have even moved to Rome because of it. Similarly, the industrial growth in northern England during the Industrial Revolution is not only due to the coal fields in the region, but also due to the rapid pace of innovations in manufacturing techniques that occurred there because of agglomeration economies. Larger cities always offered attractions that villages did not have and proved a fertile ground to exchange ideas. However, previously these effects were often dominated by other factors that had a stronger influence on urbanisation patterns, such as resource availability, natural transport connections and hygienic conditions.

Only in the 20th century did amenities and agglomeration economies become the primary drivers of urbanisation. Initially, this was mostly due to economies of scale associated with industrial manufacturing.<sup>4</sup> Larger plants were more efficient and industries clustered in a small number of cities. Later, knowledge spillovers and amenities became the driving force behind urbanisation. Today, they are the predominant forces behind the growth of most cities in OECD countries. Nevertheless, economies of scale are still highly important for countries whose economies are based on mass manufacturing, such as the People’s Republic of China.

Despite the importance of amenities and agglomeration effects, technological innovations played a crucial role in shaping post-industrial urbanisation. In particular, the widespread adoption of the automobile beginning in the 1920s in the United States had fundamental effects on the nature of urban living and the shape of cities. Whereas new construction techniques allowed much higher population densities than before, the introduction of the automobile had the opposite effect. It increased the feasible commuting distance between the place of residence and the place of work. Residential areas did not have to be close to centres of employment anymore and cities could cover a much larger space than before. Furthermore, the automobile made it possible to develop single-purpose neighbourhoods. Before the introduction of the automobile, most aspects of daily life had to be within walking distance. Therefore, most neighbourhoods were mixed-use neighbourhoods and had a combination of residential housing, shops and businesses.

After the introduction of the automobile, single-purpose neighbourhoods in previously remote locations became possible. This led to the widespread development of low-density, suburban residential neighbourhoods that often symbolise urban “sprawl”. Simultaneously, business and shopping districts with few or no permanent residents started to emerge. These developments were made possible by the widespread adoption of the automobile, but driven by a mix of cultural and economic factors. Inner cities were considered polluted, unsafe and expensive, whereas suburban developments offered affordable housing with large green spaces in safe middle-class neighbourhoods.

## **Developing countries and the second wave of urbanisation**

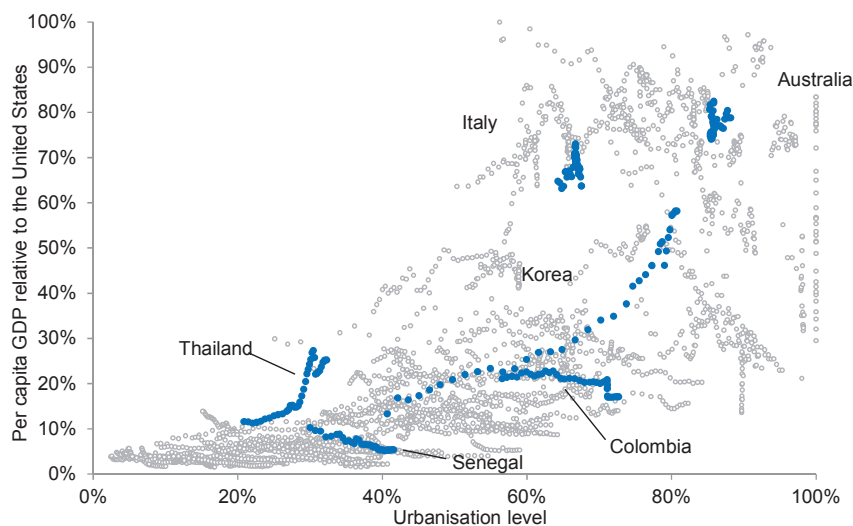
Urbanisation has shaped developed countries during the 20th century, but it has had even more transformative effects on developing countries. Several major factors distinguish urbanisation in developing countries from urbanisation in developed countries. First, it is occurring at an even quicker pace. Generally, it took more than a century for most developed countries from the time urbanisation started to increase markedly until they reached 50%. Today’s developing countries often reach that threshold in less than half the time.

Second, much larger numbers are involved. During the first wave of urbanisation between 1750 and 1950, the urban population increased by roughly 400 million.<sup>5</sup> On current projections, the second wave of urbanisation is likely to increase the urban population by approximately 8 billion between 1950 and 2100, mainly in developing and emerging countries (see Box 1.2).

Third, urbanisation and income growth are less closely connected than they were for developed countries. While development does not occur without urbanisation, urbanisation does not necessarily imply that a country is developing.<sup>6</sup> During the first wave of urbanisation, economic growth and urbanisation were driven by industrialisation.

Today, this is only the case for some countries. Other developing countries, particularly in Africa and parts of South Asia, have seen strongly growing urbanisation levels without corresponding economic growth rates. Figure 1.1 shows the relation between urbanisation and catch-up growth between 1970 and 2005 for almost 100 countries. Several countries are highlighted for exemplary reasons. Thailand and Korea experienced urbanisation and a closing of the income gap with the United States at the same time. In contrast, Senegal and Colombia urbanised, but did not experience any catch-up growth relative to the United States. Australia and Italy neither experienced any significant increase in urbanisation levels, nor did their per capita GDP relative to the United States change much.<sup>7</sup>

Figure 1.1. Urbanisation and economic development



*Note:* This figure plots annual observations of per capita income relative to the United States (vertical axis) and urbanisation levels (horizontal axis) for 91 countries during the period from 1970 to 2005.

*Source:* OECD calculations based on World Bank (2014), *World Development Indicators*, <http://data.worldbank.org>.

### Box 1.2. Urbanisation trends across the world

Data availability is a major issue when it comes to urbanisation trends before 1950. Thus, most cross-country datasets provide statistics on urban populations and their trends from 1950 onwards. Even today, data on urbanisation is not as reliable as would be desirable. Especially in developing countries, census data can be missing or inaccurate. Furthermore, there is no universal or generally accepted definition of cities, or urban agglomerations. For example, Denmark considers human settlements with a minimum of 200 residents as a city. On the contrary, Korea defines places with more than 50 000 inhabitants to be urban.<sup>1</sup> Hence, no internationally comparable data exists and cross-country comparisons of urbanisation levels, as provided below, have to be interpreted with caution. This will change with the completion of the World Bank's Global Urban Extent project that uses the EU-OECD definition of urban agglomeration to provide worldwide urbanisation data based on a common definition.

### Box 1.2. Urbanisation trends across the world (cont.)

#### Africa

In Africa, urbanisation growth is among the highest of the world regions. However, Africa remains the least urbanised region of the world. Across the continent, strong disparities in urbanisation levels exist. Southern and northern Africa are the most urbanised sub-regions of the continent, with more than 50% of their population residing in urban agglomerations. The lowest urbanisation levels of around 25% occur in eastern and central Africa. Western Africa has intermediate urbanisation levels of approximately 45%.

#### Asia

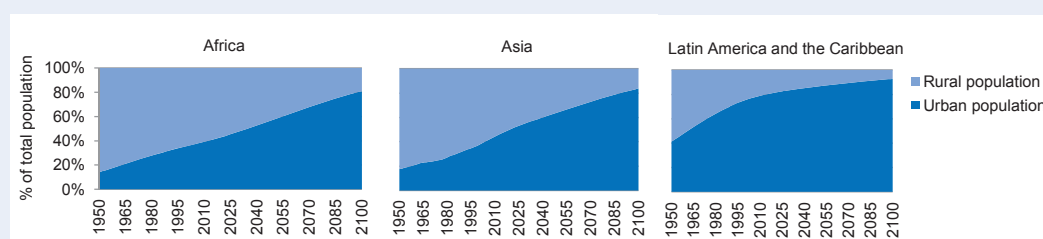
Asia has accounted for approximately 65% of the total increase in urban population since the beginning of the 21st century. The overall trend in the region is dominated by China and India, which together account for 2.5 billion people – more than one-third of humanity. In the People’s Republic of China, the urbanisation rate has more than doubled over the past 30 years; the country’s share of population living in urban agglomerations increased from below 20% at the end of the 1970s to more than 50% in 2012. India – while also urbanising quickly by international standards – has a much lower urbanisation share of approximately 30%.

Urbanisation of other Asian countries varies strongly. With more than 90%, Japan is the most urbanised among all large countries. Given that it is almost completely urbanised, it is unsurprising that the share of the urban population is hardly growing. Urbanisation levels also increased little in some countries with low levels of urban population (for example Tajikistan). Other countries, such as Afghanistan, currently have low urbanisation levels but are expected to urbanise strongly in the future. Most South-East Asian countries have average levels of urbanisation, and display growth rates that correspond roughly to the average of the continent.

#### Latin America

With an urbanisation rate of approximately 80%, Latin America is among the most urbanised regions in the world. It experienced particularly high growth of urbanisation in the second half of the 20th century, which slowed down at the beginning of the 21st century when more than three-fourths of its population had become urbanised. Several countries such as Argentina, Uruguay and Venezuela currently report urbanisation levels above 90% and thus belong to the world’s most urbanised countries. Because of the already high levels of urbanisation, only moderate changes to urbanisation levels are expected for the near future.

#### Urbanisation levels across the world



Sources: UN DESA (2014), *World Urbanization Prospects: The 2014 Revision, Highlights*, United Nations, Department of Economic and Social Affairs, Population Division; UN DESA (2012) *World Urbanization Prospects*, Extended Dataset, available at: [http://esa.un.org/wpp/ASCII-Data/DISK\\_NAVIGATION\\_ASCII.htm](http://esa.un.org/wpp/ASCII-Data/DISK_NAVIGATION_ASCII.htm); UN DESA (2012), *World Urbanization Prospects: Sources of Data on the Urban Population*, United Nations, Department of Economic and Social Affairs, Population Division, New York.

Note: 1. See United Nations (2012).

Despite those differences, some of today's urbanisation growth patterns in developing countries resemble those observed in the past. People move primarily for economic reasons. Migrants into Chinese cities are attracted by better jobs in the manufacturing sector, just as people were moving into cities in northern England in the early 18th century – notwithstanding the fact that the jobs back then were very different from the ones today.

In other respects, urbanisation trends in developing countries do not resemble historical urbanisation based on industrialization; they are more similar to current developments there. Recent figures from sub-Saharan Africa indicate that the poorest countries do not follow the path of wealthier economies. For them the manufacturing sector is not a prime driver of urbanisation. Throughout much of the past 50 years, the share of services, industry and agriculture remained roughly stable in sub-Saharan Africa at 48%, 32% and 20%, respectively. However, in the early 2000s, the service sector started to grow strongly, reaching 62% of value added in the region in 2013. Correspondingly, industry and especially agriculture declined in importance to 28% and 10%, respectively.<sup>8</sup>

Several other similarities exist. For example, developing countries are currently experiencing a de-densification of their cities driven by the spread of cars and motorcycles.<sup>9</sup> This trend is similar to the one experienced by wealthier countries during the second half of the 20th century.

## **The end of urbanisation**

Eight thousand years after the emergence of the first cities, the process of urbanisation will more or less come to an end. Based on current projections, by the end of the 21st century, 85% of the world's population is expected to live in cities. At that point, there will be little scope for further increases in urban population, because cities will still rely on rural areas and their residents for the provision of food and other essential resources as well as services such as recreation and tourism. Nevertheless, over the course of two centuries, living in cities will have changed from being a rare exception to the dominant lifestyle across the world.

In many countries that still have low or intermediate urbanisation levels and that are currently urbanising rapidly, the coming decades will shape how their cities will look for a long time into the future. This offers tremendous opportunities, but also tremendous challenges. Decisions taken today will have lasting consequences for the urban lives of many generations.

Within the OECD, most countries have passed the peaks of their urbanisation processes and some have already reached urbanisation levels where little further growth in the urban population can occur. Between 70% and 80% of the OECD population already lives in urban agglomerations. Even if the entire remaining rural OECD population would move to urban agglomerations by 2100 – an unlikely prospect – growth rates of cities would remain well below the rates that occurred during the late 19th and much of the 20th centuries. Thus, it appears unlikely that cities within the OECD will experience prolonged periods of population growth rates comparable to those that were common in the 19th and 20th centuries.<sup>10</sup>

Despite the slowdown in long-term population growth rates, cities have not become static places. Driven by a mix of cultural, economic and technological factors, their nature is changing quickly. For most of the second half of the 20th century, suburbanisation was



the dominant trend in developed countries and many large cities lost population. However, since the 1990s, inner cities have been experiencing a revival in popularity. Twenty-five years ago, urban decline was a widespread concern among policy makers. Today, it is more likely to be unaffordable housing prices. This quick reversal shows that cities continue to change at rapid pace.

It is the task of policy makers to respond to the ongoing change that cities experience and to make sure that cities will serve their current and future residents. To do so, policy makers will have to find compromises. On the one hand, they will want to preserve what residents like about their cities. Cities are not just places where economic activity occurs, they are foremost people's homes. On the other hand, policy makers need to ensure that cities remain flexible. The ideal city of the 1960s is not the ideal city of today. Similarly, today's cities will not be the answer to the problems of future decades. Cities need to adapt to developments and change their nature. Some will grow and others will shrink, but even those that do not change in size will look different 30 years from now.

## Notes

1. See Scheidel (2008) for details.
2. See Malanima and Volckert (2010) for details.
3. See e.g. Isard (1948).
4. See e.g. McCann and Acs (2011).
5. See Parmar (2013) for details.
6. See Henderson (2010) for a discussion of this issue.
7. See World Bank (2008) for a discussion of the relationship between urbanisation and development.
8. OECD calculations based on World Bank (2014).
9. See UN Habitat (2013) for details.
10. For example, the almost sevenfold increase in population that London experienced between 1800 and 1900 equals an average annual growth rate of 2% over a 100-year period. While today some cities in developed countries have similar growth rates for short time periods, very few sustain them over such a long time period. Between 2000 and 2010, only four OECD countries (Australia, Canada, Mexico and the United States) had cities with more than 500 000 inhabitants that reached growth rates over 2% annually. In contrast, cities in developing countries have experienced much higher average growth rates over the past decades.

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## *Chapter 2*

### **The secrets of successful cities**

*This chapter analyses the characteristics of successful cities along three dimensions: population growth, economic performance and a functional organisation. First, it describes the role that location, agglomeration economies and the designation as a capital city play in determining population size. Second, it explores the impact of human capital on economic performance, investigates the relationship between city size and productivity, and shows the importance of good governance arrangements. This chapter also contains an overview of recent patterns of economic performance in cities across the OECD. Third, important factors determining the functional organisation of a city are discussed. Among the topics mentioned are appropriate governance structures, smart transport solutions and balanced land-use regulations that carefully consider the costs of restricting land use.*

## Chapter Synopsis

Successful cities typically both have high levels of economic activity that allow their residents to make a good living, and function well. What are the secrets behind the success of these cities?

The economic performance of a city is influenced by a complex set of policies on the national and local level that complement each other – or not, as the case may be. But one can identify some broad patterns regarding economic performance that hold across most cities. For example, the productivity levels of cities (and thus their gross domestic product – GDP) depend on their population size, and larger cities are generally more productive. Recent OECD studies suggest that for each doubling in population size, the productivity level of a city increases by 2-5%. This is due to several factors, such as greater competition or deeper labour markets (and thus a better matching between workers and jobs) in larger cities, but also due to a faster spread of ideas and a more diverse intellectual and entrepreneurial environment.

The share of highly educated people also has important implications for productivity levels. This is partly due to more educated people being more productive themselves. But in addition there are important spillover effects: the productivity of less educated people increases with the share of university graduates. And the benefits of size partly reflect that individuals with high human capital are themselves even more productive in the presence of other highly skilled residents. City size and human capital factors reinforce each other.

Finally, the fragmentation of a city's administration and the quality of its governance structure is directly reflected in its economic strength. Cities with fragmented governance structures tend to have lower levels of productivity: for a given population size, a metropolitan area with twice the number of municipalities is associated with around 6% lower productivity. This effect is mitigated by almost half by the existence of a governance body at the metropolitan level.

Well-functioning cities require a combination of a multitude of factors. Some are similar to those that make societies and countries function well, but a large number of factors are specific or at least have a particular relevance for cities. For example, the benefits of adequate governance structures may be particularly high in cities. This is because the very density of opportunities for contact and exchange that makes cities so dynamic and productive also implies that the actions of households and firms, as well as the interactions among different strands of public policy, typically have larger positive or negative spillover effects in cities than in less dense places. In this context, it is especially important that governance structures take the functional realities of metropolitan areas into account. Often, administrative boundaries are based on centuries-old borders that do not correspond – if they ever did – to patterns of human settlement and economic activity. Getting administrative structures right typically allows for better outcomes in most dimensions that make cities function well.

These prominently include transport planning and land-use planning, as well as the co-ordination of both processes. In particular, land-use regulations need to find the right balance between protecting existing neighbourhoods and green spaces and allowing new construction. Also, the quality of public transport provision usually increases when services are integrated. In the context of transport, it is particularly important that the incentives for car use reflect the true costs of driving a car. In most cases, this implies imposing higher taxes on driving into a city in order to account for so-called externalities such as air pollution and congestion.

## Introduction

Successful cities come in many shapes and sizes. Just as human tastes and preferences differ, the success of a city can be defined along many dimensions. Some cities are economically successful, some provide a particularly good environment to raise children, others offer beneficial conditions for the urban poor and even others are especially environmentally friendly.

As moving into a city is a way for people to vote with their feet, population growth is a good indicator of the success of a city. However, cities can also be successful without attracting people and conversely, large cities can fail. In order to give a balanced account of what makes cities successful, this chapter focuses on three different aspects. First, it provides insights on the factors that make cities grow in population; second, it analyses factors that affect economic success; and third, it looks at issues that concern the functioning of cities.

### What makes cities big?

Population growth is one of the clearest indicators that a city is thriving. By moving into a city, people show that they prefer living there over wherever they lived before. Often this is due to economic opportunities, such as the availability of good jobs. In other cases, a better quality of life, for example because of a warmer climate or a more child-friendly environment, motivates people to move. Entirely personal considerations, such as the place of residence of a partner, play important roles, as well. In some cases, people move into cities for refuge because they are forced to flee violence or persecution elsewhere. However, even then, most people move into cities rather than to another part of the rural countryside because cities typically offer more opportunities.

When studying the history of a city closely enough, it is in most cases possible to explain fairly exactly what made people move. It is the outcome of a chain of historical developments that shaped the city as it exists today. Within this chain, each development is the consequence of previous events or actions. Consequently, the current population size is the result of those events and actions. Yet while such close-up historical examination helps to understand an individual city, it can also obscure the systematic forces that are active in shaping cities globally.

This section focuses on the systematic factors and common causes that explain why people move into some cities but not into others. It aims to discuss the mechanisms that are relevant for city size beyond individual historical episodes. A brief overview of recent growth trends of cities in OECD countries is given in Box 2.1 at the end of the section.

### *Location*

The most straightforward explanation why a city grows is its location and the geographical characteristics associated with it. There are several reasons why location matters. One of them is environmental conditions and the availability of resources. As outlined in Chapter 1, the first cities emerged in the floodplains of the Euphrat and Tigris rivers. This region is very fertile and has ideal conditions for primitive agriculture. It was only because of this locational advantage that the agricultural techniques of the time were able to produce a food surplus that was sufficient to sustain cities.

Today, food can easily be transported over long distances and agricultural yields within a region play little role in determining the location of cities. Nevertheless, for historical reasons many cities are still located near prime agricultural land. When those

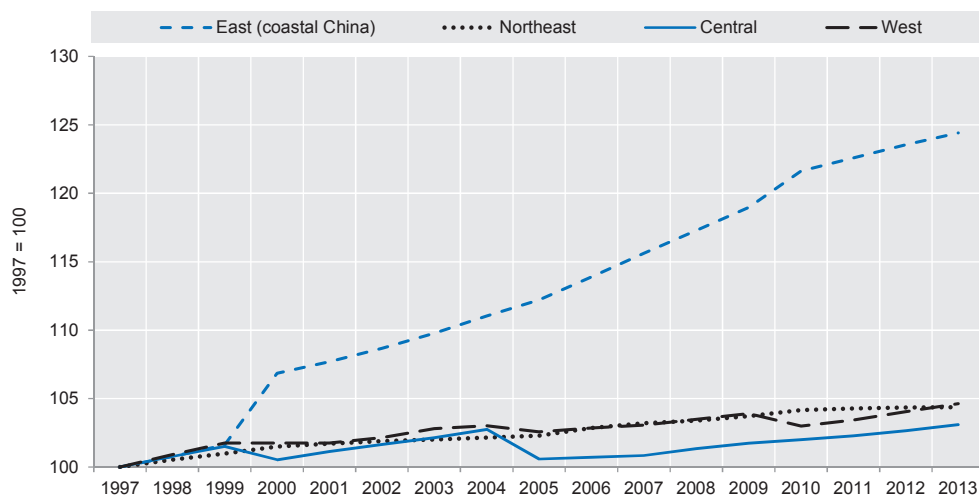
cities expand, it can create tensions on the urban-rural fringe because the agricultural land is built over with new developments.

Cities still form near sites with abundant resources. Coal mines played a crucial role in the urbanisation of many regions in the late 18th, the entire 19th and early 20th centuries. Even today, there are large cities, such as Antofagasta in Chile, that mostly owe their existence and their size to nearby mining activities.<sup>1</sup> Many more, such as Perth in Australia, are to a large degree dependent on it. Similarly, there are cities and even entire states whose population growth in recent decades is largely due to crude oil extraction.

In contrast to earlier centuries, cities based on resource extraction no longer attract much secondary industry. In the 19th century, industries such as textile and iron smelting located next to coal fields to avoid the costs of transporting coal. Today, costs of shipping raw materials are so low that there are often few incentives for other industries to locate nearby. Furthermore, the price levels in cities that rely on resource extraction are often higher than in other cities, making it unattractive for industry to move there.

Cities have long benefited from being located on a shore. Coastal locations often provide a higher quality of life and also offer economic opportunities related to shipping and tourism. In the People’s Republic of China (hereafter “China”), coastal regions have been booming since the economic opening of the country in the 1980s (Figure 2.1). Economic growth has been far higher there than in other Chinese regions and in turn has attracted millions of people. Easy access to seaports from where manufactured goods could be shipped to customers is an important reason for this phenomenon. Manufacturing companies, which form the backbone of the Chinese economy, depend on cheap, reliable and swift transport of their goods to customers overseas. As air transport is too expensive for the vast majority of goods, shipping is currently the only practical alternative. Being close to a seaport from which the goods can be shipped provides a competitive advantage by saving on the costs and time required to transport goods over land to the next port.

Figure 2.1. **Population growth in China, 1997-2013**



Source: OECD calculations based on CEIC (2014), “Macroeconomic databases for emerging and developed markets”, [www.ceicdata.com](http://www.ceicdata.com).



The attraction of coastal locations is not limited to ease of international freight transport. In the United States, for example, 39% of the population lives in counties on the coastal shoreline despite the fact that these counties cover less than 10% of the country's surface.<sup>2</sup> In contrast to China, contemporary economic factors play a lesser role behind the strong population imbalance in favour of coastal locations. Rather, it appears to be due to a mix of historical reasons and the attraction of the coast as an amenity.

Another natural amenity had a big effect on population levels of cities in the southern United States. Warm climate has attracted people to places such as Phoenix and Atlanta. Although there is some controversy how much of their population growth can be attributed to the climate and how much to other factors, such as economic policies, it appears likely that the climate is at least partly responsible. For example, economic policies and the pleasant climate may have acted as complementarities and the strong population growth would not have occurred in the absence of either of them.

Man-made location characteristics (such as being close to good transport infrastructure) are obviously also important. However, in contrast to naturally occurring characteristics, it is often much less obvious to what extent they are the cause or the effect of a nearby big city. For example, the world's busiest airport in Atlanta certainly contributed to the fast growth of the city, but it would not have been built there in the late 1970s if Atlanta had not been a big and growing metropolitan area at that time. It is difficult to determine the airport's exact contribution to the subsequent population growth of Atlanta. Nevertheless, studies show that better connected cities grow faster.

Geography was an influential factor in determining the location of cities and it still plays an important role. In many cities' history, location mattered at some point. However, more often than not, location alone is not sufficient to explain why a city has reached its current size. New York, for example, is located at the site of a natural harbour, which is also the mouth of an important navigable river. Both factors probably played an important role for the city's initial growth. However, they cannot explain why New York grew so strongly during the 20th century, when neither factor was no longer of much economic importance. During that time, rail transport had made inland waterways practically obsolete. Similarly, advances in construction methods have made natural harbours as preconditions for large ports largely irrelevant.

It is even more difficult to explain the size and location of Los Angeles, the United States' second largest city, with locational fundamentals alone.<sup>3</sup> In the late 19th century, the city had about 50 000 inhabitants and good rail connections. It was one of the more important cities on the United States' west coast, but not comparable to San Francisco, which had even better rail connections, a large natural harbour and several times as many inhabitants. In contrast to San Francisco, Los Angeles was located above oil fields that were economically important in the late 19th and early 20th centuries. However, there were many other oil fields in the United States that had similar or higher outputs and none of them gave rise to a city nearly as large as Los Angeles. While the oil industry might have had some influence on the early growth, there must be other factors that explain why Los Angeles developed into an urban agglomeration with more than 15 million inhabitants.

### ***Agglomeration economies***

An explanation why Los Angeles grew to its current size can be given by theories summarised under the label "New Economic Geography".<sup>4</sup> These theories try to explain the dynamics that make people move from one place to another and in the end determine why cities exist and how big they become. Generally, they are the most complex theories

discussed in this section and involve many assumptions and simplifications, some of which are obviously not realistic. Nevertheless, they are helpful to illustrate the key mechanisms that explain why a city of more than 15 million people develops within little more than a century at a fairly unremarkable coastal location.

New Economic Geography explains the size of cities by explaining why individuals move to them. It is based on the idea that for each city, there are factors that make it attractive and factors that make it unattractive to live there. Typically, these factors are assumed to be economic, but they can also include any other aspect that affects the quality of life. Jointly, they determine the overall attractiveness of a city. Obviously, the more attractive a city is, the more people want to live there. But there are two more mechanisms that determine the population of cities. First, it is not only the attractiveness of a city itself, but also the attractiveness of all other cities in a country that determines where people move. Second, the attractiveness of a city depends directly on its size, i.e. it changes when a city grows or shrinks.

Cities exist because there are economic factors that make it beneficial for firms and households to be located close to each other. For example, transport costs are lower if businesses operate within short distances. For this reason, it can be often observed that suppliers cluster around large manufacturing plants. Of course, the incentive for a supplier to move to a particular location increases if there are more manufacturing plants at the location. As a consequence, large cities that already have many businesses attract more and become even larger in the process. Incentives to minimise distance can arise from other factors than transport costs, e.g. businesses might locate close to each other because it makes face-to-face meetings easier. The mechanisms that make it beneficial for businesses and workers to be located close to each other are often summarised under the name agglomeration economies.

If there were only reasons to be located close to each other, one should expect that over time everybody would live in one giant city. As this is not the case, there must be forces that counteract the mechanisms described above. The predominant economic factor in this respect is the price of land. The higher the demand for land in one city, the more expensive it will become. At some point, the higher costs for land will offset the economic benefits of being located in the city and businesses will stop moving there.<sup>5</sup> Furthermore, factors such as air pollution or congestion increase when cities become larger and also offset the benefits of being close to each other.

Because the forces that make cities attractive or unattractive can be self-reinforcing, even a small initial change might have large consequences. A single business that moves into a city can make it more attractive for others to follow. If other businesses move in, this might induce still more to follow and so on. In the case of Los Angeles, it appears likely that the construction of transcontinental railways and the discovery of oil in the late 19th century started a virtuous circle that created a metropolitan area with 15 million inhabitants.<sup>6</sup> If the agglomeration economies behind this virtuous circle suddenly stopped working, estimates suggest that almost 80% of the jobs in Los Angeles would eventually disappear.<sup>7</sup>

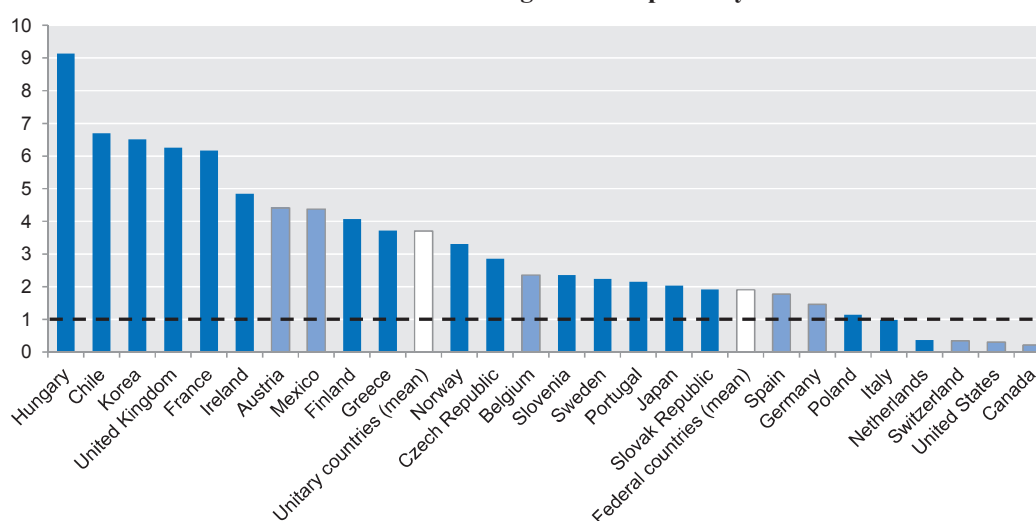
### ***Capital cities***

Another characteristic that strongly influences the population of a city is role of administrative and political centre of a country. Five of the 10 largest cities within the OECD are capitals and in 26 of the 34 OECD member countries, the capital is also the largest city (Figure 2.2).<sup>8</sup> Abstracting from the fact that governments often choose big

cities as capitals, there are several reasons why the designation as a capital makes a city grow. First, governments are big employers that provide many well-paid jobs in the public administration. They also attract other organisations, such as newspapers and lobby groups, which also provide jobs. Of course, many of the employees will bring their families with them, which further increases the number of people who live in a city because it is the capital. In addition to those people are the people who provide services for government workers, for example in schools and restaurants. Taken together, the presence of these people partly explains why capitals are larger than comparable cities.

To some degree the size of capital cities is also due to what economists call rent seeking. Rent seeking consists of legal or illegal activities that benefit businesses or individuals without adding to the overall amount of wealth that is produced. Typical examples are the lobbying for favourable regulation or the bribing of an official to be awarded a contract at excessive prices. Even though rent seeking behaviour can be unrelated to government activities, in practice it is very common that it focuses on the government.

Figure 2.2. **Ratio of the population of the capital city of a country relative to the largest non-capital city**



*Note:* This figure shows the population of the capital city divided by the population of the largest non-capital city. Most capital cities are more than twice as large as the largest non-capital city in the country and sometimes more than six times as large. Federal countries are shown in light blue.

*Source:* OECD calculations.

Rent seeking is especially strong in authoritarian countries. Non-democratic regimes have relatively more resources to disburse because they do not face the checks and balances present in democracies. Because the population in the capital often forms a power base of these regimes, disbursement of rents is especially concentrated in the capital city. This attracts more people to the capital and is reflected in the data by the fact that the share of the population of a country that is living in the main city is approximately 50% larger in non-democratic countries than in democratic countries.<sup>9</sup>

In democratic countries, evidence suggests that capital cities are particularly large whenever the political system is strongly centralised. Figure 2.2 shows that unitary countries tend to have capitals that have larger relative populations than federal countries (light blue bars). While it could be that federal countries place their capitals in smaller

cities, the pattern is consistent with the explanation that capitals that host more powerful governments tend to become larger.

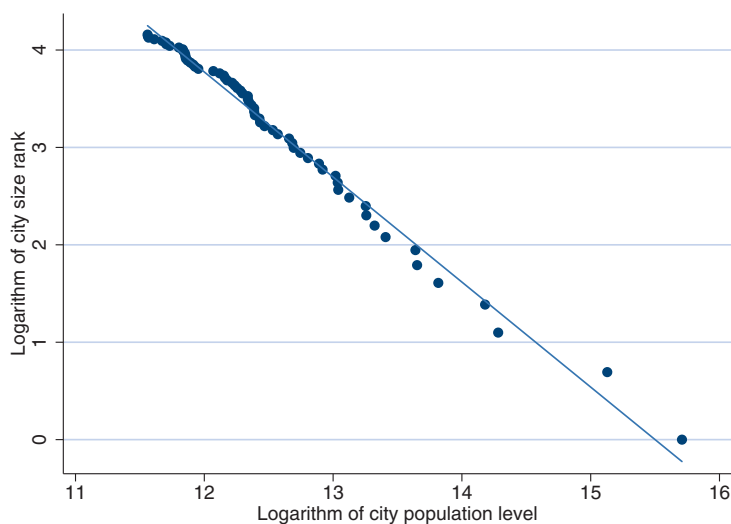
Just as any other factor that determines population size, designating a city as the capital does not affect its population levels instantaneously. Rather, it will take several decades until the full effect is realised. After the German reunification, Berlin became once again the capital of Germany in 1998. Nevertheless, population levels were nearly stagnant over the following decade. Although Berlin's population is increasing again, its population growth rate is still below that of some other German cities, for example Munich. This might also be due Germany's federal system and the political importance of the different state governments.

### *Random growth*

A very strong statistical regularity called Zipf's law motivates another explanation for city growth. In the context of cities, Zipf's law predicts that the largest city of a country has twice as many inhabitants as the second largest, three times as many as the third largest and so forth. From this, the relation of population levels of all other cities to each other follows. For example, the tenth-largest city must have one-tenth less inhabitants than the ninth-largest city; the eleventh-largest city must have one-eleventh less inhabitants than the tenth largest, and so on.

This simple relationship holds with surprising precision in most countries. Sometimes, the two or three largest cities are outliers, but generally all other cities above 100 000 inhabitants, accurately fit the described pattern.<sup>10</sup> Zipf's law is not a recent phenomenon but holds at least for the past 100 years and maybe even longer (the lack of good population data for earlier centuries makes it difficult to verify).

Figure 2.3. Zipf's law for Spanish cities



*Note:* The nearly linear relation between the logarithmic population and logarithmic rank of a city is a graphical expression of Zipf's law.

*Source:* OECD calculations based on INE (2015) "Municipal results", Population and Housing Census 2011, Instituto Nacional de Estadística, [www.ine.es/jaxi/tabla.do?path=/t20/e244/avance/p02/11/&file=1mun00.px&type=pcaxis&L=1](http://www.ine.es/jaxi/tabla.do?path=/t20/e244/avance/p02/11/&file=1mun00.px&type=pcaxis&L=1) (accessed 18 November 2014).

The strength and universality of this statistical relationship is difficult to explain and its causes are not yet fully understood. There are few theoretical models that predict such a pattern and it is not possible to create such a regular population distribution across cities based on the explanations discussed so far.<sup>11</sup> However, it is exactly what would occur if annual growth rates for cities were determined by a random statistical process. In non-technical terms, such a process would be similar to a lottery that would occur yearly for all cities and determine their growth rates. Every year, a city would receive a new individual growth rate. While the actual rates that are randomly chosen are different for all cities, the odds of receiving a particular growth rate are identical. If such a process is simulated for all cities in a country, the pattern that emerges after some time is almost identical to the one that can be observed in reality.<sup>12</sup>

Nevertheless, random growth processes do not seem to be a satisfying explanation of city sizes for two reasons. First, there is no obvious mechanism that explains the existence of such processes and second, a random nature of city growth is contradicted by the many non-random explanations that can be found for city sizes.

A possibility to reconcile random growth theories with more meaningful explanations of city growth could be to assume that they matter over different time horizons. Whereas over the centuries, city growth might resemble the outcome of random processes, over shorter time periods it is driven by more tangible factors. This idea is supported by results that show that changes in population levels remain persistent long after the factors that caused them have disappeared. Thus, even events that appear from today's perspective as mere accidents of history still influence population levels.

For example, in North America during the 17th and 18th centuries, cities formed at portages along rivers. At these sites, rapids made shipping impossible and cargo had to be transported for short stretches (usually not more than a few kilometres) over land. The labour-intensive nature of portage attracted workers and the required unloading of all goods invited trading at these sites. In the early 19th century, locks were built and ships could bypass many rapids without any need for unloading. Soon after, emerging rail transport made shipping on most rivers economically irrelevant. Nevertheless, the cities along portage sites not only still exist, they are also still larger than comparable cities in other locations.<sup>13</sup>

Even if the reason for a population increase lasts only a few years, its effects can persist long after. In the aftermath of World War II, refugees and expellees from East Germany were only allowed to settle in some parts of West Germany. In these areas, they increased population levels by more than 20%. The restrictions to free movement only lasted from 1945 to 1949; afterwards people could move freely. Nevertheless, the difference in population levels between areas where refugees could settle and areas where they could not settle remained almost unchanged for several decades afterwards.<sup>14</sup>

The high persistence of population levels means that events long in the past still have an influence on today's city sizes. For example, the initial growth of cities at portage sites was almost certainly due to a combination of geographical advantages and agglomeration effects. However, looking back in history, it seems more like a historical accident that was essentially random. Thus, it could explain why a population pattern can be observed that – despite the obvious importance of locational fundamentals and agglomeration effects – resembles the outcome of a random process.<sup>15</sup>

One of the implications of random growth explanations would have been that policy makers have little control and hence little responsibility for the development of cities. The argument above shows that this is not necessarily true. It implies that random

growth patterns dominate only over very long time periods. Over time horizons that matter for most people (i.e. a few decades), other factors are at work, which can be influenced by policy. Thus, at least over such time horizons, city size is not only determined by good fortune but also by good policy.

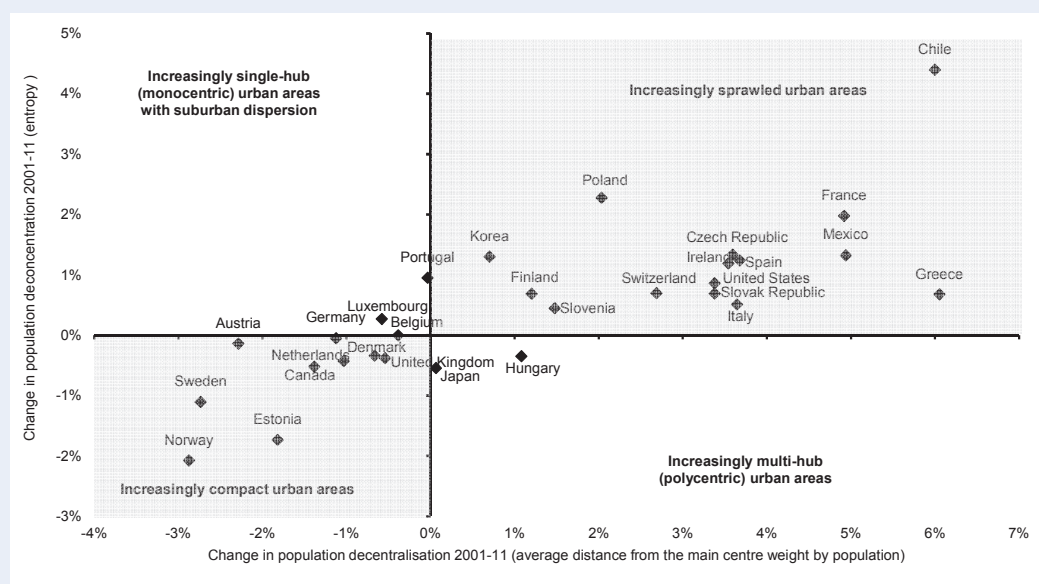
### Box 2.1. Population growth and urban form in OECD countries

Large cities have become more attractive in the last 10-20 years. This is reflected in accelerated population movements into large urban agglomerations since 2000. Since then, most metropolitan areas with more than 500 000 inhabitants have had stronger population growth than the countries they are located in. Especially the disproportionate population growth of the very largest urban agglomerations is a reversal compared to earlier decades. From 1970 to 2000, the share of population living in metropolitan areas above 5 million inhabitants declined. In contrast, between 2001 and 2011 it increased by 2%.

No common trend regarding urban form can be observed between 2001 and 2011. Across the OECD, population growth was on average stronger in the commuting zones of the metropolitan areas than in the urban cores (especially in Chile, Poland, and France). Nevertheless, a number of countries observed the opposite trend (Norway, Estonia, and Sweden) and had stronger population growth within the urban centre.

A similar picture emerges when looking at concentration and centralisation indicators. No clear trend is visible across the OECD. Concentration indicators measure whether people live in dense settlements or widely dispersed throughout an urban agglomeration. Centralisation measures the degree to which people cluster around a single centre in a metropolitan area. When concentration and centralisation both increase, a city becomes more compact, whereas a decrease in both measures points to urban sprawl. An increase in concentration together with a decrease in centralisation suggests that cities become more polycentric. The figure below shows the average changes to concentration and centralisation in different OECD countries.

#### Change in centralisation and concentration of population in metropolitan areas, 2001-11



Source: Veneri, P. (2015), "Urban spatial structure in OECD cities. Is urban population decentralising or clustering?", *OECD Regional Development Working Papers*, OECD Publishing, Paris, forthcoming.

## What makes cities rich?

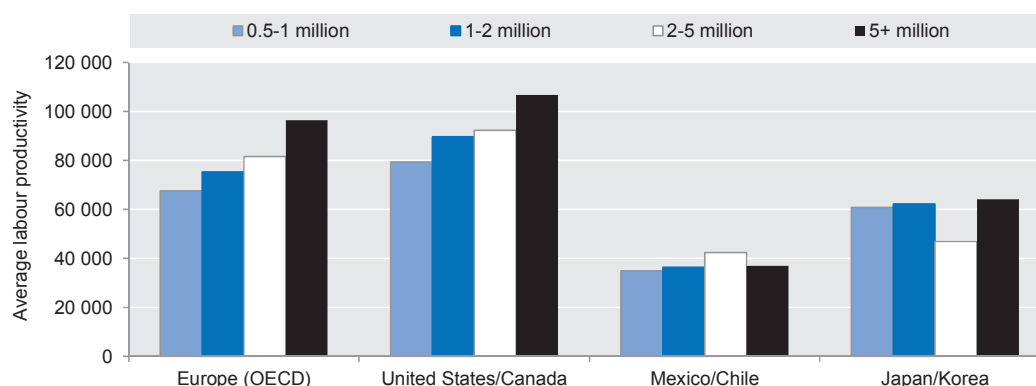
*“Some places will, however, be left behind. Not every city will succeed, because not every city has been adept at adapting to the age of information, in which ideas are the ultimate creator of wealth.”* (Edward Glaeser, 2011)

Economic prosperity and population growth are linked in a multitude of ways, many of which are discussed throughout this volume. Yet, the underlying causes and the processes that make cities rich and that make them big still have certain distinct features.

Productivity is the most important determinant of economic success. If two cities have the same number of workers, invariably the more productive city will be the richer one. Therefore, this section starts out examining economic productivity levels in cities. Most importantly, it provides insights into the fundamental reasons underlying the existing patterns of economic strengths across cities, both within and across countries. Thereafter it looks at recent economic growth in cities, disentangling its drivers. Within limits, this should allow the reader to form some idea about future economic developments in the cities she or he cares about. This section focuses exclusively on economic outcomes; the equally important question of how economic strength translates into well-being is examined in Chapter 3.

Productivity depends on a multitude of factors. Some are related to national policies, such as labour market regulations or tax systems. Others are due to local characteristics, such as the quality of infrastructure, the sectoral composition of the economy and the quality of local institutions. Even though those characteristics are specific to individual cities, one can observe important regularities as regards their impact on productivity. In particular this section shows that larger cities tend to be more productive.

Figure 2.4. **Larger metropolitan areas are more productive, 2010**



Source: OECD calculations based on OECD (2014a), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014).

### ***Productivity and human capital***

Human capital levels in a city are a strong determinant of its productivity. More educated people tend to be more productive – which is reflected in higher wages.<sup>16</sup> As people with higher education levels tend to live in larger cities, these cities are usually more productive. A high share of well-educated residents benefits a city not only because

highly educated people are, on average, more productive themselves. A higher share of educated people also raises the average productivity levels of less educated residents.

### Box 2.2. What are the benefits of attracting highly educated people?

The attractiveness of cities for specific groups of the population has many facets. While some of them – including weather and location – are beyond the control of policy makers, many others are closely connected to policies, and as such amenable to change. Having good quality higher education institutions can help, as graduates often stay on after their studies if there are job opportunities. There are also likely policy complementarities here, as higher education institutions are more likely to benefit the economic performance of a city if students consider it attractive to stay in the city (or at least do not perceive the city as particularly unattractive) and can find adequate jobs there.

An influential study finds that for a ten percentage point increase in the share of university educated population, the productivity of non-university educated residents rises by 5-6% (Moretti, 2004). Other studies estimate the effect to be somewhat smaller, but few doubt its overall existence and general importance. A recent OECD study argues that it is in the range of 3-4% (Ahrend et al., 2014). These results were widely popularised in the early 2000s and provided an argument for cities to improve their economic fortunes by trying to attract highly educated professionals.<sup>1</sup>

However, more recently, mounting evidence suggests a more complex picture. Although a higher share of highly educated workers raises the wage of less educated workers, it also leads to an increase in cost of living that can outweigh the increase in wages (see Chapter 3 for a further discussion of this argument). On the one hand, policies to attract highly educated professionals increase overall productivity levels of cities and will foster economic growth. This benefits highly educated workers, but also leads to more opportunities for poorly educated workers. On the one hand, not every poorly educated worker benefits from improved economic opportunities and the rising costs of living will be a burden to them.

*Note:* 1. See for example Florida (2003) as one of the best-known works in this context.

*Sources:* Ahrend, R., E. Farchy, I. Kaplanis, A.C. Lembcke (2014), “What makes cities more productive? Evidence on the role of urban governance from five OECD countries”, *OECD Regional Development Working Papers*, No. 2014/05, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz432cf2d8p-en>; Florida, R.L. (2003), *The Rise of the Creative Class: And How it's Transforming Work, Leisure, Community and Everyday Life*, Basic Books; Moretti, E. (2004), “Workers’ education, spillovers, and productivity: Evidence from plant-level production functions”, *American Economic Review*, Vol. 94, No. 3, pp. 656-690.

### ***Productivity and city size***

Agglomeration economies, which were already mentioned in the previous section, tend to make larger cities more productive. Importantly, agglomeration economies are independent from effects due to a different composition of the workforce in different cities. As mentioned above, larger cities tend to attract more educated workers and this tends to raise their productivity levels compared to smaller cities. However, on top of this effect, other mechanisms exist that increase productivity levels in larger cities even further.

In order to clarify the point, it is useful to provide a hypothetical example. If it were possible to pick a random person from a small city and relocate that person to a larger city without changing his or her characteristics, the person would, on average, be more productive in the larger city. This is not dependent on the individual characteristics, such as the occupation, of a person. The effect would occur no matter whether the randomly picked person worked in a high-skilled or in a low-skilled occupation. This is primarily



due to two reasons. First, more jobs exist in larger cities, which allows individuals to find positions that better match their personal strengths. Second, firms in larger cities tend to be more specialised and more innovative, which raises the productivity of their workers. The mechanisms behind these agglomeration economies are described in more detail in Box 2.3.

### Box 2.3. Understanding agglomeration economies

The mechanisms that create agglomeration benefits can be broadly split into three groups: sharing, matching and learning. The outline below follows Duranton and Puga’s contribution to the *Handbook of Regional and Urban Economics* (2004) and builds on a long history of research, with early discussion of the concept of agglomeration benefits ranging back to the 19th century economist Alfred Marshall and his “Principles of Economics” (Duranton and Puga, 2004; Marshall, 2009).

Sharing of facilities or inputs by a large number of firms is one way of creating critical mass. The provision of certain goods or facilities requires a critical mass of beneficiaries. For example, branching a river to provide a constant stream of fresh water for an industrial site involves large fixed costs that are only worth paying if there are enough firms benefiting from this investment. A similar argument applies to the provision of specialised goods and services. Specialisation creates gains, but also requires a large enough demand to sustain the business model.

Larger labour markets result in better matches between employers and employees. A better match means that the person who is hired for a job is better suited for his or her position and hence more productive. Most people tend to look for jobs primarily within their city. In larger cities, they have more choice between different potential employers and are more likely to find a matching one.

Another cause that is often considered to be relevant are so-called technology spillovers. Businesses tend to learn from other nearby located businesses about the latest production methods. In larger cities, more businesses that are similar to each other exist. Therefore, there are more opportunities for them to learn about the most efficient production methods and to adapt accordingly.

In addition to these main mechanisms, agglomeration benefits are often thought to also be related with higher “connectivity” of individuals in larger cities, and to possibly arise in the context of higher levels of “knowledge-based capital” (intangible assets) in enterprises located in larger cities.

Lastly, a larger number of businesses also increases the level of competition within a city. Fiercer competition ensures that unproductive businesses leave the market, which increases the average level of productivity within a city and raises its GDP.

*Sources:* Duranton, G. and D. Puga (2004), “Micro-foundations of urban agglomeration economies”, in Henderson, J.V. and J.F. Thisse (eds.), *Handbook of Regional and Urban Economics*, Vol. 4, Ch. 48, pp. 2 063-2 117; Marshall, A. (2009), *Principles of Economics: Unabridged Eighth Edition*, Cosimo, Inc.

Jointly, agglomeration economies can have large effects. Recent OECD estimates suggest that productivity increases by 2-5% for a doubling of population size, which is in line with comparable studies for individual countries.<sup>17</sup> While this figure may not seem large, it implies that, on average, productivity increases by more than 20% when comparing urban agglomerations of 50 000 inhabitants with a metropolitan area such as Paris. Such effects are particularly relevant for today’s rapidly urbanising countries, where urban growth at such a scale is occurring in several instances.

In the context of agglomeration economies, the connectedness of cities also plays an important role. In addition to own population size, proximity to nearby populous cities

affects positively the productivity of a city, implying that cities benefit from the agglomeration economies of their neighbours. If the population within 300 kilometres (weighted by distance) doubles, the productivity of a city increases by 1-2%.<sup>18</sup> This is important for European cities, which are often smaller than cities in the Americas or Asia. While US cities, for example, are larger and may therefore benefit from higher agglomeration benefits, cities in Europe might benefit from agglomeration spillovers from nearby cities because they are close to each other. Put differently, the density of the European urban system, which may well be a factor in explaining the relatively small size of European cities, may thus help offset any economic disadvantages associated with smaller city size.

Figures 2.5 and 2.6 show city productivity premiums for four countries based on Ahrend et al. (2014). As it is impossible to observe productivity directly, it is approximated using the wages of workers (this is a standard procedure in the literature on productivity). For each city, the effect of the workforce composition is estimated using individual-level data that contains information on the jobs of workers and their education. The differences in wage levels between cities in the same country that cannot be explained by the jobs and the education of workers can be interpreted as an estimate of the agglomeration economies that occur in cities. The vertical axis plots the estimated productivity premium due to agglomeration economies against city size on the horizontal axis. These figures confirm that for all of these countries, productivity is higher in larger cities. In contrast, countries differ in the extent to which productivity varies across cities of similar size.

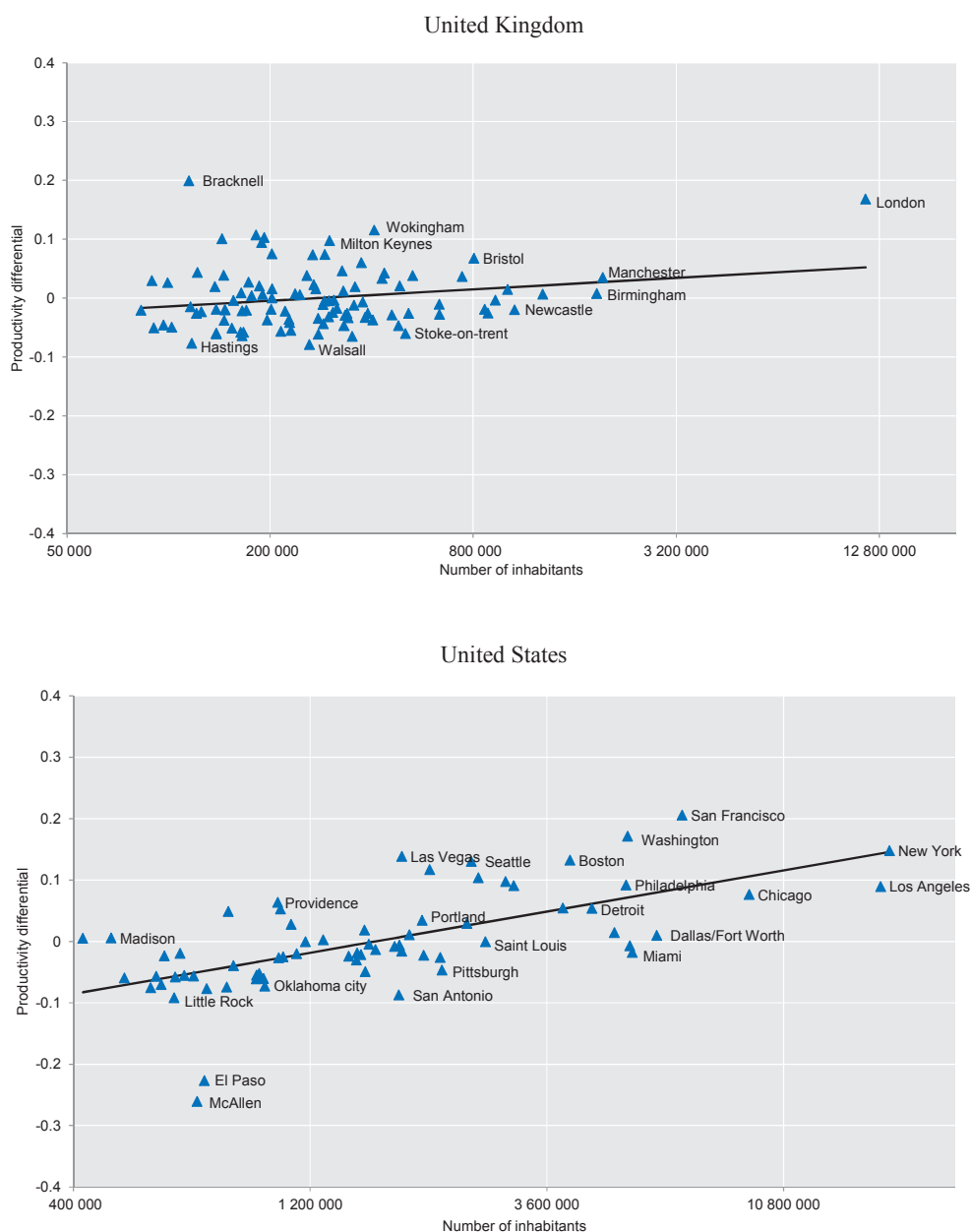
In the United Kingdom, city productivity premiums in London are larger than would be expected given its size. In contrast, after abstracting from London and its surroundings, productivity in the United Kingdom barely increases with city size. Together with human capital levels, proximity to London appears to account for much of the performance of the positive outliers. Bracknell, Wokingham, High Wycombe and Guildford – all with high levels of tertiary education – are all within a 50-kilometre radius of London, while Basingstoke is less than 80 kilometres from London. In contrast, there is no specific geographical pattern among the negative outliers, although all have education levels below the UK average.

In the United States, the productivity premium in Washington, DC and San Francisco is higher than would be expected given the size of these cities. By contrast, underperforming cities, including Chicago and Los Angeles, are often relatively sprawling cities with low employment densities and relatively fragmented labour markets. Other negative outliers include cities close to the US-Mexico border.

In Germany, the most noteworthy feature is probably the strong east-west divide, with city productivity premiums in East German cities being, on the whole, significantly below the levels found in West German cities of comparable size. It is also noteworthy that a number of mid-sized German cities have city productivity premiums at levels similar to Munich, Stuttgart and Frankfurt – the most productive large agglomerations. This probably reflects a number of highly productive small and medium-sized enterprise (SME) clusters in the manufacturing sector that – often for historical reasons – are located in these smaller agglomerations.

In Mexico, there is a clear north-south divide. Negative outliers are mostly agglomerations in the south of the country, whereas positive outliers are generally located in the north, on or close to the US border. (In contrast, as noted above, some of the negative outliers in the United States are located on or close to the Mexican border.)

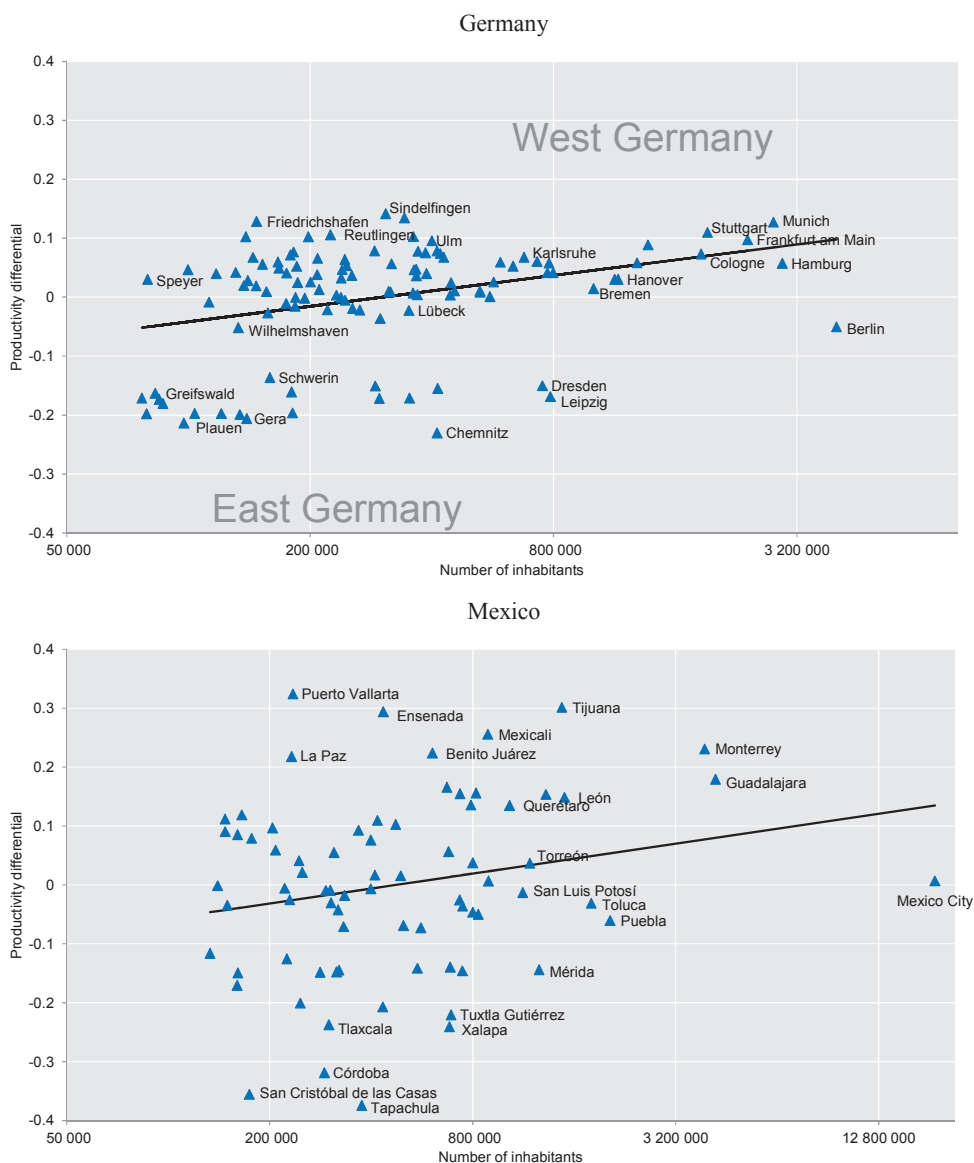
Figure 2.5. Productivity and city size: United Kingdom and United States



*Notes:* City productivity is defined as a wage premium associated with each city once the characteristics of the city workforce are taken into account. Individual wage regressions are estimated with controls for the individual characteristics of the workforce, in order to account for sorting of individuals to cities. The city is defined at the functional urban area (FUA) level, so that it allows comparison of meaningful spatial entities based on functional economic criteria rather than on administrative boundaries.

*Source:* Ahrend, R., E. Farchy, I. Kaplanis, A.C. Lembcke (2014), “What makes cities more productive? Evidence on the role of urban governance from five OECD countries”, *OECD Regional Development Working Papers*, No. 2014/05, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz432cf2d8p-en>.

Figure 2.6. Productivity and city size: Germany and Mexico



*Notes:* City productivity is defined as a wage premium associated with each city once the characteristics of the city workforce are taken into account. Individual wage regressions are estimated with controls for the individual characteristics of the workforce, in order to account for sorting of individuals to cities. The city is defined at the functional urban area (FUA) level, so that it allows comparison of meaningful spatial entities based on functional economic criteria rather than on administrative boundaries.

*Source:* Ahrend, R., E. Farchy, I. Kaplanis, A.C. Lembcke (2014), “What makes cities more productive? Evidence on the role of urban governance from five OECD countries”, *OECD Regional Development Working Papers*, No. 2014/05, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz432cf2d8p-en>.

Poorly organised cities can forfeit potential agglomeration benefits, as demonstrated by Figure 2.5 and Figure 2.6. Mexico City, for example, could have higher levels of productivity given the size of its population. London’s productivity premium is outstanding, but more striking still is the weak performance of most other UK metropolitan areas. Few of them appear to benefit from agglomeration economies.

### *Cities as centres of trade*

Larger cities are more likely to be hubs or service centres through which trade and financial flows are channelled. These flows typically require the provision of high value-added services, in fields such as law and finance. Therefore, businesses specialising in the provision of these services tend to locate in large cities, which leads to higher income levels in these cities. Businesses that target the same markets abroad tend to cluster in the same urban agglomerations. This is especially relevant for businesses that target challenging international markets. Among Spanish exporters, businesses that act in markets that are characterised by language barriers, currency risks or institutional fragility tend to be located in close proximity.<sup>19</sup>

In addition to the economically desirable activities related to trade flows and financial flows, cities that are hubs for them also attract businesses that specialise in rent extraction. As mentioned above, rent extraction are activities that enrich the actor but do not provide any value added. They can increase the income levels within a city, but do nothing to contribute to the prosperity of the overall economy of a country.

### *General trends*

Different sectors in an economy have different productivity levels. Some sectors such as research and development provide a lot of value added per worker, whereas others add comparatively little value per employed worker. The sectoral composition of the economy in a metropolitan area has strong effects on its productivity level and hence on its average per capita income.

The economy of some cities is specialised in very well-performing sectors that provide a lot of value added per worker. Typical examples of such sectors are information technology and finance, but also advanced manufacturing. Ulsan in Korea has one of the highest per capita GDP levels of all cities in the OECD because several advanced manufacturing plants are located there. Other cities are burdened with a specialisation in a sector that once performed well but is now unproductive.

The determinants of the success of individual sectors are mostly beyond the control of local policy makers. What matters in the longer term is the capacity of a city to adapt. In the short term, cities' fortunes may be influenced by basic economic trends. For example, cities in fast-growing countries are likely to grow faster, too. Similarly, cities with a larger share of activity in well-performing sectors are likely to do better than those with large productive capacities in declining sectors. However, given that fast-growing sectors usually mature and eventually decline, at least in relative terms what matters in a long-term perspective is the capacity of a city to transform itself. This depends, in no small part, on its institutions.

### *Specialisation versus economic resilience*

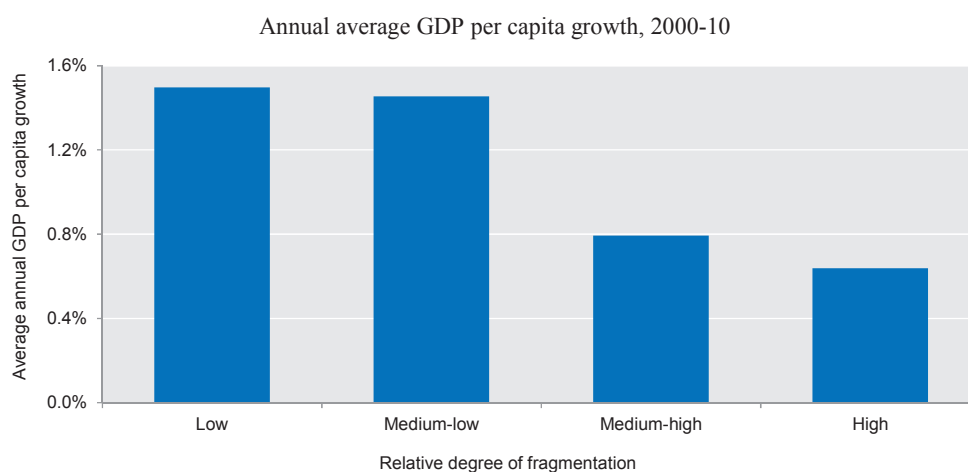
Cities may experience a trade-off between reaping agglomeration benefits and economic resilience. Economically more diversified cities are likely to be more resilient to sector-specific shocks. However, unless they have critical mass in certain sectors, they may not be able to reap benefits from clustering. Such a trade-off may be less acute for metropolitan areas of several million inhabitants, which typically can have economic activity of sufficient scale in many different sectors. In contrast, smaller cities may, out of necessity, become more specialised, implying a greater vulnerability. Consequently, institutions allowing for a quick transformation of industrial structure may be particularly

important in mid-sized metropolitan areas, as they are sufficiently large to make structural change difficult but often too small to have a sufficiently diversified economic structure.

### ***Fragmented governance***

Political administrative fragmentation may affect the economic growth of metropolitan cities. This could, for example, arise if municipal fragmentation, together with insufficient co-operation, leads to sub-optimal provision of transport infrastructure. This is not just a theoretical possibility; there are numerous cities where certain transport modes – for no apparent economic reason – end at administrative borders. The results are tangible; OECD work shows that, indeed, OECD metropolitan areas with a higher level of governmental fragmentation are less productive and have experienced lower growth of GDP per capita over the last decade (Figure 2.7). The problem of fragmented governance is discussed in further detail in the following section.

Figure 2.7. **Less fragmented metropolitan areas have experienced higher growth**



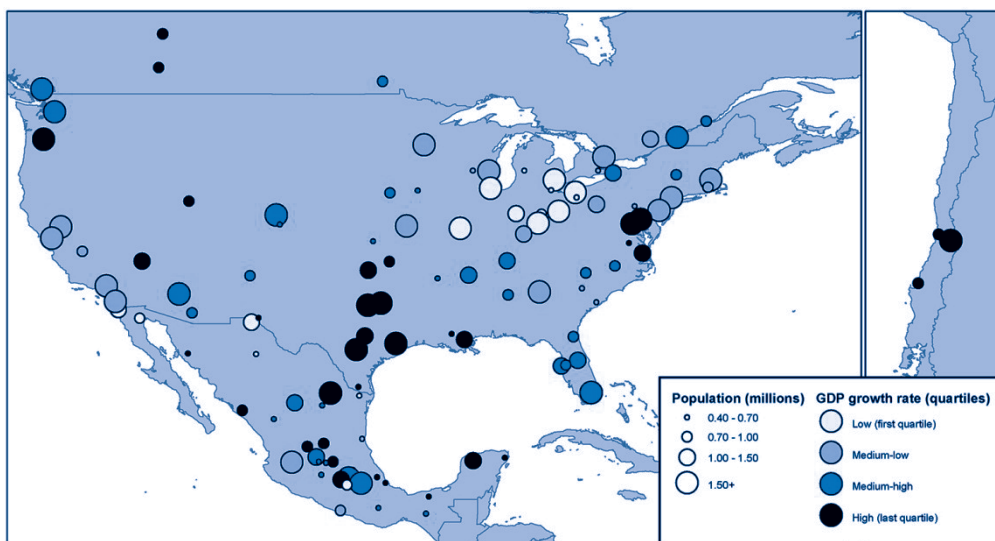
Source: Ahrend, R. and A.C. Lembecke (2015b), “Economic and demographic trends in cities”, *OECD Regional Development Working Papers*, OECD Publishing, Paris, forthcoming.

### ***Observed economic growth paths***

Over the last decade, economic performance has greatly differed among cities of comparable sizes. Unsurprisingly, the GDP growth of metropolitan areas has been higher in faster growing countries, but there has also been significant variation in growth across metropolitan areas within countries. For example, in the United States – with the exception of some coastal cities – north-eastern cities have been among the slower growing OECD metropolitan areas, while southern and south-western cities have been among the faster growing ones.

While city performance depends on many factors idiosyncratic to each city, some general trends can be established. Economic convergence (i.e. initially less-productive cities growing faster than more productive ones) was observed among the largest cities. Mirroring economic convergence across countries, metropolitan areas in richer countries experienced slower per capita GDP growth than those in countries with lower levels of per capita GDP. Also, though this effect was weaker, there was some convergence of metropolitan areas within countries, as richer (in terms of per capita GDP) metropolitan areas experienced slower growth, this effect being mainly driven by a particularly strong growth performance of cities between 750 000 and 1.5 million inhabitants.

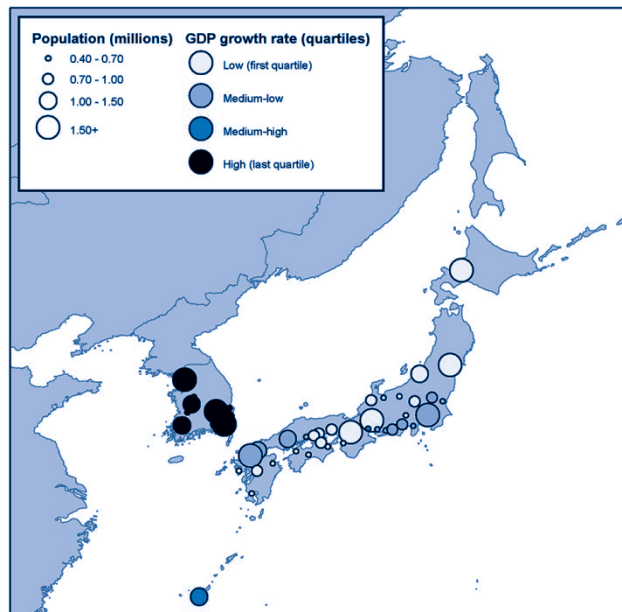
Figure 2.8. GDP growth by city: North and South America



*Note:* This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

*Source:* OECD calculations based on OECD (2014a), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014).

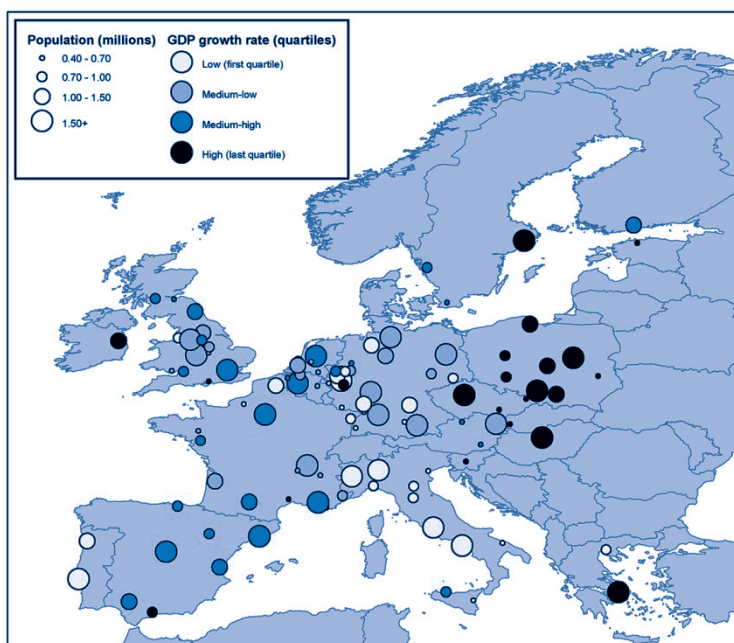
Figure 2.9. GDP growth by city: Japan/Korea



*Note:* This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

*Source:* OECD calculations based on OECD (2014a), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 4 November 2014).

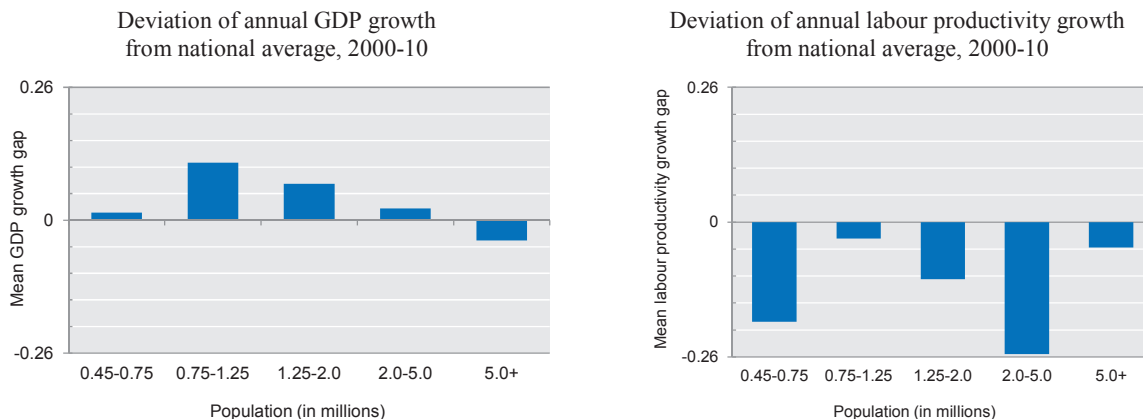
Figure 2.10. GDP growth by city: Europe



Note: This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Source: OECD calculations based on OECD (2014a), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014).

Figure 2.11. Decomposition of economic growth trends of metropolitan areas



Source: OECD calculations based on OECD (2014a), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014).

Even though productivity levels in metropolitan areas are far above country averages, over the last decade the large contribution of these cities to national economic growth has not come from above-average increases in productivity. Figure 2.11 shows that labour productivity in metropolitan areas generally grew substantially below the average of their



country, the exception being cities with around 1 million inhabitants and with above 5 million inhabitants, where labour productivity grew only marginally below the country average. The growth contribution of cities hence resulted from their sheer size, and often through strong increases in population, as those migrating to larger cities are, on average, more productive there. Strong population increases may also partly explain the unexceptional productivity growth of metropolitan areas, as the productivity of those moving to them – while higher than in other places – is (at least initially) often below the average city level but increases with time.<sup>20</sup> In other words, very dynamic cities may appear to perform less well on per capita and per worker measures of productivity even though they are helping to lift national productivity levels substantially.

### What makes cities function well?

*“The more successfully a city mingles everyday diversity of uses and users in its everyday streets, the more successfully, casually (and economically) its people thereby enliven and support well-located parks that can thus give back grace and delight to their neighbourhoods instead of vacuity.”* (Jane Jacobs, 1961)

Urban living is the dominant lifestyle in all OECD countries and shapes today’s societies. Cities are mirrors of societies and often magnify the problems that they face. As a consequence, almost everything that contributes to well-functioning societies also contributes to well-functioning cities.

It would be impossible to present everything of importance in this respect in one brief chapter. Therefore, this section has a different aim. It tries to highlight some of the factors that contribute to making cities function well. It focuses on areas that are particularly important for many cities, but does not intend to present an exhaustive overview of everything that matters. Depending on the particular challenges that cities face, some of the presented factors are more important than others. The section has an implicit focus on OECD countries. While many of the issues mentioned in it are also relevant for cities in developing countries, they are typically not the most pressing problems for them.

**NOTE:** Good governance of urban agglomerations is essential for their functioning. Readers with an interest in the topic might want to consult the OECD publication *Governing the City* (OECD, 2015a) for an in-depth analysis of metropolitan governance and several case studies that analyse particular examples of different governance arrangements.

#### ***Limited administrative fragmentation***

Prerequisite for well-functioning cities are effective governance arrangements that fit the situation in a city and its surrounding areas. Good governance structures form a foundation that helps policy makers to make the right decisions. They ensure that policy makers have the necessary information, the required powers and the proper incentives to make decisions that are best for a city. While good governance structures are no guarantee for good policies, it is very difficult to design and implement good policies without them.

Urban agglomerations are defined by their physical characteristics (such as population densities and the developed land) but also by their functional relations that are expressions of the daily lives of their inhabitants. People live in one area, commute to another and go for dinner in even another. Friends might live in the same neighbourhood, but the shopping centre is located across town and business trips begin at the airport

outside the city. For a single citizen, this is just a pattern of daily life. Taken together across all residents, these patterns make up the functional relations that define a city.

For several reasons, administrative borders in metropolitan areas rarely correspond to these functional relations. Often, they are based on historical settlement patterns that no longer reflect human activities. Due to population growth and improvements in transport technologies, formerly well-delimited villages have become part of the suburbs of a city or might even be fully integrated in the urban core. Often, no corresponding changes to administrative borders have occurred. Common reasons for the persistence of administrative borders are strong local identities and high costs of reforms, but also vested interests of politicians and residents.

Even if policy makers try to reorganise local governments according to functional relations within urban agglomerations, it is often difficult to identify unambiguous boundaries between functionally integrated areas. Urban agglomerations are not defined by a single functional relation, but by many overlapping ones. Generally, they are not identical in their geographical extent. For example, the functional relation defined by typical shopping patterns is different from the one defined by commuting patterns.

The mismatch between functional boundaries and administrative boundaries is well known and policy makers have long been aware of the co-ordination problems it might cause. In response, a wide range of metropolitan governance arrangements has emerged. While some countries have chosen to shift administrative boundaries to match the new urban form (e.g. via municipal mergers), others are encouraging municipalities to build partnerships, within a more or less institutionalised framework.

The degree of administrative fragmentation is difficult to compare across countries because their institutional frameworks vary strongly. For example, on average 0.4 municipalities per 100 000 inhabitants exist in metropolitan areas in the United Kingdom whereas the figure in the Czech Republic is 24.3 municipalities per 100 000 inhabitants. This corresponds to a 50-fold difference and obviously suggests that important differences in fragmentation exist in both countries. Nevertheless, it would be wrong to conclude that fragmentation is 50 times worse in the Czech Republic than in the United Kingdom. Differences in the institutional arrangements imply that municipalities in both countries operate very differently from each other. Therefore, their raw numbers give only limited information regarding the extent to which fragmentation poses a problem.

Despite the institutional differences between countries, it is possible to provide quantitative evidence on the effects of administrative fragmentation within metropolitan areas. Metropolitan areas have different levels of labour productivity for several reasons. Part of the difference is due to national policies, such as labour market regulations and tax systems. Some of it also depends on a different composition of the workforce because workers with different characteristics move into different cities. Another part is due to observable characteristics of the metropolitan area, such as size and governance structure. In order to analyse the role of these, an OECD study used econometric techniques to distinguish observable characteristics from other factors that affect productivity and analyse only them.<sup>21</sup> This analysis shows that for each doubling in the number of municipalities per 100 000 inhabitants within a metropolitan area, labour productivity in the metropolitan area decreases by 5-6%.

### *Governance bodies as tools for co-ordination*

How to respond to the mismatch between functional relations within a city and administrative borders has been subject to a long-standing debate. On the one side, proponents of public choice theories favour informal co-ordination between autonomous local authorities.<sup>22</sup> They argue that the most effective co-ordination mechanisms are those developing from the bottom up and that few economies of scale exist in public service provision at the local level. On the other side, proponents of centrist approaches argue that effective co-ordination among local authorities will not occur. According to this approach, municipalities within large urban agglomerations should thus be merged with each other or, alternatively, lose some of their functions to an authority that is responsible for the entire urban agglomeration.<sup>23</sup>

In order to provide insights on this issue, the OECD has conducted a survey of governance structures in metropolitan areas. The OECD Metropolitan Governance Survey aims at providing a representative overview of the governance structures that exist in metropolitan areas (see Box 2.4). It focuses on organisations in charge of co-ordinating policies in metropolitan areas – called governance bodies hereafter. The survey includes only organisations that have a clear focus on metropolitan issues and a broad mandate in terms of policy fields. It does not include single-purpose authorities such as school districts or transport authorities.<sup>24</sup>

A total of 263 metropolitan areas with more than 500 000 inhabitants were surveyed across 21 OECD countries. More than two-thirds of all metropolitan areas have a governance body formally responsible for co-ordinating policies within the metropolitan area. They exist in 17 of the 21 surveyed countries, but only in 6 of them do they cover all the metropolitan areas of the country. The survey confirms that metropolitan governance arrangements differ strongly from each other, not only across countries but also within them. It is not unusual to have some large urban agglomerations in a country that has very stringent governance arrangements and others that do not have any formalised governance structure at all.

Responsibilities of governance bodies depend on the institutional context of a metropolitan area and the country in which it is located. In many cases, the bodies have few formal powers and serve mostly as institutionalised forums to exchange information and to propose non-binding policy initiatives. However, going beyond these relatively basic approaches, a wide range of other arrangements exists with regard to institutionalised co-operation.

The most common next step towards further integration is a transfer of selected powers to the governance body. In some cases, these are very specific powers, such as the drafting of a particular land-use plan or narrow environmental regulations. In other cases, they are broader and may include many policy instruments or cover several policy fields. Sometimes, not only powers to regulate are transferred to governance bodies but also responsibilities for service provisions. Again, the scope varies from minor tasks, such as the provision of transport services for the elderly, to broad public services, such as waste disposal and the management of all public housing.

Most governance bodies have in common that they cannot be considered fully fledged local governments because they are not a legal tier of the government of a country. Although they tend to be institutionalised through national laws (or state laws in the case of federal countries), they often emerged bottom up through local initiatives. When national governments imposed governance structures on metropolitan areas, this was

generally done on a case-by-case basis and not as a systematic reform of local governance (exceptions are, for example, the city-regions in the Netherlands, which are scheduled to be abolished in 2015).<sup>25</sup>

#### Box 2.4. The OECD Metropolitan Governance Survey

Systematic studies of governance arrangements in metropolitan areas have been hampered by a lack of representative data. The OECD Metropolitan Governance Survey aims to solve this problem for the first time by collecting representative data of governance arrangements in almost all OECD metropolitan areas with more than 500 000 inhabitants. It focuses on so-called governance bodies – organisations that have the task of co-ordinating policies within the metropolitan area. Any definition of metropolitan area governance body has to consider two aspects. On the one hand, it needs to be broad enough to capture the variety of organisations that exist across the OECD and should include local solutions that differ from mainstream approaches to metropolitan governance. On the other hand, the definition needs to be narrow enough to remain meaningful.

Four criteria were used to identify governance bodies:

- **Geographical scope:** The organisation must cover the central city and a large share of the remaining parts of the metropolitan area. If its geographical scope extends beyond the metropolitan area, the metropolitan area must constitute the predominant part of its sphere of responsibility.
- **Involved actors:** National or sub-national governments must be dominant actors within the organisation or, alternatively, the organisation itself has to have the status of a sub-national government.
- **Thematic focus:** The organisation must primarily deal with issues that are directly and predominantly relevant to metropolitan area governance.
- **Thematic width:** The organisation must have a mandate that allows it to work on more than one issue that is related to metropolitan area governance.

In order to capture the variety in approaches to metropolitan governance, the definition does not put any restriction on the legal powers that an organisation must have in order to be considered a governance body. Metropolitan governance arrangements vary greatly in this respect both across and within countries. In some cases, governance bodies are powerful organisations but in many other cases, they work primarily through collecting and disseminating information and by organising regular forums for policy makers to meet.

The survey was conducted during the second half of 2013 and covered 263 metropolitan areas with more than 500 000 inhabitants. For further details see also OECD (2015a) and Ahrend, Gamper and Schumann (2014).

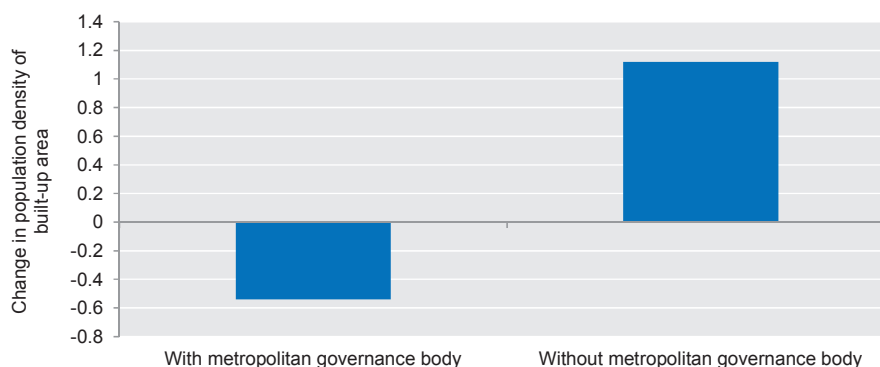
*Sources:* Ahrend, R., C. Gamper and A. Schumann (2014), “The OECD Metropolitan Governance Survey: A quantitative description of governance structures in large urban agglomerations”, *OECD Regional Development Working Papers*, No. 2014/04, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz43zldh08p-en>; OECD (2015a), *Governing the City*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264226500-en>.

Over 80% of metropolitan governance bodies work on regional development, over 70% on transport and over 60% on spatial planning. More than half of the metropolitan governance bodies are active in all three fields. This is probably due to the fact that in these fields, the demand from residents for a metropolitan-wide approach is highest. Furthermore, the positive consequences of working together are most obvious in these

areas. Transport in particular has a special status in metropolitan governance that is reflected by the fact that more than half of all metropolitan areas also have dedicated transport authorities. These are also common in countries that have otherwise no tradition of sectoral authorities or special-purpose districts.

Governance bodies can be effective tools for co-ordination within metropolitan areas. Where they exist, outcomes along two important dimensions are better than in places where they do not exist. One of the most common fields of works for metropolitan governance bodies is land-use planning. As urban sprawl is often mentioned as one of the consequences of fragmented land-use planning, it is perhaps not surprising that metropolitan areas where governance bodies exist experienced a decline in sprawl between 2000 and 2006.<sup>26</sup> In contrast, those metropolitan areas where no governance body exists experienced an increase in sprawl.<sup>27</sup> At the same time, metropolitan areas with a governance body seem to be more attractive. Their average population growth rates were 0.28 percentage points higher between 2000 and 2010 than those of metropolitan areas without governance bodies.

Figure 2.12. **Change in sprawl**



*Notes:* This figure shows estimates of the impact of a metropolitan governance body on economic sprawl over a six-year period. Sprawl is defined narrowly as the population density of the built-up area of a city. The estimates are based on a linear regression that controls for country-specific effects and population levels using 204 observations. The difference in sprawl between cities with governance bodies and cities without governance body is significant at the 99% confidence level.

*Source:* Ahrend, R., C. Gamper and A. Schumann (2014), “The OECD Metropolitan Governance Survey: A quantitative description of governance structures in large urban agglomerations”, *OECD Regional Development Working Papers*, No. 2014/04, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz43zldh08p-en>.

Metropolitan areas without governance bodies have, on average, higher levels of air pollution, as measured by the amount of particulate matters in the air (PM<sub>2.5</sub>). Possibly, this is the result of more efficient transport policies in combination with better land-use planning, both of which are central fields of work for most governance bodies.

The existence of metropolitan governance bodies might reduce problems related to administrative fragmentation. Estimates show that where they exist, about half of the correlation between fragmentation and the loss of labour productivity disappears. This is an indication that they are effective in co-ordinating fragmented local governments.<sup>28</sup> Several possible transmission channels can explain this positive effect. Synergies between different policy fields, and in particular related to spatial planning, can lead to a more efficient urban form over time. Furthermore, economies of scale in the provision of some

public services imply that these can be more effectively provided at the metropolitan level. An organisation co-ordinating the provision of these services across a metropolitan area could also improve their quality or reduce their costs, which in turn should affect productivity positively.

### ***Integrated sectoral policies: Land-use planning and transport planning***

The previous sections have discussed administrative fragmentation between municipalities within metropolitan areas and the role that governance bodies can play in overcoming possible co-ordination problems associated with it. A related issue concerns excessive sectoral fragmentation between policy fields. On a sub-national scale, this occurs frequently if different sectoral authorities or special-purpose districts are responsible for different policy fields or if responsibilities are divided between different vertical levels of government. Policies in different fields benefit from co-ordination whenever they affect each other. In practice, this means that complementarities between policy fields have to be identified. The stronger they are, the greater the need for co-ordination between the policy fields.

In the context of large urban agglomerations, land-use planning and transport planning are often the fields where the need for co-ordination is greatest. They are typical examples of complementary policy domains, where the effectiveness of policies in one field depends strongly on the decisions taken in the other field. Housing and commercial developments need to be well connected to other parts of the urban agglomeration and public transport in turn relies on a minimum population density to operate efficiently. In the absence of proper co-ordination, residential areas might be planned without appropriate provisions for public transport and without regard to the strains on the road network that they impose in the rest of the urban agglomeration. Similarly, it can be difficult to develop public transport systems if it is not assured that residential housing or commercial property along public transport lines will reach the densities required to operate an efficient public transport network.

Transport and land-use planning are frequently the responsibilities of different levels of government or of different agencies within the same level of government. Furthermore, funding for transport often comes from different public sources. The levels of government in charge of planning transport and land use are routinely not the ones providing the majority of funds for transport infrastructure. Co-ordinating policies in such constellations is difficult and governance gaps occur frequently.

Co-ordination between land-use planning and transport planning is important for all cities, but it matters especially for cities that expand in size. Generally, transport infrastructure can be provided much more cost effectively if it is built on undeveloped land rather than in already built-up areas. By co-ordinating transport and land-use planning, the required space for public transport infrastructure can be protected from other development. If this is done, the construction of new transport infrastructure can be timed to meet demand. If it is constructed at a later point in time, existing planning approval can ease the political process and the protected undeveloped space will reduce the costs of construction.<sup>29</sup>

Integrated land-use and transport planning also make it easier to develop mechanisms designed to recoup some of the costs of public infrastructure investments – so-called land-value capture tools. Public spending for infrastructure increases the price of adjacent land. Often, this price increase provides a publicly funded windfall profit to land owners

or developers. Land-value capture tools aim at recapturing these windfalls from developers in order to (partially) fund the infrastructure investment.

Tools for land-value capture differ greatly depending on the legal context of a country and the particular circumstances of individual cases. They can include land taxes, fees, pre-emptive purchase rights for local governments at discounted prices and co-development of the improved land. Often, land-value capture regulations and agreements are combined with terms and regulations regarding the characteristics of new developments. Across the OECD, the availability of land-value capture tools varies strongly depending on the national legislative framework. Where they exist, they are important instruments for local governments to finance infrastructure investments.<sup>30</sup>

### ***Integrated public transport provision***

A well-functioning public transport system is crucial for every large city. Integrated transport and land-use planning facilitates the design of an effective public transport network. While this is an important precondition for a good public transport system, it is not sufficient to guarantee effective transport services. It is also important that the existing public transport infrastructure is efficiently operated.

The term “integrated public transport” refers to systems where all aspects of the public transport provision are co-ordinated with each other. Among the advantages offered by integrated public transport systems are optimised routing and synchronised timetables between different lines and modes of transport. Other advantages are universal fare schemes with tickets that are valid across different modes of public transport and real-time itinerary information systems. All of the advantages increase the mobility within metropolitan areas by lowering travel times and improving accessibility.

Integrated public transport systems are typically managed by a single authority. In some cases, this authority is also responsible for the operational transport provision, whereas in other cases the task is delegated to sub-contractors.<sup>31</sup> The OECD Metropolitan Governance Survey has found that the share of residents who are satisfied with the public transport provision in their cities is 14 percentage points higher if a transport authority exists (Figure 2.13).<sup>32</sup> It appears likely that this is at least partly due to the better integration of public transport in these cities.

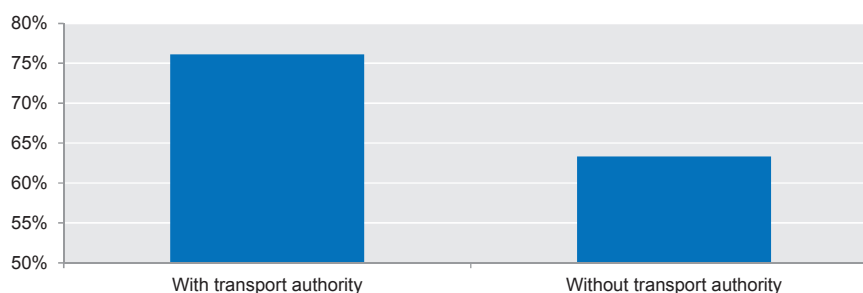
In order to be able to integrate the entire public transport system, transport authorities need to be supported by local governments and have to be responsible for all modes of public transport in a metropolitan area except for long-distance transport. In particular, they need the power to influence where and how frequently transport lines operate. If they are not operating the actual transport provision itself, they also need the power to regulate subcontractors with respect to fares and other characteristics of transport provision. Transport authorities with these powers exist in many OECD countries but are especially common in Germany, where every large urban agglomeration is covered by one.

### ***Smart road transport***

Besides public transport, individual road transport is the other major pillar of an efficient transport system in urban agglomerations. Congestion is a major problem in virtually every large city and attempts to mitigate it are ongoing almost everywhere. A mix of policies from different sectors has to be employed to fight it effectively. Some important strategies focus directly on a reduction of road traffic or an improvement in road capacity. Others aim at preventing congestion indirectly through interventions in

other policy fields. Previous sections have discussed how some of these indirectly related policies, such as requiring minimum densities for new developments, can have positive effects on congestion. This section discusses several possible interventions to limit congestion, which aim directly to decrease road traffic.

Figure 2.13. Share of population satisfied with public transport provision



*Note:* Estimates are based on the share of respondents from 37 cities in the Urban Audit Perception Survey who state that they are either “satisfied” or “very satisfied” with the public transport provision in their city. The difference between the two groups is statistically significant at the 95% confidence level.

*Source:* Ahrend, R., C. Gamper and A. Schumann (2014), “The OECD Metropolitan Governance Survey: A quantitative description of governance structures in large urban agglomerations”, *OECD Regional Development Working Papers*, No. 2014/04, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz43zldh08p-en>.

One of the most efficient methods to reduce congestion is the introduction of a congestion charge. Congestion charges ensure that motorists driving in cities pay a compensation for the negative consequences that this has for residents and other road users (for example air pollution and congestion). It also discourages some potential road users from driving and thereby reduces congestion. Congestion charges often face fierce political resistance but have nevertheless been successfully introduced in several major cities (such as London, Singapore, Milan and Stockholm) in recent years.

To be effective, congestion charges need to be sufficiently high. The exact level depends on how motorists react to the congestion charge and has to be decided on a case-by-case basis. If cities are very congested, the charge required to fully ease congestion can be substantial. Despite London’s congestion charge of GBP 11.50 per day, it is still the 9th most congested city in Europe with an average delay of 36 minutes per peak hour of driving.<sup>33</sup>

Setting congestion charges to such or even higher levels can be politically difficult because poorer people and those who have no alternative to commuting by car are disproportionately affected by them. To some degree, the political backlash can be mitigated if congestion charges are implemented in a revenue-neutral way with the extra funds being used to reduce other taxes or fees. In contrast to developed countries, congestion charges in developing countries are progressive because car owners tend to have above-average incomes.

Congestion charges can be varied according to the time that a car enters a city or the amount of pollution it emits. In Stockholm prices vary over time and are highest during the peak rush hour, but are completely free at night. In Milan, no charges are applied to low-emission vehicles, whereas high-emission vehicles are charged up to EUR 10 a day. Both types of variation in the pricing schemes are effective because they target



externalities related to entering a city by car. In the case of Stockholm it is the congestion effect on other road users and in the case of Milan it is the polluting effect on residents.

Much more widespread than congestion charges are parking charges. While they primarily affect parked cars, they also have the effect of reducing the number of cars that are driven into the city. Politically, it can be easier to increase already existing parking charges than to introduce congestion charges.

Besides congestion charges and parking charges, local governments can take other measures to limit congestion. Technological innovations, for example, can increase the traffic volume that can operate on existing road infrastructure. Adaptive traffic flow control systems that regulate traffic lights, open and close lanes, adjust speed limits and change direction signs are already used in many cities. They are efficient measures to increase road capacity and reduce congestion. They are usually much more cost effective than the construction of new roads.

In Frankfurt, for example, traffic control centres steer traffic on all major roads in and around the city. Traffic flows are monitored by cameras and sensors and reported to the control centres. Most traffic lights in Frankfurt are connected to a control centre and can respond flexibly to traffic volumes by modifying the timing of green phases. Besides ensuring smoother traffic flows, the traffic lights also limit the inflow of vehicles into the city if the maximum road capacity is reached. Thus, traffic jams occur predominantly outside the city where their negative consequences (such as air pollution) are less pronounced. Furthermore, the traffic lights automatically grant priority to buses and trams. Throughout the city, the number of free parking spaces in different neighbourhoods is displayed on signs to prevent motorists from driving around in search of a parking spot. On main routes into the city, variable direction signs are used to steer traffic flows in case of large public events and traffic accidents. On motorways around Frankfurt, it is possible to remotely open the emergency lane for regular traffic in case of high traffic volumes and to close it in case of accidents or breakdowns.

Smart technologies are paving the way for other innovations related to transport in many other cities. Individually, they often have only small impacts, but taken together they can make the transport system of a city much more effective. San Francisco, for example, is pioneering smart parking meters that adapt prices to demand. When available parking spots are scarce, prices increase to discourage people from driving into the city centre. Similarly, Madrid has introduced smart parking meters that charge varying prices according to the emissions of a car.

Cities should also pay close attention to the development of automated driving technology. Once fully developed, these technologies will allow cars to move without human input and are likely to have drastic effects on cities. Street side parking might disappear, because cars could drive autonomously to large parking lots. Innovative car sharing of autonomous vehicles could replace taxi services and compete heavily with public transport due to low prices and higher comfort. The urban form might change because autonomous cars will make long commutes less strenuous, which could increase sprawl and congestion.

Currently, prototypes exist that can drive autonomously in normal traffic under human supervision. While all major car manufacturers are working on the technology, it is too early to predict when it will be ready for widespread adaptation. Nevertheless, it appears likely that it will be within a few decades, i.e. well within the lifetime of most large infrastructure projects planned today.

Despite the potential of new technological breakthroughs, low-tech solutions still offer great potential in many cities to reduce congestion. One of the simplest solutions is to encourage people to carpool. Currently, large majorities of people commute alone to work. In the United States, for example, only 16% of commuters who commute by car share it with another person, a figure that is similar to that of most other OECD countries (AASHTO, 2014). People can best be encouraged to carpool by direct incentives, such as reduced tolls on toll roads. A solution that is particularly common in the United States is high-occupancy vehicle lanes. These lanes are reserved for cars with more than one occupant. High-occupancy lanes make carpooling attractive because they are less congested and allow for faster commutes.

Another innovative solution to urban traffic is bicycle sharing schemes that have been adapted in many cities around the world in recent years. These schemes are typically based on annual subscription that allow for unlimited free short-term rentals of shared bikes located around the city. The largest scheme within the OECD, in Paris, has approximately 20 000 bicycles distributed over more than 1 200 stations throughout the city. They are used for more than 30 million rides per year. Bicycle sharing schemes offer a fast and flexible transport option that can substitute cars for short trips. Perhaps more importantly, they also offer an uncomplicated way to start cycling for people who have not done so before. Thereby, they can contribute to an increased acceptance of cycling and help to initiate a broader shift towards it.

### ***Balanced land-use regulations: Green spaces and conservation vs. the cost of housing***

Construction in cities is heavily regulated. Typical regulations vary from place to place but often concern building height, floor space, lot sizes, built-up surface, usage and external appearance. In many cities, entire neighbourhoods are protected to preserve their character. Almost all land-use regulations are imposed for comprehensible reasons, but they always have unintended consequences, primarily in the form of higher housing costs. It is important to acknowledge the benefits and downsides of land-use regulation and to find a careful compromise between too much and too little regulation.

In order to illustrate the intended and unintended consequences of building regulations, it is useful to discuss two hypothetical scenarios. The first scenario assumes that no new construction is permitted and the supply of housing in a city is fixed. The second scenario assumes the opposite case, in which construction is permitted everywhere without restrictions.

In the first hypothetical scenario, the protection of existing neighbourhoods and of green spaces dominates all other concerns. If a strict ban on any new construction is imposed, house prices are exclusively determined by demand. As the supply of housing space cannot increase, the population of a city is essentially fixed. If more people wanted to move into the city, prices would increase until demand equals supply. The more people want to move into the city and the more they are willing to pay for it, the higher the resulting prices.

In the second case, house prices are the only concern and construction is assumed to be completely unrestricted. This is the more complex scenario. If there were no regulations at all, construction would occur as soon as the cost of building additional floor space fell below the price of the existing floor space.<sup>34</sup> In the city centres of large urban agglomerations where little free space exists, construction would occur primarily by building upwards. In contrast, in smaller urban agglomerations and in the peripheral parts

of large urban agglomerations, growth would occur not only through higher densities but also through the build-up of undeveloped land.

### Box 2.5. Challenges for cities in developing countries

While cities in developing countries face many of the same problems as those in developed countries, they often also face other challenges that have largely been solved in OECD countries. Among the problems that are specific for cities in low-income and lower middle-income economies are a lack of access to water, sanitation and electricity; a lack of systematic urban planning; and the spread of informal settlements. Insecure and unclear land tenure in those informal settlements hinders further development and makes it difficult for both inhabitants and the administration to improve living conditions in them. Public transport is often delivered privately without any formal co-ordination. Although it works surprisingly well in many instances, it cannot efficiently provide the capacity required for cities with many millions of inhabitants.

Some of the challenges can be solved by new technologies. Whereas the percentage of households with landline telephone connections is in the single digits in sub-Saharan African cities, stable cell phone connections are available even in Mogadishu in Somalia. However, technology can only go so far without improvements in governance structures. Most of the problems of cities in developing countries are at least partly due to a lack of institutional capacities and ineffective governance structures. Among experts on African cities surveyed by UN Habitat (2013), by far the most consider poor governance the most important impediment to prosperity.

Well-known economist Paul Romer proposes the establishment of so-called charter cities as a solution to the institutional challenges in developing countries. The idea behind charter cities is to create new cities on uninhabited land in developing countries and to put them under the complete political, legal and administrative oversight of an independent third-party body. By building new institutions from scratch under the supervision of external experts, supporters hope that many of the problems associated with current institutional structures in developing countries can be avoided. To implement the idea, developing countries would need to give up sovereignty over a small part of their territory. If charter cities work, they would in return benefit from having a well-run and economically powerful city nearby that could serve as a driver of growth for the entire country. However, the idea of charter cities is far from being uncontroversial. Opponents of charter cities question the political feasibility and worry about their democratic legitimacy. They also argue that it will be nearly impossible to set up an independent third-party body that is effective in running a large city. While discussions about the creation of charter cities have occurred in a few countries (i.e. Honduras and Madagascar), so far the idea has not been tested in practice.

*Source:* UN Habitat (2013), *State of the World's Cities 2012/2013: Prosperity of Cities*, United Nations Human Settlements Programme.

In a city without building regulations, competition would ensure that the price of floor space was about as high as the cost of building it. Perhaps surprisingly, land prices would not play a major role in determining it, because it would not be a limiting factor in determining how many people can live in a city. Land owners competing with each other would build more floor space as long as its price was higher than the cost of construction. Supply would increase until the price of floor space falls to the point where it equals construction costs. Because the cost of adding one more floor to a new building is roughly constant for buildings that have between 7 and 30 floors, there would be more than enough space for additional construction in the centres of all cities without significant increases in construction costs.<sup>35</sup>

The difference between construction costs and actual prices is therefore a measure of the impact of building regulations on cities. For the centres of the most expensive cities, such as London and New York, estimates suggest that building regulations are

responsible for prices that are two to eight times higher than they were without regulations.<sup>36</sup> Even in the centres of smaller cities, regulation increases prices by more than 50%. Similar considerations apply also to more peripheral areas of large cities, but the costs of regulation are more difficult to calculate because land prices and site preparation costs play a bigger role for less dense developments.

Although neither of the two hypothetical examples is realistic, they illustrate the consequences of housing policies. The first example would make housing more expensive and reduce labour mobility by making it difficult to move into economically successful cities. Such a policy would not only have negative consequences on renters and prospective buyers in the city, it would also have negative effects on the economic performance of the entire country. When workers move into economically successful cities, their own productivity increases (see previous section). Policies that make it difficult or impossible for workers to move into such cities take away economic opportunities from them and also reduce the overall GDP of the country because they force workers to stay in less productive jobs.

However, the apparently free-market based opposite solution of abolishing all building regulation does not lead to efficient outcomes. It would make housing too cheap because it would not incorporate the hidden costs of additional developments and higher densities. Open spaces in and around cities (such as parks and greenbelts) are so-called public goods. They can be enjoyed by many, but it is virtually impossible to charge for them. Therefore, public goods are not provided by private investors. Furthermore, the construction of new buildings often has so-called negative externalities on nearby residents.<sup>37</sup> A very tall building in a residential neighbourhood might reduce the quality of life for nearby residents. Similarly, a badly designed modern development in a historical city could reduce the appeal of an entire city. Even when houses are built in the outskirts of a city they have negative externalities. For example, they contribute to an increase in congestion and carbon emissions due to the commutes of their new residents.

When it is possible to impose taxes for externalities related to new developments, this is usually an efficient solution. Examples in this respect are a carbon tax and a congestion charge to account for the externalities of commuting by car (see Box 2.6). If they are set appropriately, they will limit urban sprawl without any direct building regulation because they make it more expensive to live in sprawling developments.

In other cases, it is nearly impossible to use tax incentives to account for externalities of housing development. For example, it is very difficult to use a tax to counteract the negative cultural and aesthetic consequences of badly designed new developments in historical city centres. In these cases, direct building regulation remains the only feasible way to protect neighbourhood characteristics or open spaces. Without any regulations, developers would not take any of the negative externalities into account when making decisions where and what to build.

Nevertheless, it is important to remember that building regulations can impose high social costs that are often ignored by proponents of building height regulations, minimum lot sizes and greenbelt protection. Also, the opposition to any form of regulation will not lead to desirable outcomes because new construction imposes social costs that are ignored by developers. Smart urban planning policies require careful building regulations that allow new developments to keep the costs of housing low, but minimise negative side effects. Where to draw the line has to be decided by local policy makers.

### Box 2.6. Land-use and transport policy simulations

Transport policies and land-use policies affect the quality of the transport system and whether people live in areas that are easily accessible by cars or by public transport. It can be interesting to use model simulations to examine the impact of these policies on city structure, traffic flows and carbon emissions. The simulations are undertaken with the General Equilibrium Model of the Space Economy (GEMSE) which allows assessing the general equilibrium effects of some urban policies in French metropolitan areas (for details, see <http://mythesis.alwaysdata.net/gemse>).

Following these simulations, in the Paris agglomeration, policies that directly affect traffic have a noticeable impact on modal shift and emissions, whereas policies that try to achieve such outcomes via land-use policies alone have basically no discernable positive impact on these variables. While the latter are, in certain situations, effective in densifying the agglomeration, the general equilibrium effects are such that the model predicts no discernible effects on transport flows, modal shift and environmental outcomes.

With respect to transport policies, a reduction in speed limits in the centre of Paris by on average 6-8 km/h would result in a reduction of the modal share of cars in the Paris agglomeration by 6%, as well as PM or carbon emissions in the order of 5.5%.

Similarly, introducing a congestion charge somewhat below the level currently applied in London,<sup>1</sup> with receipts being used to improve public transport in less well-served areas would lead to a reduction in car traffic by roughly 8%, with reductions in particulate matter and carbon emissions in the order of 6%. The reduction in car traffic in places where congestion charges have actually been introduced has typically been 10-30% for entering the billed zone, but usually very low for traffic outside of the zone. The simulation results for Paris, which consider all traffic, are hence roughly in line with actual experience.

In contrast, a relaxation of building height restrictions that would lead to an average increase in building heights by one floor basically would have no noticeable effects on either modal shares or emission levels. Even though such a policy would have effects on the urban form, such changes do not appear to systematically favour public transport over car use. Similarly, a policy that would penalise construction in badly connected areas by up to 15% and use the receipts to subsidise construction in better connected areas by up to 10% would have no marked impact on modal share or ecological outcomes. Improvements in congestion that would result from people moving to areas better serviced by public transport induce other people to switch to car travel because lower congestion improves the attractiveness of car use. Within the model, the only way to cause a substantive shift in the modal share towards public transport is to increase the costs of car use.

*Note:* 1. More precisely, the congestion charge is modelled to increase the cost of private car transport by 40%.

Finding the right balance between permissive and protective land-use regulation can be difficult because costs and benefits of regulation are not equally distributed. Land-use regulation that limits new construction benefits home owners at the expense of renters and prospective residents. Home owners tend to benefit in several ways. First, they can enjoy the amenity value of attractive protected neighbourhoods. Second, they benefit from the house price increases that regulation causes. Land-use regulation can also be used to prevent people with lower social status from moving into a neighbourhood (for example by prohibiting multiple dwelling units). In contrast, renters will suffer because they have to pay higher prices. Similarly, prospective residents lose out because they have to pay more to move to the city. It also limits labour force mobility and can have detrimental effects on the entire economy of a country.

As home owners are often the most vocal group of the three, local governments might be tempted to pay particular attention to their wishes and restrict construction strongly. This might have positive effects on the current residents of a city, but will have negative

effects on the rest of the country. If every local government pursues such a policy, it leads to a situation in which the negative effects outweigh the positive effects and most residents will be worse off.

Perhaps surprisingly, similar mechanisms can also explain the emergence of sprawl. Sprawl is often driven by building height or minimum lot-size regulation. Such regulation tends to be in the interest of current residents who benefit from preserving the character of their neighbourhoods. However, they also cause sprawling, land-intensive developments whose costs are borne by residents outside the direct neighbourhood.

House price increases can primarily be counteracted by new construction. In particular, it is unlikely that measures such as rent-control regulations have any lasting success in reducing the price of housing. When these measures are applied across entire housing markets, they tend to have two effects. First, they suppress private construction, thus worsening the problem. Second, they create excess demand. More people are interested in renting a home at the regulated price than there are homes available.

In such a situation, black or grey markets for housing are likely to emerge because there are people who are willing to pay more to rent a home than the regulated price. Furthermore, low-income residents (for whom the benefits of rent regulations are often introduced) tend to be especially disadvantaged by excess demand. If landlords have several applicants for a home, they tend to select those with the highest income and most stable jobs. Therefore, rent regulations might make it difficult for poorer people to find any apartment at all, whereas those who need it least benefit the most.

Alternative solutions to construction within a city are improvements to the transport network that make additional parts of the urban agglomeration accessible for commuting into business districts. Such a strategy can be successful in lowering housing costs, especially if the transport system has been a bottleneck to the growth of an urban agglomeration. Signs of an insufficient transport system are congestion, but also strong differences in the cost of housing between well-connected and poorly connected areas that are in close proximity.

However, there are two limitations to this strategy. First, the newly connected areas need to be able to absorb additional population. If no room for additional development is available in the newly connected areas, better transport will do little to lower prices. Second, accommodation in peripheral areas is only an imperfect substitute for accommodation in city centres. In recent years, living in inner-city neighbourhoods has become more popular in many OECD countries. If this trend is responsible for price increases in a city, making peripheral areas more accessible will have limited effects on prices in central neighbourhoods.

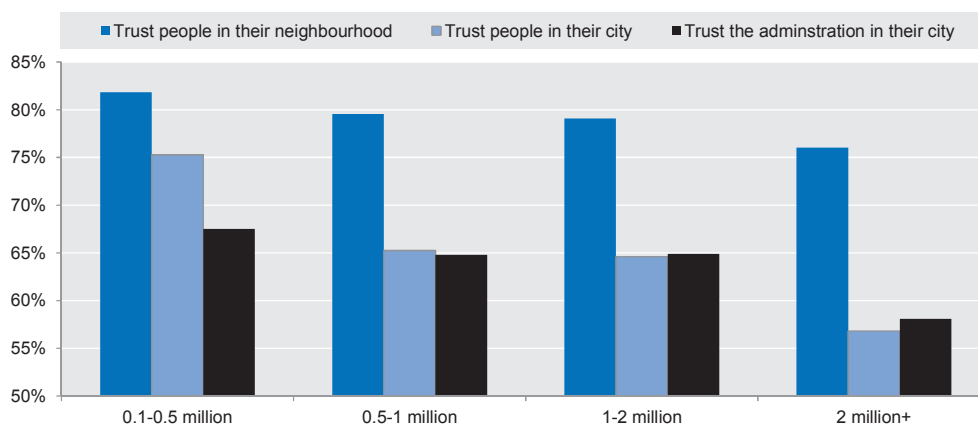
### ***Trust***

Trust is a subtle, yet important, issue for the functioning of cities. People who exhibit high degrees of trust towards others, towards the government and towards society in general tend to be happier and behave in ways that are socially desirable. In contrast, people who tend to distrust others are less altruistic and less willing to comply with rules and norms that are imposed for the common good.

Levels of trust are strongly correlated to city size. The larger a city, the lower is the degree of trust in fellow residents and the public administration. To some degree, this can be explained by objective factors such as crime rates, which are higher in larger cities. To some degree it is also due to subjective factors, such as a feeling of greater anonymity in

larger cities. Whatever the reason for this correlation, it shows that large cities especially have a lot to gain from inspiring their residents to trust others.

Figure 2.14. **Trust and city size**



Source: OECD calculations based on European Union (2013), “Quality of Life in European Cities: Annexes”, *Flash Eurobarometer 366*, [http://ec.europa.eu/public\\_opinion/flash/fl\\_366\\_anx\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl_366_anx_en.pdf) (accessed 19 June 2014).

In daily life, trust affects, for example, the behaviour when queuing to enter a bus or light rail car. In most cities, it is a convention to let people exit first before trying to enter. The benefits of this behaviour are obvious. Waiting for other people to leave a bus or train car prevents clogging the exits and saves time for everybody. Furthermore, it prevents pushing and shoving, which many people find unpleasant.

Despite the obvious advantages of letting people exit first, the convention does not exist everywhere and in cities where it exists, compliance varies. In some cities, people form actual lines to wait before entering, whereas in others people start rushing in before the last person has left. An important explanation behind the varying compliance rates concern differences in trust in fellow residents. Most people are only willing to wait in line if they trust other people not to jump the queue. After all, those entering earlier have a greater chance of getting a seat in a crowded bus. Without trusting that they are treated fairly by others, they are tempted to rush into a bus or a train car to ensure that nobody cuts in front of them. However, by doing so, they will confirm the low levels of trust that other people place in them. Thus, having low trust in other people can be a self-fulfilling prophecy because it causes behaviour that justifies low degrees of trust.

While the example of letting other people exit first might seem of minor importance, it is representative of a wide range of situations in which many strangers interact with each other. Similar situations occur, for example, in road traffic.

The aspect of trust that can be influenced most directly by policy makers is trust in government.<sup>38</sup> Trust in government is important for several reasons. If residents trust that laws and regulations are designed to benefit them, they are more likely to comply. Most laws and regulations that are imposed for the greater good affect some people negatively. Many people who are negatively affected by a law still comply with it because they believe that it is desirable if everybody follows the law. Without trusting that the laws improve society, people would stop abiding them voluntarily. Furthermore, trust in

government reduces resistance against changes initiated by the government. Higher levels of trust can facilitate reforms that might have a negative short-term impact but are beneficial in the long run, because residents are more likely to believe that a reform will affect them positively in the long run.

A special case of trust is trust in the police. Effective policing relies strongly on exchanging information with local communities. In many high-crime neighbourhoods, the police are not considered to be trustworthy because they are believed to discriminate against residents from those neighbourhoods. In these neighbourhoods, little collaboration between residents and the police occurs. As a consequence, the police might resort to tactics that further lower the degree of trust – for example ID checks and body searches without indication of a crime having been committed. As in the previous examples, an initial lack of trust reinforces behaviour on all sides that justifies the lack of trust. Thus, vicious circles can form where low levels of trust lead to even lower levels of trust.

Among all levels of government, local governments can have the strongest effects on trust because they interact most closely with residents. They have several options to influence the level of trust that the public puts in the government. Local governments are ideally placed to implement open government policies that make the decision-making process transparent and offer opportunities for residents to engage in it. Offering effective services also contributes to higher levels of trust in the government. Equally important are high integrity standards and fairness in the decision-making process. Corruption strongly reduces trust. Arbitrary decision making is equally damaging to trust.

Trust also contributes to better-functioning economies because it lowers transaction costs. These are costs that occur whenever businesses interact with each other or with customers. A typical transaction cost is the cost of setting up a contract that specifies the details of a business deal. With higher levels of trust between business partners, fewer safeguards against possible fraud and other deceptive actions have to be taken. This makes it easier to conduct business.

### ***Resilience***

In order to be considered well-functioning, cities have to respond effectively not only to daily challenges, but also to catastrophic scenarios that occur infrequently. In other words, cities have to be resilient. Resilience is a broad concept that captures several aspects and it has different definitions depending on the context. In the context of cities, it is often used to refer to resilience against natural disasters. More broadly, resilience can refer to the preparedness of a city to respond to any negative developments in the future, no matter if they are sudden events, such as natural disasters, accidents or terror attacks, or gradual developments, such as economic crises or resource shortages.<sup>39</sup>

Because every city faces its own distinct set of possible catastrophic scenarios, resilience will have a different meaning for every city. Nevertheless, several common principles for boosting resilience exist that are valid for all cities. A precondition for the development of policies to increase resilience is awareness of the potential risks that a city faces. Partly, this refers to the identification of possible risks, but it also concerns information sharing between different levels of government and different government departments. It also includes informing the public, so that private actors can respond independently to risks.



### Box 2.7. The effect of climate change on cities

Coastal cities are particularly vulnerable to climate change. In recent OECD work, global flood losses were estimated to be on average at about USD 6 billion per year for the largest 136 coastal cities. Forecasts suggest that losses could increase to USD 52 billion by 2050 due to socio-economic changes only. Taking into account climate change and subsidence, flood losses of large cities may reach USD 1 trillion if no action is taken.

While large cities in high-income countries are often ranked highest in terms of exposure to floods, particularly cities of low- and middle-income countries are ranked to have the highest economic losses. The “top” 10 cities of forecasted losses are: Guangzhou, Mumbai, Kolkata, Guayaquil, Shenzhen, Miami, Tianjin, New York-Newark, Ho Chi Minh City and New Orleans. More than half of them are predicted to experience a downward shift of their soil surface.

The population living in low-elevation coastal zones is sizeable, with more than 400 million dwellers living in flood-prone areas. The table below displays the countries with the greatest number of people residing in low-elevation coastal zones. High exposure is, however, not necessarily associated with high losses. The case of Amsterdam illustrates how advanced defence standards keep losses low. While a value of USD 83 billion assets is estimated to be exposed in the city of Amsterdam, economic average annual losses are not higher than USD 3 million.

#### Many countries have large populations living in low-elevation coastal zones (LECZs)

Country	Population in LECZs (million)	Share of total population (%)
China	143	11
India	63	6
Bangladesh	62	46
Viet Nam	43	55
Indonesia	41	20
Japan	30	24
Egypt	25	38
United States	22	8
Thailand	16	26
Philippines	13	18

*Source:* Bicknell, J., D. Dodman and D. Satterthwaite (eds.) (2010), “Adapting cities to climate change: Understanding and addressing the development challenges”, *Earthscan*, London; Hallegatte, S., C. Green, R.J. Nicholls and J. Corfee-Morlot (2013), “Future flood losses in major coastal cities”, *Nature Climate Change*, Vol. 3, No. 9, pp. 802-806. For more information see also: OECD and Bloomberg Philanthropies (2014), *Cities and Climate Change. Policy Perspectives. National Governments Enabling Local Action*, [www.oecd.org/env/cc/Cities-and-climate-change-2014-Policy-Perspectives-Final-web.pdf](http://www.oecd.org/env/cc/Cities-and-climate-change-2014-Policy-Perspectives-Final-web.pdf); and OECD (2010), *Cities and Climate Change*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264091375-en>.

## Notes

1. See OECD (2013) for a detailed review of the case of Antofagasta.
2. According to the National Oceanic and Atmospheric Administration (NOAA) of the United States (including counties located on the shores of the great lakes). See: <http://stateofthecoast.noaa.gov/population/welcome.html> (accessed 24 September 2014).
3. By some measures, the urban agglomeration of Los Angeles is even larger than that of New York.
4. Despite being called New Economic Geography, those theories have existed for more than 20 years. See Krugman (1998) for a more detailed summary.
5. The higher costs of land are not only reflected in direct land prices and rental costs, but are also transmitted through a generally higher price level in the city.
6. Another important event responsible for the growth of Los Angeles in the early 20th century was the emergence of the movie industry. This tends to support the explanation provided by New Economic Geography theories, because the emergence of such clusters is exactly what is predicted by agglomeration economies.
7. See Chatterjee (2003) for a non-technical description of the analysis behind the estimate and Chatterjee and Carlino (2001) for an in-depth technical discussion.
8. The five capital cities among the ten largest cities within the OECD are Tokyo, Seoul, Mexico City, London and Paris.
9. See Ades and Glaeser (1995) for details.
10. See Veneri (2013) for a discussion of the validity of Zipf's law across OECD countries.
11. See, for example, Hsu (2012) for a formal model that can explain Zipf's law under certain conditions.
12. See Gabaix (1999) for details.
13. See Bleakly and Lin (2012) for details.
14. See Schumann (2014).
15. See Duranton and Puga (2014) for a discussion of the possibility to reconcile the observed city-size distribution with explanations other than random growth.
16. OECD work finds, for example, that in Germany, university educated workers earn 25% more than non-university educated workers (see Ahrend and Lembcke, 2015a for details).
17. See Ahrend et al. (2014) and Combes, Duranton, and Gobillon (2011).
18. See Ahrend et al. (2014).
19. See Ramos and Moral-Benito (2013) for details.
20. See Glaeser and Maré (2001).

21. See Ahrend et al. (2014) for details. Note that fragmentation is mainly affecting productivity in cities. Recent evidence suggests that more urbanised TL2 regions are more strongly affected by the detrimental impact of administrative fragmentation (Bartolini, 2015).
22. See Tiebout (1956), Ostrom et al. (1961) and Parks and Oakerson (1989) for some of the most influential works of this school of thought.
23. See Peirce, Johnson and Hall (1993) and Savitch and Vogel (2000) for examples of this school of thought.
24. See Ahrend, Gamper and Schumann et al. (2014) and Ahrend and Schumann (2014) for details of the analysis described in this section and a formal definition of the term “governance body”.
25. See OECD (2014b).
26. No later data is available.
27. An increase in sprawl in this context is defined as a decrease in the population density of the built-up area and vice versa. It should be noted that this definition captures only one of several dimensions along which sprawl is usually defined in the academic literature.
28. See Ahrend et al. (2014).
29. See Angel (2012) for an elaboration of this argument.
30. See Smith and Gihring (2006) for a comprehensive annotated bibliography of the economics of land-value capture in the context of public transport development.
31. See Preston (2012) for a discussion of integrated public transport systems that focuses on the United Kingdom but also provides lessons also for other countries.
32. Data on public satisfaction with the transport system is collected for larger urban zones (LUZ) in Europe. The LUZs correspond to the core city and their surrounding functional urban areas.
33. See the TomTom (2014) Congestion Index for details.
34. Expressed in economic terms, construction would start if the marginal costs of constructing floor space are lower than prices.
35. See Glaeser, Gyourko and Saks (2005) for a detailed exposition of the argument for the case of Manhattan.
36. See Glaeser, Gyourko and Saks (2005) and Cheshire and Hilber (2008). The estimates in Glaeser, Gyourko and Saks (2005) refer to the early 2000s. Assuming that real construction has not increased since then and given actual house price developments, the current difference between construction costs and floor prices is likely to be even larger than the one reported for 2005.
37. See Annex A for an explanation of which externalities.
38. For example, Charron, Lapuente and Dijkstra (2014) show that “good governance”, measured by a multi-dimensional measure of quality of government, is positively associated with trust at the regional level.
39. See OECD (2014c) for a comprehensive overview of risk governance policies that increase resilience.

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## *Chapter 3*

### **How cities affect citizens, countries and the environment**

*This chapter examines the role of cities in the local, national and supra-national dimension. For each of these levels, the chapter asks the question of whether cities are “good”. The first section considers whether cities are good for their residents, with an emphasis on the trade-off between the benefits and costs that arise from agglomeration for city residents. Taking the question to the national level, the second section investigates whether cities are good for their country. This section considers the concentration of countries’ activity in cities, the role of cities for innovation and the impact of cities beyond their borders. The final section asks whether cities are good for the planet, focusing on the environmental footprint of cities.*

## Chapter Synopsis

Above all, cities are where people live. While the question whether cities correspond to the needs and aspirations of their residents has many nuances, overall, individuals generally benefit from living in well-functioning large cities, and many millions of individuals even choose to live in poorly functioning large cities rather than in small towns or rural places.

Big cities raise their workers' productivity and wages, offer a large set of opportunities and allow for an unrivalled access to amenities of all types. The benefits that larger cities provide are, however, balanced by increased costs of living, as well as non-pecuniary cost such as congestion, long commutes or air pollution. These non-pecuniary costs are significantly driven by urban form and transport infrastructure, and hence largely reflect policy choices (or the lack thereof).

Large cities – being particularly attractive for the well-educated – are often characterised by the joint presence of highly productive districts and pockets of high unemployment. Inequality tends to be higher in larger cities, and this spread between rich and poor appears to have widened in recent decades. Still, the more pressing problem may be social exclusion. Social exclusion is often concentrated among certain groups, and its impact can be highly persistent across generations. A key challenge is therefore to ensure that access to jobs, education and training, is within reach for all residents.

Roughly half of the population in the OECD lives in one of 300 metropolitan areas that account for significantly more than half of gross domestic product (GDP) produced. But the importance of cities goes far beyond simple arithmetic. Nested within countries and linked to both surrounding and distant regions, cities are hubs of productivity and innovation, goods and service providers for their local area, and they play a critical role in providing skills and environmental efficiency for sustainable and inclusive growth.

While innovation can happen anywhere, it tends to be concentrated in highly urbanised areas. Cities are thus crucial in pushing out the productivity frontier, thereby becoming drivers of a country's potential for long-run economic growth. The benefits that cities generate extend beyond their borders. These spillovers of larger cities to smaller cities and surrounding or adjacent regions are sizeable, and the positive economic impact of large cities on regions remains measurable up to a distance of 200-300 kilometres.

It is modern lifestyles rather than urbanisation *per se* that determine environmental impact. In this context, it is improbable that a wider spread of city populations across small towns and rural areas would bring any systematic ecological benefits. When taking into account the per capita contributions to soil sealing or climate change, larger cities actually perform better in a wide array of dimensions. Overall, whether or not cities are good for the planet seems to depend mainly on how they are organised. The choices made during the current wave of urbanisation will therefore have a huge and likely lasting impact on the environmental sustainability of human activity.

The empirical evidence suggests that with urban sprawl the environmental impact of urbanisation deteriorates, and many countries have the stated policy objective of limiting sprawl. This makes it surprising that in most cities, existing policy frameworks actually subsidise or incentivise it. As a consequence, people are pushed further apart than they would otherwise wish to be. Correcting such policies, including via the imposition of realistic carbon prices and congestion charges would make an important contribution towards improved environmental outcomes.

## Are large cities good for their residents?

*“Have you seen Paris?”*

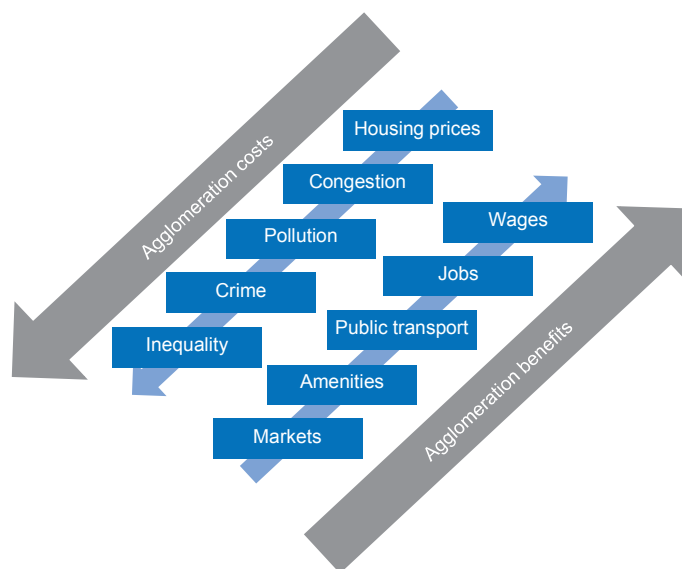
*“I should think I have! I’ve knocked about there a little.”*

*“And is it really so beautiful as they say?” asked Little Chandler. [...]*

*“Beautiful?” said Ignatius Gallaher, pausing on the word and on the flavour of his drink. “It’s not so beautiful, you know. Of course, it is beautiful.... But it’s the life of Paris; that’s the thing. Ah, there’s no city like Paris for gaiety, movement, excitement....”*  
(James Joyce, “Dubliners”, 1914)

Nearly 12 million people choose to live in London, 17 million in Los Angeles and 35 million in Tokyo, but fewer than 150 000 make their home in Hastings in the United Kingdom, Galveston in the United States or Niihama in Japan.<sup>1</sup> What is it that makes the larger cities so attractive? And if larger cities are indeed more attractive, why do smaller cities persist? The evidence presented in this section focuses on the perspective of a city’s residents, who experience both their city’s benefits and drawbacks in their daily lives. These agglomeration benefits and costs can be pecuniary, such as higher wages or higher costs for housing, but they can also be non-pecuniary, e.g. air quality or a variety of cultural amenities (Figure 3.1).

Figure 3.1. Large cities have benefits and costs



The remainder of this section considers specific benefits and costs in more detail. The first part focuses on pecuniary agglomeration benefits and costs, such as jobs, wages, housing costs and, more generally, price levels. The second looks at non-pecuniary aspects of city life, including (public) transport and congestion, local (dis)amenities, access to goods and services, and social equity.<sup>2</sup> The section concludes by considering what policy levers can be used to improve well-being in cities.

### *Jobs and wages*

As already mentioned, the presence of agglomeration economies implies that workers in larger cities are more productive. For the individual worker, some of the agglomeration economies accrue when arriving in a city, manifested in, on average, a higher wage. But some of the benefits develop only over time. For example, the worker usually also experiences higher subsequent wage growth. The reason seems to be that training, networks and knowledge gained while living and working in a large city are a valuable experience. This is supported by evidence from Spain that even when workers move away from a bigger city, their experience is still reflected in their earnings.<sup>3</sup>

Another characteristic of large cities are “deep” labour markets. This means that larger cities offer a wider range of jobs than smaller cities or rural areas, but also that there is more competition among workers for these jobs. Deep labour markets affect both wages and job quality. For example, the likelihood that a university graduate works in a job that is closely related to their field of study increases with city size and has a positive impact on both wage and job satisfaction.<sup>4</sup> Benefits from “deep” labour markets in large cities are not reserved for the well-educated but extend to all young workers. Evidence from the United States shows that in the early stages of their careers, young people in large cities are more likely to switch jobs across occupations and industries. The greater range of job opportunities allows them to move quickly into different fields until they find the right match.<sup>5</sup>

The advantage of living in larger cities can go beyond a worker’s own job, especially for highly educated workers. The versatility of the labour market helps attract households in which both partners have a university degree. The specialisation that accompanies advanced educational degrees often makes it difficult to find adequate employment for both partners in smaller communities, which results in large shares of highly educated couples in larger cities.<sup>6</sup>

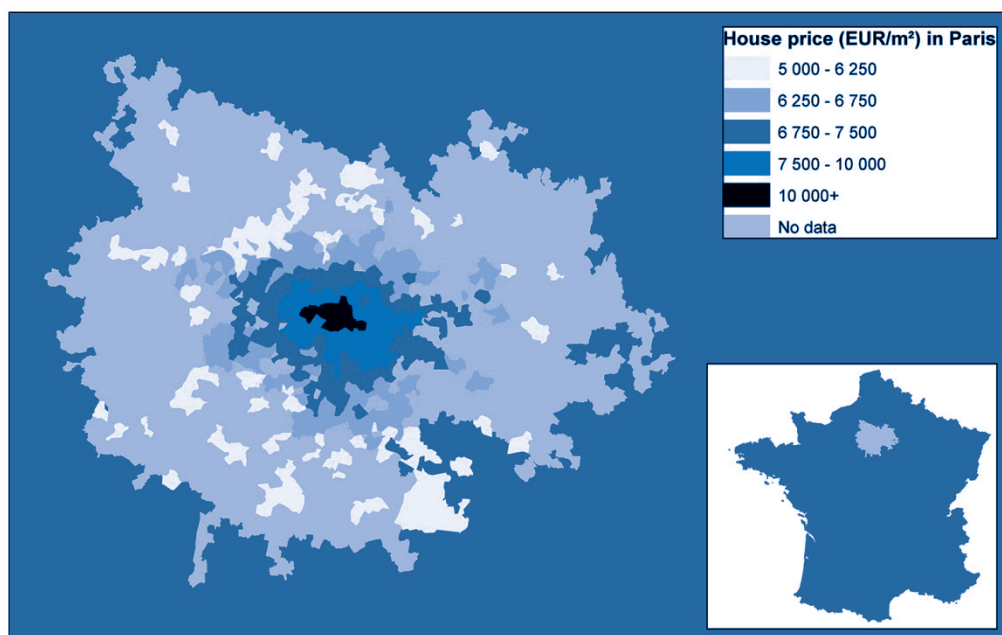
### *Housing and consumer prices*

Residential mobility across and within cities implies that – at least in the medium to long term – wage levels, urban (dis)amenities and commuting costs will be reflected in land prices and, more generally, in a city’s price level. As a result, housing prices and rents in larger cities are higher, and attractive areas within cities usually carry large premiums. What constitutes a “sought-after” area depends on the specific city and is partly determined by historical and cultural preferences.<sup>7</sup> For example, while in certain US cities property prices in inner cities are below those of suburbs, in most other OECD countries the central parts of a city are typically more highly valued. In Paris, for example, the core *arrondissements* in the city centre are (by far) the most expensive (Figure 3.2). On average, land prices of the most central properties in France are about 85% higher than the most peripheral properties in a city.<sup>8</sup>

Since businesses have to pay higher prices for inputs (such as rents and wages), local prices tend to rise with city size. However, increased local competition in larger cities is likely to squeeze profit margins and thereby partly offsets the increase in consumer prices. Empirical studies find that, on average, prices increase at the same rate at which agglomeration economies accrue.<sup>9</sup> But these studies usually also find large variation in real local earnings (i.e. city price-level adjusted earnings) across cities. One reason for this variation is that quality differences may blur price statistics. A meal in an average restaurant in Madrid’s (exclusive and expensive) Salamanca district is presumably not the same as a meal in an average restaurant in the city of Salamanca (Spain). While it is

impossible to identify systematically quality differences in services across cities, for certain goods this is possible by tracing barcodes. Barcode-based evidence from the United States suggests that 97% of the variation in goods prices across metropolitan areas is due to differences in the products purchased.<sup>10</sup> This suggests that higher prices in larger cities might indeed be partly justified by higher quality.

Figure 3.2. House prices in Paris, 2008



Source: Faucheux, L., F. Grazi and H. Waisman (2014) “Policy choices for the cities of tomorrow: Assessing the general equilibrium effects of selected urban policy measures in French metropolitan areas”, mimeo, <http://mythesis.alwaysdata.net/gemse/> (accessed 29 October 2014).

Scarcity of land and slow adjustments to the quantity of available housing are the main reasons for higher housing costs in growing cities. Creating new housing opportunities requires planning, investment and time. As a result, housing supply often fails to respond rapidly enough to increases in demand. The result is that population growth frequently leads to increases in land prices, house prices and rents. Effects can be sizeable: evidence on land prices from France suggests that for each percentage point increase in the population growth rate, the cost of land increases by 3%.<sup>11</sup> As a consequence, population growth in a city has significant distributional implications.

Home owners benefit doubly from population growth in their city, as their property becomes more valuable and their wages, on average, go up. Residents who rent their apartments, however, typically see the price of housing go up in tandem with, or even faster than, their earnings, and prospective buyers are often confronted by house price increases that far outstrip their wage increases. How much housing prices adjust, and therefore how the benefits of living in a larger city are split between property owners on the one side, and tenants or prospective buyers on the other, depends on the ability of housing supply to respond flexibly.<sup>12</sup> Flexibility of housing supply, in turn, largely depends on policies, for example, land-use regulations. This implies that the degree to which the growth of cities leads to – often undesirable – redistribution largely depends on policy choices.

### *Transport and congestion*

A key factor in explaining the large price differential for housing within cities, for example between a city's centre and its outskirts, is the trade-off between higher housing cost and longer commutes (Box 3.1). A city's outskirts often offer cheaper and larger flats or houses, but typically require spending a significant amount of time commuting to the city centre. In reality, jobs in most cities tend to be located not only in the city centre but are more widely spread. Nevertheless, it still holds that the time workers spend in daily commute increases with city size (Figure 3.3). In London, about half the workforce spends more than 45 minutes commuting, whereas in Glasgow only about 30% need that long to get to work. Of course, there are other factors that contribute to widening the gap between prices in the centre and the outskirts; for example, building height in city centres is often limited and hence expanding the existing housing stock in the centre is difficult.

#### **Box 3.1. A basic model of a city (Part I): Housing prices and distribution of people within a city**

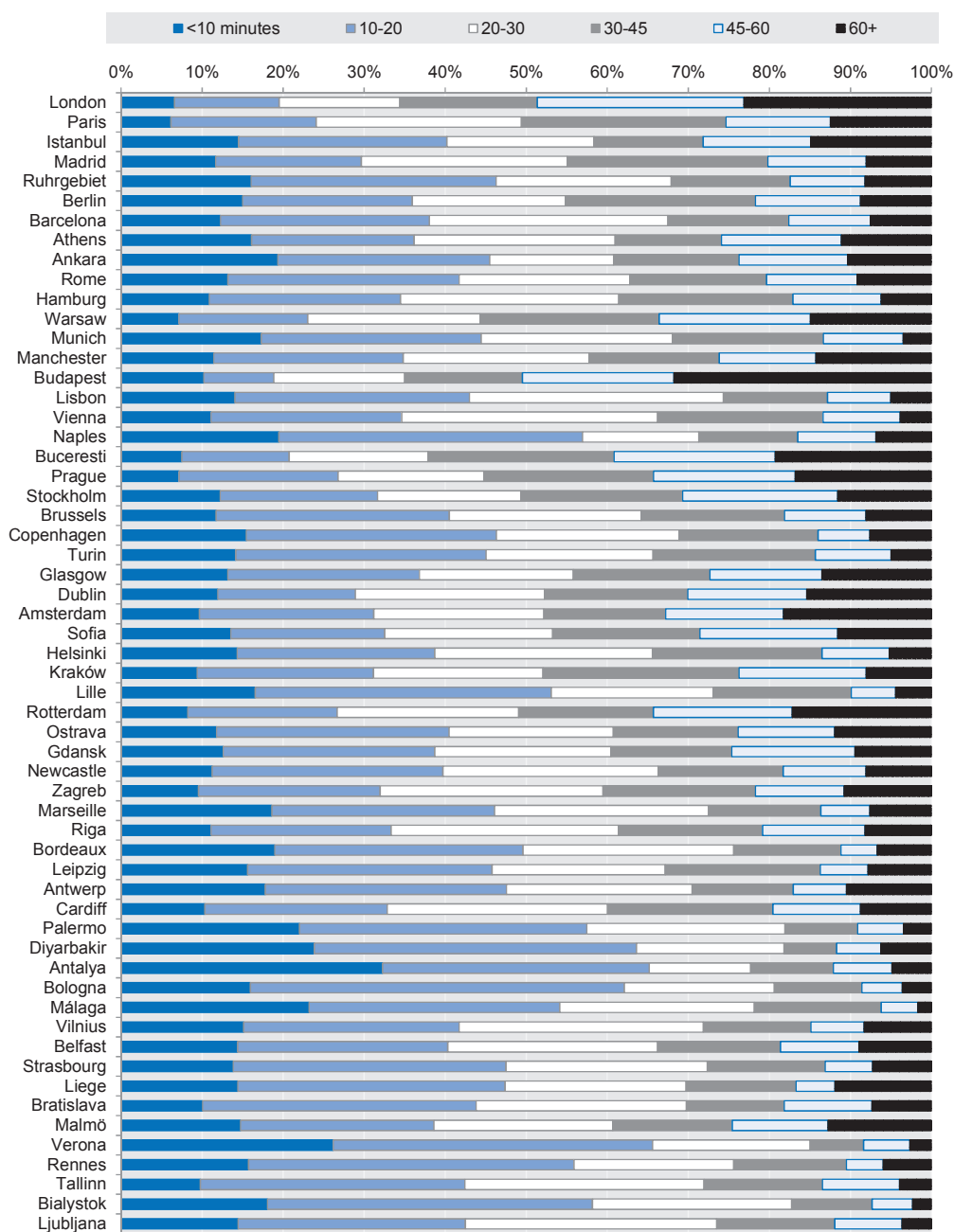
In a basic model a city – let it be called Cityville – takes the form of a large circle with a small circle in the centre. This inner circle represents the central business district (CBD), the place where every resident works. The homes of its residents are spread across the remaining area of Cityville outside the CBD. To get to work, all residents commute each day to the CBD. For simplicity, travel time is assumed to be proportional to distance, and that the only travel that occurs is the daily commute between homes and the CBD. This model obviously is a gross oversimplification, but it is useful to understand many basic phenomena of cities that apply similarly in more complex and realistic frameworks.

In this basic model, rental prices decline with distance to the CBD. More precisely, the rental price for a flat some distance away from the CBD needs to equal the rental price of an identical flat right at the frontier of the CBD, minus the monetary equivalent of the costs that individuals incur by commuting back and forth to the CBD each day (this not only includes transport fares, but mainly reflects the opportunity cost of time spent and inconvenience suffered in transport). The necessity for the condition above to hold can be seen from the following thought experiment: if, for example, flats 1 kilometre from the CBD were cheaper than the price determined as stated above, people would improve their well-being by moving from other locations to the area 1 kilometre from the CBD. This would bid up prices there until the above-stated condition is restored.

In the model, for a given income level, residents living further away from the CBD will have larger flats/houses than if they lived closer to the city centre. This results from their demand for living space going up with a lower square metre price of housing further away from the city centre. Put differently, for a given quality and size of a flat or house, occupants closer to the city centre will have higher incomes than if they lived further away. The latter comes from the fact that people with a higher income will be willing to pay a higher price for having a shorter commute. Also, when new people come to the city, if a sufficient amount of new housing cannot be built, shortage of housing will increase rents and housing prices where they settle. Given that prices in different parts of the city are connected – the more remote location being cheaper by the monetary equivalent of the additional commuting requirements to the CBD – pressure on prices in one area will translate to price increases all over the city.

Obviously, in reality richer people may live further out if for some reason, not captured in the basic model, living in, or close to, a certain area has specific attractions (e.g. the possibility to have house with garden, better schools, a location on the waterfront, etc.). This, however, is just a simple extension of the basic model, in the sense that housing prices increase with proximity to desirable places (which in the basic model is the CBD).

Figure 3.3. Time spent commuting (European Union and neighbouring countries)



Note: Cities are ordered by city size.

Source: OECD calculations based on European Union (2013), "Quality of Life in European Cities: Annexes", *Flash Eurobarometer 366*, [http://ec.europa.eu/public\\_opinion/flash/fl\\_366\\_anx\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl_366_anx_en.pdf) (accessed 19 June 2014).

While commuting time increases with city size, some cities fare much better than others in handling the daily flows. In part, this might be explained by a polycentric city structure. For example, the German Ruhr area is an amalgamation of several cities. Each city has its own urban core and supporting industry structure, which alleviates the amount

of traffic across the different centres. This is not only evident in the time workers spend commuting, but also in the amount of congestion they are confronted with. Among 59 European (greater) city regions, only 6 are less congested than the Ruhr area.<sup>13</sup>

But even in monocentric cities – those with a single contiguous core – the burden of daily commute is very diverse. In Moscow, commuters who take the car face on average 76 minutes' delay for each hour of daily commute, while in London the average time lost per hour is 36 minutes, or less than half.<sup>14</sup> Part of the difference in commuting time across Europe can be explained by past underinvestment in adequate transport infrastructure or limits set by a city's natural environment. Another part is attributable to transport policies. For example, in London the congestion charge, which is levied for car trips into London's city centre, strengthens the role of public and shared transport (see also Chapter 2).

City morphology and public transport have important implications for access to jobs. Connectivity can be a particularly critical problem for low-income workers, whose (potential) earnings typically do not allow them to live close to the areas of a city that offer the most jobs. Their “effective” labour market – the area accessible to them for daily work – is therefore highly dependent on the city structure and the city's transport networks, and might in fact cover only a small part of the city. In Sydney, for example, residents living in the outskirts can reach less than 10% of the jobs in the city within 45 minutes by car or 60 minutes by public transport (Figure 3.4). This means that from the point of view of a job seeker, living in one of these disconnected neighbourhoods, Sydney is not a labour market with 2.3 million jobs but one with less than 230 000.

Having access to public transport is one dimension of access, another is the frequency of service. For example in Daejeon (Korea), few areas outside the city centre are within five minutes' walking distance from public transport. Moreover, most of the areas that are well-connected to the public transport network are serviced only at a low frequency (Figure 3.5), which further reduces the attractiveness of public transport. High concentration of access points to public transport can shape a city structure: better connected areas are more attractive and therefore typically made up of higher income residents than comparable less well-connected areas.

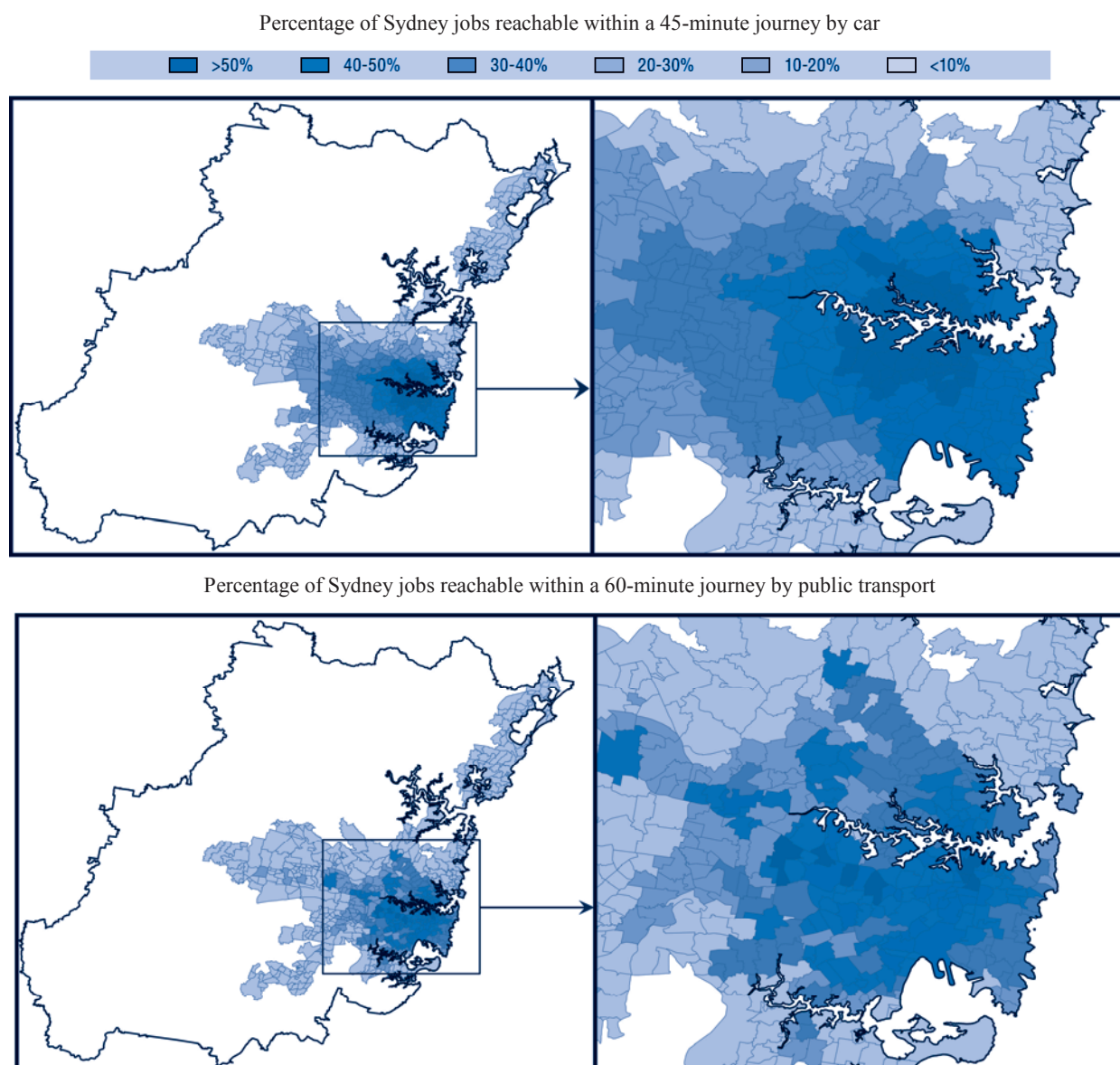
Even though the area covered by a city typically increases with its population size, access to public transport tends to be significantly better in larger cities. Recent indicators, which combine a range of data sources with a common and coherent methodology, show that the share of residents that lives within walking distance to high-frequency public transport in metropolitan areas is nearly double the share in small cities (Figure 3.6).

### ***Amenities, disamenities and (subjective) well-being***

A person's job, income and residence are certainly important for their daily life, but they are only part of the experience of living in a city. This experience is also shaped by the fact that large cities host a wide array of amenities. In 2013, nearly 60% of international visitors to the United Kingdom stayed in London, where they spent an even slightly higher share of total tourist expenditure in the country.<sup>15</sup> Part of this dominance is due to London's economic strength: business travel makes up about one-fourth of international visits to the United Kingdom. But for a large share of visitors, London's attraction stems from its plethora of museums, historical sites, theatres, musicals, markets, high street shops, clubs or bars. Of course, these amenities are not only available to visitors, the residents of the city benefit from them as well.



Figure 3.4. Urban morphology and public transport: Access to jobs in Sydney (Australia)

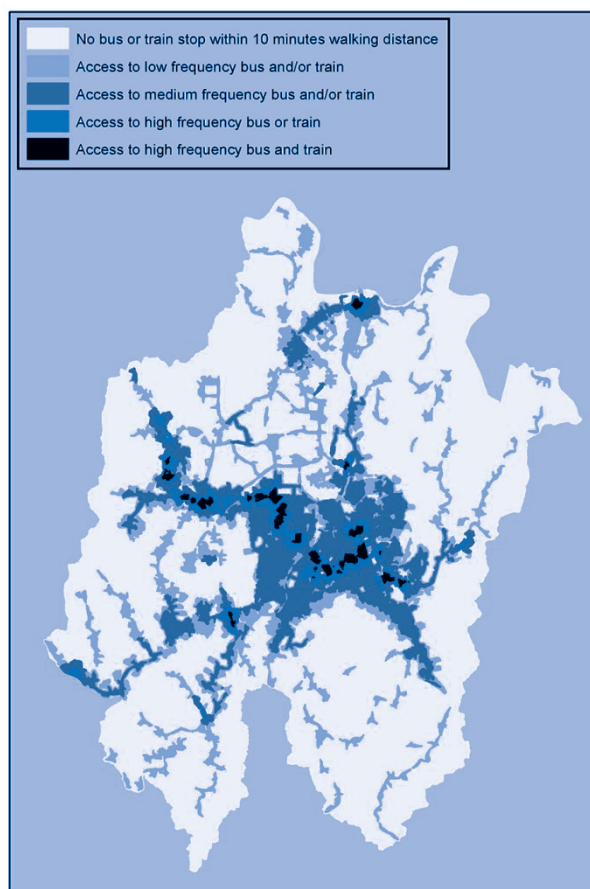


*Note:* These maps are for illustrative purposes and are without prejudice to the status of or sovereignty over any territory covered by these maps.

*Source:* Kelly, J.-F., Mares, P., Harrison, C., O'Toole, M., Oberklaid, M. and J. Hunter (2012), *Productive Cities*, Grattan Institute.

The attractiveness of large cities stems in part from the variety of possibilities that they can offer. As larger cities can support a wider range of (cultural) amenities, their residents have more choice, which enhances their well-being. This is directly reflected in the price level in larger cities. Empirical studies suggest that residents are willing to accept higher price levels in cities that they consider to be more attractive.<sup>16</sup> This willingness to pay appears to be particularly marked for more highly educated persons.<sup>17</sup>

Figure 3.5. Access to public transport in Daejeon (Korea)



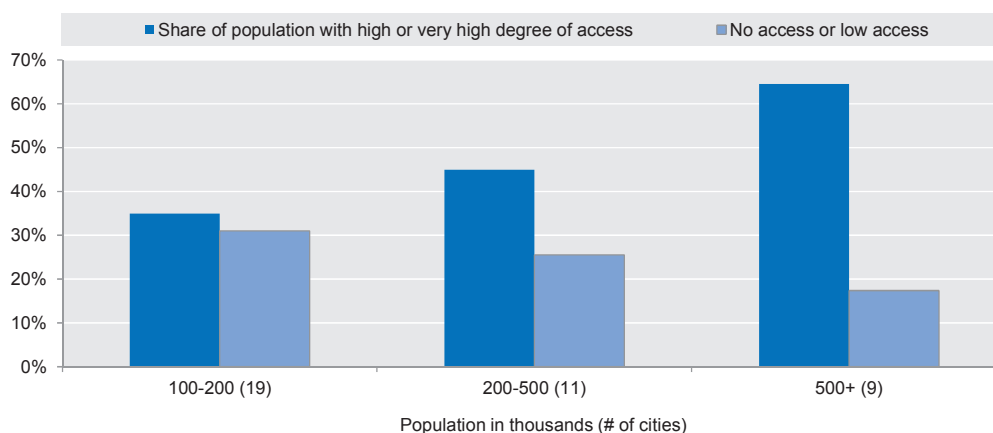
*Note:* Areas are considered without access to public transport if there is no bus stop within a five-minute walking distance and no train station within a ten-minute walking distance. See Dijkstra and Poelman (2014) for a detailed description of this type of methodology.

*Source:* OECD calculations based on Korea Transport Database (2011).

Evidence suggests that, on average, the positive impact of larger cities on productivity is neutralised by an accompanying increase in price levels (Figure 3.7). There are, however, huge variations across cities: some cities are more, and others less, expensive relative to their residents' earnings. These deviations can in large part be explained by non-pecuniary benefits, i.e. amenities, and costs, e.g. pollution, associated with certain cities. In a sense, people accept lower real incomes – earnings relative to price levels – in exchange for more attractive features of a city. Attractiveness is multifaceted, but seems to include leisure opportunities as exemplified for example by proximity to a large lake or the sea, cultural amenities such as theatres, but also lower levels of pollution.

Take, for example, the cities of Munich and Ingolstadt, which have similar levels of earnings and productivity, but different price levels. The fact that many people prefer to live in Munich despite a much higher price level can at least in large part be explained by the benefits they draw from using the amenities Munich offers (Table 3.1).

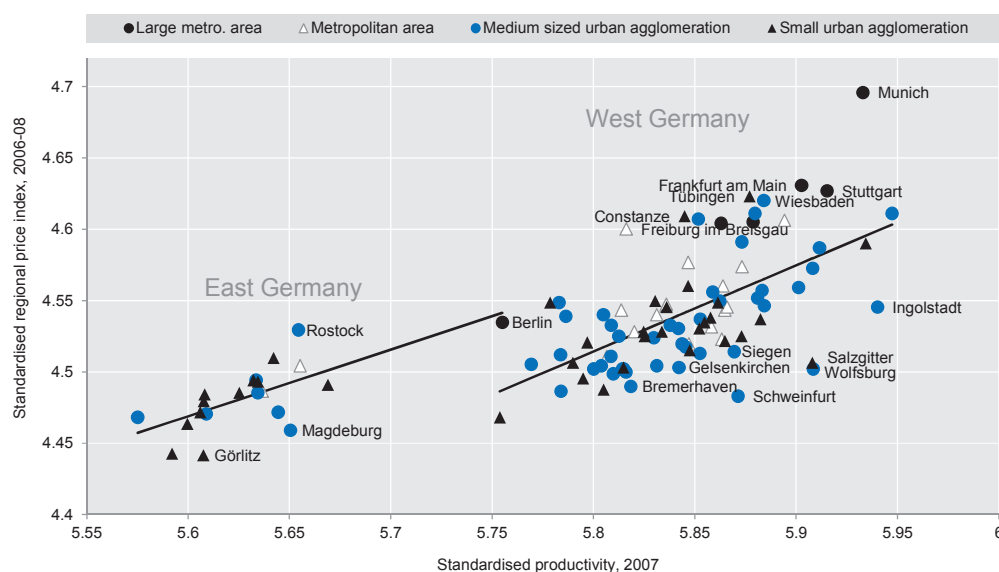
Figure 3.6. Access to public transport and city size, 2011-14



Note: Figure includes (functionally defined) cities with at least 100 000 inhabitants in 2006 from Belgium, Denmark, Estonia, Finland, the Netherlands and Sweden.

Source: Dijkstra, L. and H. Poelman (2014), “Access to public transport in European cities”, *Regional Working Paper*, Directorate-General for Regional and Urban Policy, European Commission, Brussels.

Figure 3.7. Productivity and price levels in East and West Germany



Source: Ahrend, R. and A.C. Lembcke (2015), “Does it pay to live in big(ger) cities? The role of agglomeration benefits, local amenities, and costs of living”, *OECD Regional Development Working Papers*, OECD Publishing, Paris, forthcoming.

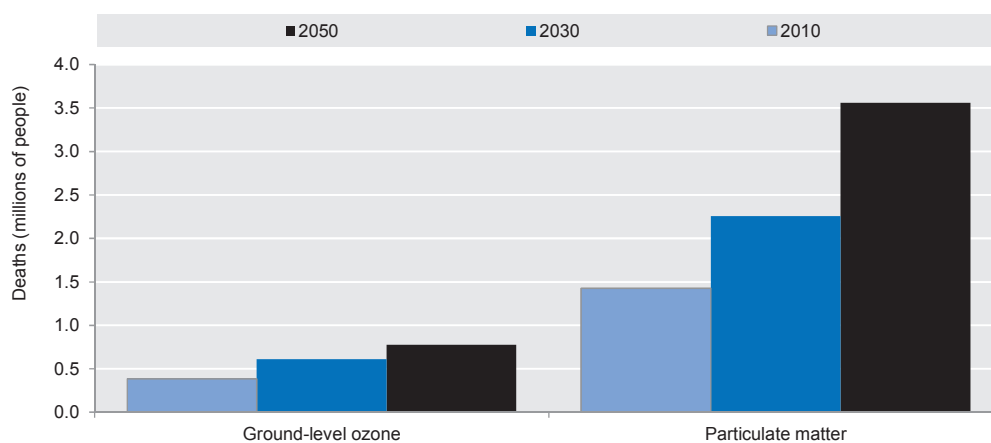
Residents of larger cities also face a range of non-pecuniary costs. The crime rate in cities increases with city size.<sup>18</sup> As crime within cities tends to be concentrated in certain areas, the actual likelihood of being the victim of a crime might not be very high, but even the perceived threat can constitute a severe burden.<sup>19</sup> As discussed previously, congestion is also a challenge for large cities. The concentration of car traffic and the accompanying exhaust and noise levels have a large detrimental impact on the health and well-being of city dwellers.

Table 3.1. **Urban amenities in Munich and Ingolstadt (Germany)**

Urban conditions	Munich	Ingolstadt
Population of functional urban area (EU-OECD definition)	2.8 million	336 370
Large lake within functional urban area	Yes	No
Natural reserves (green spaces) as a percentage of total area	1.2%	0.5%
Hotels	1 079	238
Visitors (with hotel stays)	7.4 million	712 000
Air pollution (annual average normalised PM <sub>10</sub> level)	1.31	0.59
Sites for plays, operas, other performances (central city only)	41	6
Registered theatres and orchestras	11	1
Number of universities (granting PhDs)	15 (6)	2 (1)
Share of workers with university education (tertiary degree)	23.6%	11.5%

Source: Ahrend, R. and A.C. Lembcke (2015), “Does it pay to live in big(ger) cities? The role of agglomeration benefits, local amenities, and costs of living”, *OECD Regional Development Working Papers*, OECD Publishing, Paris, forthcoming.

Air pollution, in particular, is measurably detrimental to health and is estimated to account for more than 1.5 million premature deaths annually (Figure 3.8). Rapid industrialisation, energy production and increased motorisation are driving air pollution. If current trends continue, the number of annual premature deaths from air pollution is expected to grow steadily – possibly even at an accelerating pace – and is projected to reach 3.5 million by 2050. The associated implicit costs of pollution are staggering: for 2010 they are estimated at USD 1.7 trillion for the 34 OECD countries.<sup>20</sup>

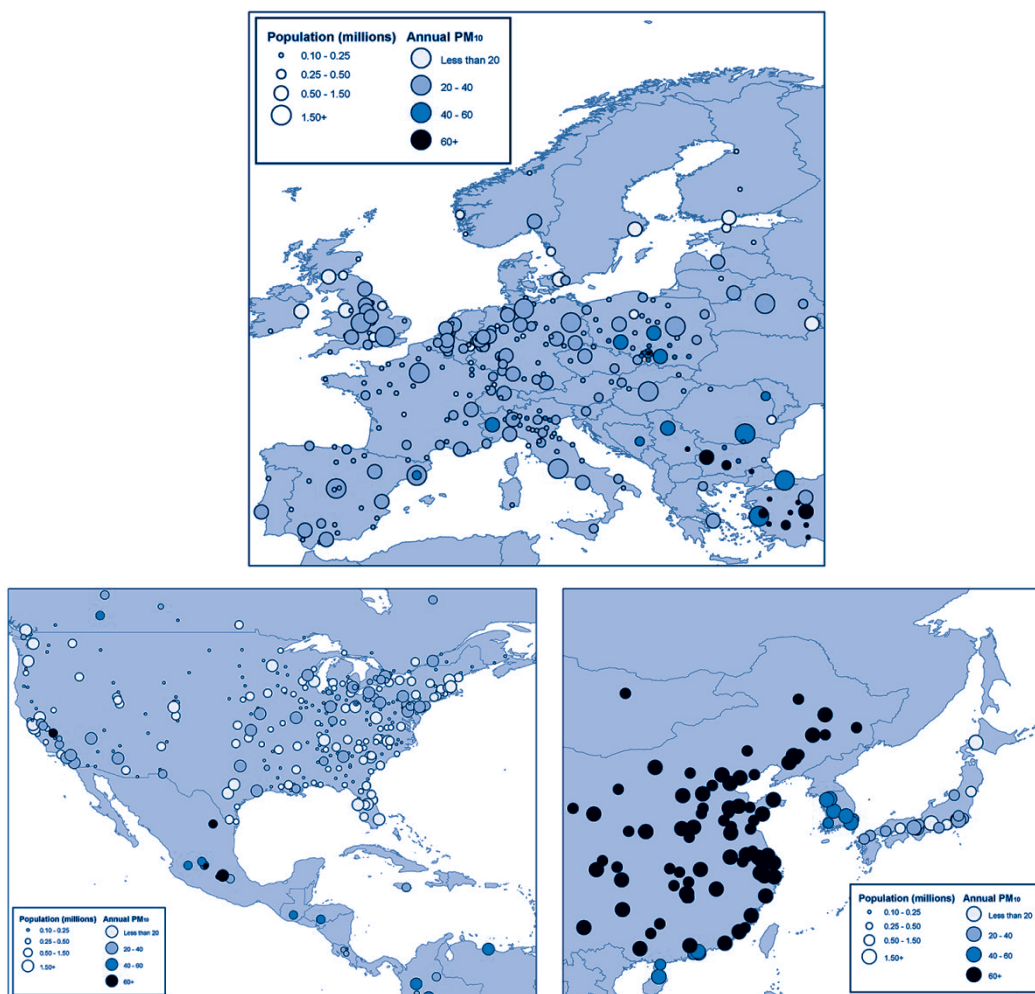
Figure 3.8. **Global premature deaths from selected environmental risks, 2010-50**

Source: OECD Environmental Outlook Baseline; output from IMAGE, in OECD (2012b), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264122246-en>, p. 25.

The public discussion tends to focus on the severity of air pollution in developing and emerging economies, where, indeed, air pollution levels of five times the recommended limit are common. The lower right panel of Figure 3.9 shows, for example, the high pollution levels in Chinese metropolitan areas. For the People’s Republic of China and India alone, the cost of pollution-related ill-health is estimated to be higher than for all 34 OECD member countries combined.<sup>21</sup> Nonetheless, metropolitan areas in most developed countries also regularly exceed limits set by the World Health Organization

(WHO). For example, the vast majority of metropolitan areas in Europe do not manage to stay below the WHO limits set for  $PM_{10}$ .<sup>22</sup> Few exceed double that bound, though (Figure 3.9, upper panel). In the United States the problem is more contained: the majority of cities achieve pollution standards below the recommended level (Figure 3.9, lower left panel).

Figure 3.9. Annual average  $PM_{10}$  level in cities



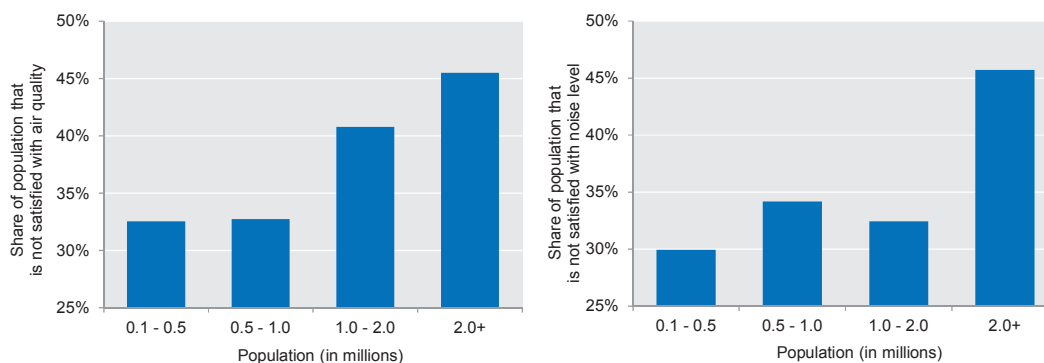
*Note:* The map depicts annual mean concentration of  $PM_{10}$  (particulates smaller than 10 microns) measured in  $mg/m^3$  for cities of different size. The WHO recommended upper bound for annual mean concentration of  $PM_{10}$  is 20  $mg/m^3$ . This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

*Source:* OECD calculations based on WHO (2014) *Ambient (outdoor) Air Pollution in Cities* (database), [www.who.int/phe/health\\_topics/outdoorair/databases/cities/en](http://www.who.int/phe/health_topics/outdoorair/databases/cities/en) (accessed 30 October 2014); United Nations (2012), *2012 Demographic Yearbook*, United Nations, Department of Economic and Social Affairs; US 2010 Census and China 2010 Population Census.

Air quality is one of the (dis)amenities of cities. When asked about their satisfaction with local air quality, residents of larger cities show greater levels of dissatisfaction (Figure 3.10, left panel). While air pollution and greenhouse gas emissions rightly tend to be the major focus in the national and international debate, well-being can also be

affected by other forms of pollution. Noise pollution, for example, can be both physically and mentally harmful for residents, mainly through the stress and the annoyance that constant noise can generate.<sup>23</sup> Especially residents in the largest metropolitan areas are affected by noise pollution (Figure 3.10, right panel).<sup>24</sup>

Figure 3.10. **Pollution and health problems increase with city size**



Source: OECD calculations based on European Union (2013), “Quality of Life in European Cities: Annexes”, *Flash Eurobarometer 366*, [http://ec.europa.eu/public\\_opinion/flash/fl\\_366\\_anx\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl_366_anx_en.pdf) (accessed 19 June 2014).

Both amenities and disamenities of a city contribute to the subjective well-being of its residents – measured as their self-reported satisfaction with their “life in general”. Comparing the subjective well-being of city dwellers with residents of smaller towns and villages shows no clear difference among the two groups for developed countries. In contrast, in developing countries city dwellers tend to be happier, even though cities in these countries tend to have relatively high levels of disamenities.<sup>25</sup>

### *Access to (better) goods and services*

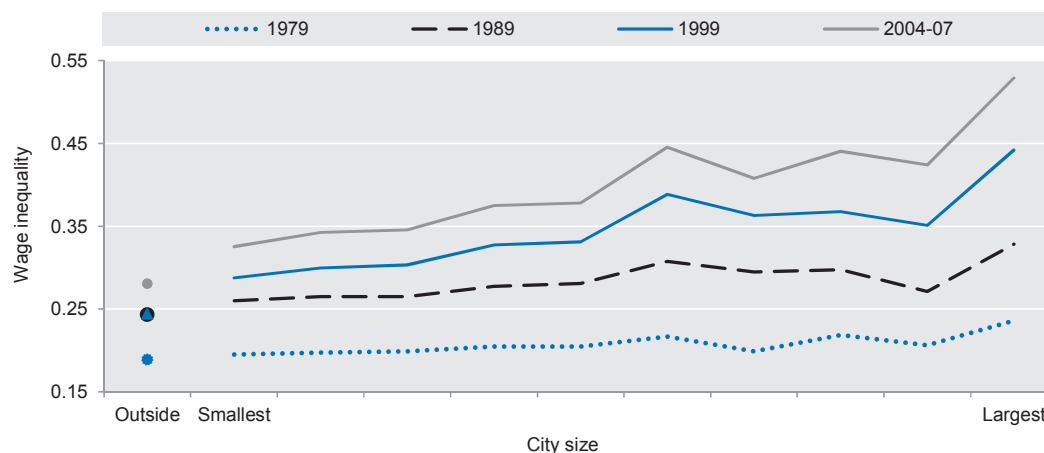
Larger cities provide more and – to a degree – better goods and services. The greater demand in larger cities sustains both more and a greater variety of providers. This increases competitive pressure and reduces margins. Empirical evidence from the United States shows that the number of available products increases by about 20% for each doubling in city size. As previously mentioned, higher prices in larger cities can therefore be indicative of higher product quality, or are, to a degree, compensated by a larger range of choice. Larger cities also ease consumers’ access to shops or services, as the distance to the nearest convenience store, post office or bank is typically shorter than in less densely populated areas.<sup>26</sup> What cities cannot offer is a wide range of fresh locally produced food, but the variety of fresh food produced outside and on offer in large cities is usually good.

The availability and quality of many services is also positively related to city size. Recent evidence from a reform of the United Kingdom’s National Health Service suggests that for elective procedures residents of larger cities can choose from a wider range of hospitals than residents in less densely populated areas.<sup>27</sup> The competition among hospitals induced by this greater choice results in better outcomes, as measured by mortality rates after specific procedures, without increasing costs.<sup>28</sup> Improved management practices among hospitals that face greater competition seem to be one reason for these results.<sup>29</sup>

### *Inequality and social exclusion*

Inequality tends to be greater in cities than in their respective countries. In 2009, 17 of the 25 largest US cities had estimated Gini coefficients in excess of the US average. Studies for Canada, the United States and Western Europe point to increasing urban inequality, as well as greater variation in inequality dynamics across the urban hierarchy since the 1970s (Figure 3.11). Across OECD countries, income inequality is higher in regions where the majority of the population lives in metropolitan areas – cities with 500 000 or more inhabitants.<sup>30</sup>

Figure 3.11. **Wage inequality in US cities of different sizes over time**



*Note:* Wage inequality is measured as the variance of hourly wages. “Outside” denotes areas that are not classified as city (US Metropolitan Statistical Area). Cities are classified by decile, such that each decile contains 10% of the urban population

*Source:* Baum-Snow, N. and R. Pavan (2013), “Inequality and city size”, *The Review of Economics and Statistics*, Vol. 95, No. 5, pp. 1 535-1 548.

Agglomeration economies work against both income equality among people and convergence among places. People appear to sort spatially according to skill, occupation and human capital, with larger cities attracting more highly skilled people, but also low-skilled individuals. Given existing wage differentials between highly skilled and low-skilled workers, larger cities are hence bound to show a larger degree of wage inequality. Similarly, in a situation where the wage gap between highly skilled and unskilled workers increases, wage inequality in larger cities is bound to increase more strongly than in smaller cities or rural places. The trend of increasing inequality in cities in OECD countries is also likely related to deindustrialisation. Industrial cities during the last century usually had more homogenous populations, in particular with less variation in skill levels. High unionisation rates in industrial cities typically had an additional limiting effect on wage differentials.

Increased wage inequality in larger cities is balanced by other factors. For example, low-skilled workers enjoy higher wages in large cities than their peers in smaller places. Whether this translates into a higher purchasing power is unclear though, depending in large part on their exact consumption basket. As previously mentioned, bigger cities also offer more professional opportunities (including training), as well as better amenities and consumption opportunities. The more pressing problem would therefore appear to be social exclusion.

While social exclusion depends on income levels and income inequality, it is also often concentrated among certain social groups, such as immigrants, ethnic minorities or young people from low-income households. The labour-market barriers these groups face are not only economic. Decentralised education funding reinforces the problem, as does spatial sorting and low accessibility and mobility at the metropolitan level. The impact of exclusion can be highly persistent, as it is not necessarily limited to a single generation. A recent study on income mobility – the dependence of children’s income on their parents’ income – in the United States finds not only low levels of income mobility in general, but also lower levels of income mobility for workers who grew up in cities with high levels of inequality.<sup>31</sup>

Large cities not only have high levels of inequality, they are also often spatially stratified along socio-economic dimensions. Most large cities have poor and wealthy neighbourhoods that are clearly separated from each other. This contributes to social exclusion and inequality because the different neighbourhoods have different levels of public service provision and accessibility. Recent OECD work, for example, shows that poorly qualified young people from several poor northern suburbs of Marseille cannot get a job in booming western parts of the agglomeration because it is impossible for them to get there by public transport within a reasonable amount of time.<sup>32</sup>

Spatial stratification into poor and rich neighbourhoods also leads to unequal access to education, even if spending on schools and other education facilities is not determined by income levels in neighbourhoods.<sup>33</sup> So-called peer effects are important determinants for learning students’ outcomes. In other words, the social background and skill level of classmates influences the schooling outcomes of students. For this reason, students who go to school with other students from low-income and poorly educated families are disadvantaged compared to students who go to school with other students from high-income and well-educated families. Geographical separation into wealthy and poor neighbourhoods therefore contributes to self-perpetuating patterns of inequality.

Depending on the governance arrangements, administrative fragmentation of a metropolitan area into many small municipalities can increase the consequences of inequality. The more fragmented a metropolitan area is into individual municipalities, the more likely it is that these municipalities have socially homogenous populations. This has particularly strong consequences if municipalities use own tax revenues or receive transfers that are proportional to their economic strength to pay for public services and infrastructure provision. In this case, poorer municipalities have lower tax revenues and consequently less funds for public services and infrastructure. This puts their residents at a disadvantage and reinforces socio-economic segregation because it provides incentives for those who can afford to move to wealthier municipalities.

Administrative fragmentation and the resulting split into wealthy and poor municipalities can also increase social exclusion and foster patterns of spatial inequality for reasons other than financial ones. Wealthy municipalities might use land-use restrictions as a tool to prevent inflows of poor individuals. Regulations that restrict building heights, stipulate minimum lot sizes or prohibit multi-family dwellings can make it impossible for developers to construct affordable housing. While the regulations are generally imposed to uphold neighbourhood appearance, an implicit purpose is often to preserve the social characteristics of a neighbourhood by making it impossible for poor individuals to move into the area.



Adequate metropolitan-wide governance arrangements can help to overcome these issues. Good public transport connections to more prosperous parts of a metropolitan area are especially important to residents in poor neighbourhoods who often lack private means of transport. Public transport offers them the access to jobs and amenities that their own neighbourhoods lack. Strong co-ordination mechanisms between wealthy and poor municipalities are required to build and operate public transport connections between them. Similarly, metropolitan governance arrangements can reduce other disparities in public service provision by ensuring a more equal distribution of public services. Metropolitan-wide co-ordination mechanisms also contribute to land-use and other planning policies that reduce the social stratification of neighbourhoods.

### ***Room for policies***

The question of what is the best strategy for policy makers to increase the well-being of city residents may arise. Policies to improve well-being can be aimed at increasing agglomeration benefits or reducing non-pecuniary agglomeration costs. Often, effects on well-being are likely to be higher than on economic productivity, for example, time lost in transport will typically reduce individuals' leisure time more than their effective working time. More generally, it may be easier to mitigate agglomeration costs than to foster agglomeration benefits, implying that policies may want to put stronger emphasis on the former (Box 3.2).

#### **Box 3.2. A basic model of a city (Part 2): Targeting agglomeration benefits or agglomeration costs**

Given that Cityville can make a contribution to improving well-being both by increasing agglomeration benefits and by reducing agglomeration costs, the question of which of the two options is preferable arises. Theoretically, if the costs for achieving a given increase in agglomeration benefits were the same as achieving a corresponding decrease in agglomeration costs, well-being implications should be roughly similar. However, in practice there may be differences.

For a start, it is generally less obvious which policies would be effective for increasing agglomeration benefits. Increased education levels may help, but as people are mobile, they may move away once they have completed their education. Also, if Cityville attracts students from other cities in the country, this likely will not lead to significant social benefits at the national level, even though there may be net benefits for the country if Cityville attracts high-potential individuals from abroad. Increasing innovation would certainly be useful, but while the desirability of more innovation is well understood, the concrete means of achieving it are much less obvious.

All in all, what needs to be done to decrease, in particular, non-pecuniary agglomeration costs would appear to be better understood than policies to increase agglomeration benefits. Decreasing agglomeration costs may also have a more equal distributive impact, as, for example improvements in transport, lower levels of pollution or larger green spaces benefit different income groups in broadly similar fashion (this is likely different for operas and concert houses, though). Targeting agglomeration costs also ensures that expenditures will benefit Cityville, simply as these improvements cannot move away.

## Are large cities good for a country?

*“We will neglect our cities to our peril, for in neglecting them we neglect the nation.”*

(John F. Kennedy, 1962)

Since 2009, cities have been home to more than half of earth’s population and the trend towards greater urbanisation continues unabated.<sup>34</sup> This section considers whether cities, and especially larger ones, are good for their countries. The answer provided in this section is split into three parts. The first part argues that by concentrating both population and economic activity, cities in most OECD countries are the main contributor to their country’s income and growth. The second part considers the critical role of cities for innovation and technological progress, the main drivers of long-term growth. The third part highlights the spillovers created by cities beyond their own limits and the benefits they can provide to other parts of the country.

### *Concentration of activity*

The vast majority of the population in OECD countries chooses to live in cities. To allow for cross-country comparison of size and economic activity in cities, the OECD and the European Union have jointly developed a coherent and comparable methodology to define the extent of cities according to their residents’ daily reality, rather than administrative boundaries.<sup>35</sup> Across 29 OECD member countries 1 179 cities with at least 50 000 inhabitants have been delineated, among them 275 metropolitan areas with more than 500 000 inhabitants. This common methodology ensures comparability across countries, but estimates might deviate from country-specific estimates or collections of data that rely on countries’ own definitions of cities, e.g. the data used for the UN World Urban Prospects.<sup>36</sup> Using the EU-OECD definition to assess urbanisation across these 29 OECD countries shows that metropolitan areas account for nearly half of the total population, with total urbanisation around two-thirds (Figure 3.12).

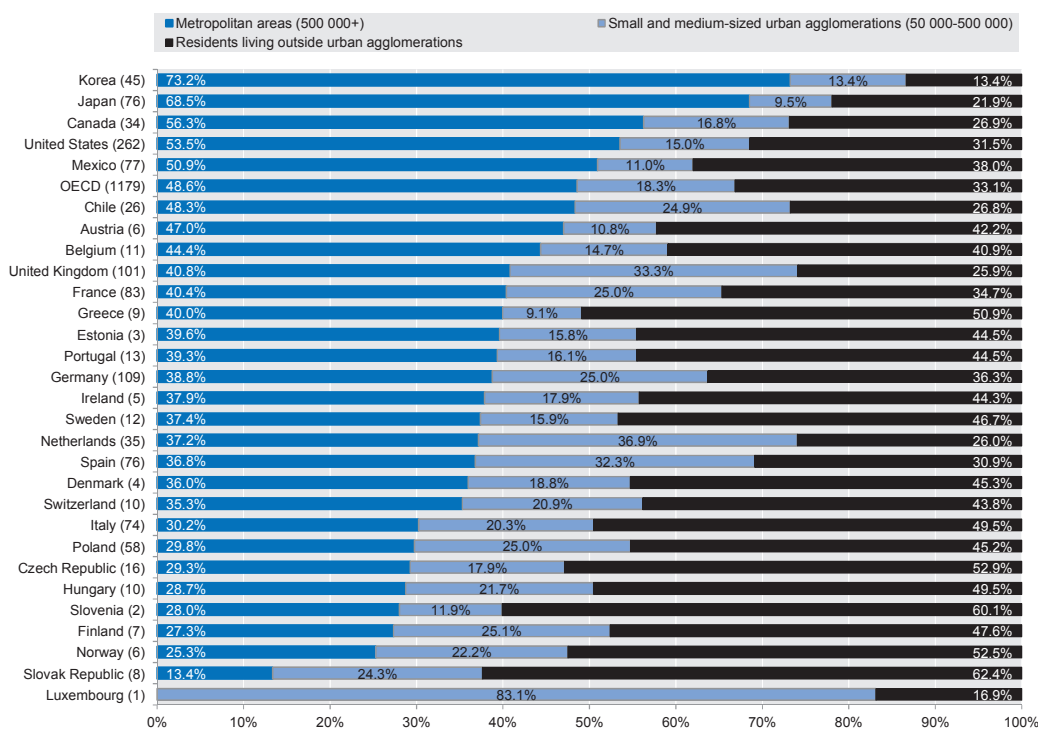
Economic activity is even more concentrated than population. The 275 metropolitan areas alone account for close to 55% of total GDP produced across these 29 OECD countries.<sup>37</sup> This reflects the fact that productivity in large cities exceeds the productivity in the rest of the country, partly due to the selection of more productive individuals into larger cities and partly due to agglomeration benefits that make both workers and businesses in larger cities more productive. The crucial role of cities for their countries’ economies is also evident when GDP growth is considered. Metropolitan areas accounted for half of OECD countries’ GDP growth between 2000 and 2010 (Figure 3.13).

It is not only the size of cities, but their spatial distribution as well that matters. Countries with more polycentric systems, i.e. systems of large cities instead of a small number of megacities, are found to have higher per capita GDP.<sup>38</sup> The reason for this could be that, with a larger number of metropolitan areas, a bigger part of the territory benefits from being close to at least one of these metropolitan areas compared to, for example, a situation where one megacity combines the population of all those metropolitan areas.

In contrast, within a region of a given country, a more dispersed structure of cities appears to be associated with lower per capita GDP than if one larger city were to combine the population of those cities. In this case, with spillovers from small cities being fairly minor – both geographically and in size – having one large city in a region rather than a network of small cities may be economically more beneficial. This may also apply to small countries.

Figure 3.12. Urbanisation levels across OECD countries, 2012

Share of population living in metropolitan areas, urban agglomerations and outside urban agglomerations.



Note: This figure depicts the share of a country's residents that lives inside and outside of cities, separated by city size. Numbers in parentheses are the total number of cities (both metropolitan areas and small and medium-sized cities).

Source: OECD calculations based on OECD (2013b), *OECD Regions at a Glance 2013*, OECD Publishing, Paris, [http://dx.doi.org/10.1787/reg\\_glance-2013-en](http://dx.doi.org/10.1787/reg_glance-2013-en); OECD (2014a), "Metropolitan areas", *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014); and OECD (2014b) *Country Statistical Profiles* (database), <http://dx.doi.org/10.1787/20752288> (accessed 4 November 2014).

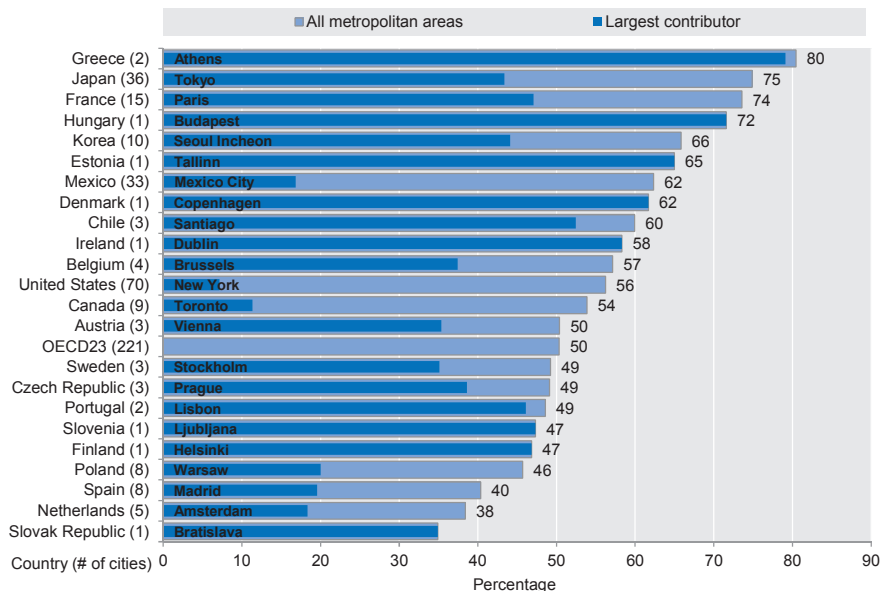
## Innovation

Innovation and technological progress are generally believed to be the main drivers of long-term economic growth.<sup>39</sup> Innovation allows production factors, capital and labour, to be used in new and better combinations, thereby increasing output and ultimately well-being. For many countries and regions, the first priority is to adapt their production processes to the current state-of-the-art and to catch up with those areas at the technological frontier.<sup>40</sup> But for long-term growth and prosperity, advances along the technological frontier – advances that push the limits of productivity further and further out – are paramount. While innovation can happen anywhere, it tends to be concentrated in highly urbanised areas. R&D activity, patent applications and venture capital are all highly concentrated, both within countries and even within cities.<sup>41</sup> For innovation, size matters: larger cities – on average – patent more than smaller cities across the OECD. The link between city size and patenting activity is strikingly non-linear, with the largest cities concentrating the majority of patenting (Figure 3.14).

The high degree of concentration can have different causes. For innovation, even more than for other aspects of productivity, knowledge spillovers matter. Empirical evidence suggests a strong local component in knowledge diffusion. Knowledge

spillovers – measured in terms of patent citations – are significantly higher within local clusters than outside such clusters.<sup>42</sup> Another important aspect is the incentive cities provide for acquiring skills. Since agglomeration benefits increase the value of skills, residents of large cities have an incentive to invest more in their “human capital”.<sup>43</sup> Human capital is, in turn, crucial in determining the capacity of an area to create innovation and adapt to new ideas.<sup>44</sup>

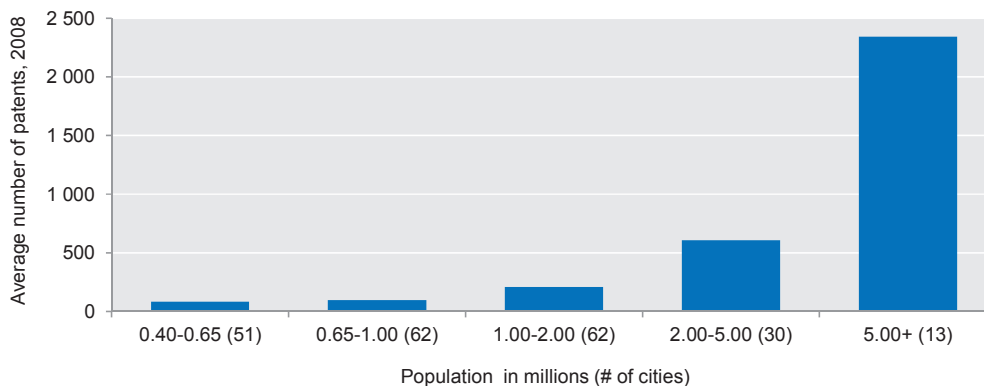
Figure 3.13. Metropolitan areas’ contribution to national growth, 2000-10



Note: Share of national GDP growth (2000-10) contributed by metropolitan areas (cities with 500 000 or more inhabitants).

Source: OECD (2013b), *OECD Regions at a Glance 2013*, OECD Publishing, Paris, [http://dx.doi.org/10.1787/reg\\_glance-2013-en](http://dx.doi.org/10.1787/reg_glance-2013-en).

Figure 3.14. Concentration of patenting activity, 2008



Source: OECD (2014), “Metropolitan areas”, *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/data-00531-en> (accessed 30 October 2014) for 218 metropolitan areas (countries covered: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Italy, Japan, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, United States; excluded – for lack of data – are: Canada, Chile, Czech Republic, Greece, Hungary, Ireland, Korea, Poland, Slovak Republic, Slovenia, Switzerland, United Kingdom).

### *Effects beyond city limits*

Cities are not only important for their residents, but also strongly affect the prosperity and well-being of other parts of the country. From the point of view of a person considering where to live and work, each city offers its own unique combination of agglomeration benefits and costs.<sup>45</sup> If a city invests into measures that alleviate congestion and reduce transport time, its attractiveness increases. This will lead to more people choosing to live in the city, since benefits accrue both to the current residents and new residents that move to the city from other parts of the country. The inflows into the investing city can therefore alleviate congestion and housing costs in other cities, reducing overall agglomeration costs. This means that improvements in a city create shared benefits among current and future residents of the investing city, but also benefits for residents in all other cities (Box 3.3).

#### **Box 3.3. A basic model of a city (Part 3): A spatial equilibrium model of cities**

Cityville is an open system that people can move to, or away from. People will tend to move to Cityville if this increases their well-being, with well-being determined by their wage and the benefits they draw from being in a specific place, minus the costs connected with being there. In a basic model, the benefit from being in a specific place is simply the wage that can be earned there, and the costs are the price of housing and the monetary equivalent of the disutility that individuals incur from commuting.

Given that individuals are free to move, in the long run, levels of well-being for residents need to be roughly the same in all cities and rural areas within a country. The mechanism is the following: when the well-being of Cityville's residents increases above those of other places, more people will be drawn to Cityville. This will drive up prices (in particular, but not only, housing prices/rents) in Cityville,<sup>2</sup> but will also lead to a decrease in prices in places people are leaving. Price increases in Cityville decrease the consumption possibilities of its residents, and hence their well-being. In contrast, a fall in prices in less attractive places increase the consumption possibilities of their population, and thereby their well-being. Population flows persist until well-being is roughly equal across places. This implies that cities with better amenities or cities paying higher wages because of, for example, larger agglomeration benefits, will – at least in the long run – have higher living costs that balance these advantages. This is not just a theoretical finding, it is supported by empirical evidence.

If well-being increases through improvements in Cityville's liveability ultimately result in price increases that reduce well-being, the question arises why the city should work on improving transport systems or other amenities, or try to increase agglomeration benefits. First, adjustments to improved well-being in Cityville not only occur through price increases and/or increased congestion in Cityville itself, but also through a fall in prices and/or less congestion in other cities. This implies that increases in the liveability of Cityville do result in permanent well-being increases for its population, they just indirectly also contribute to increased well-being elsewhere. Second, increases in well-being from improved transport or amenities occur right away, while adjustment mechanisms through increased prices resulting from in-migration only work very gradually over time, implying that during the adjustment period there are sizeable net well-being effects. Third, city dwellers who own their housing, or those who are on rent contracts with price increases restricted by law, fully benefit from any improvements in a city's liveability, without incurring the (full) costs, and, in the case of owners, even profit from the appreciation of their property value. If those residents account for a sufficiently large share of the electorate, improvements in Cityville's liveability certainly have strong appeal from a political economy perspective.

**Box 3.3. A basic model of a city (Part 3): A spatial equilibrium model of cities (cont.)****The example of French metropolitan areas**

As previously mentioned, policies in one metropolitan area have implications for all other metropolitan areas within a country (and also possibly beyond its borders). For example, simulations on the impact of a congestion charge introduced in the Greater Paris area, with its proceeds invested in public transport, show that commuting time would be significantly reduced. This would result in an increase in both the well-being of Parisians and the attractiveness of the Paris agglomeration. People from other metropolitan areas and from the countryside will be drawn into Paris. These population shifts towards Paris alleviate the benefits provided by the policy, but do not negate them; in fact, simulations suggest substantial gains in both commuting time and overall well-being for the average Parisian. Even many of those paying the congestion charge would see their well-being increase as they would experience significant reductions in commuting time.

Exact effects obviously depend on the technical details of the policy. For example, the impact of a congestion charge somewhat below the level currently applied in London,<sup>2</sup> with proceeds used to improve public transport in less-served areas, can be simulated with the GEMSE model.<sup>3</sup> This model allows assessing the general equilibrium effects of certain urban policies in French metropolitan areas.

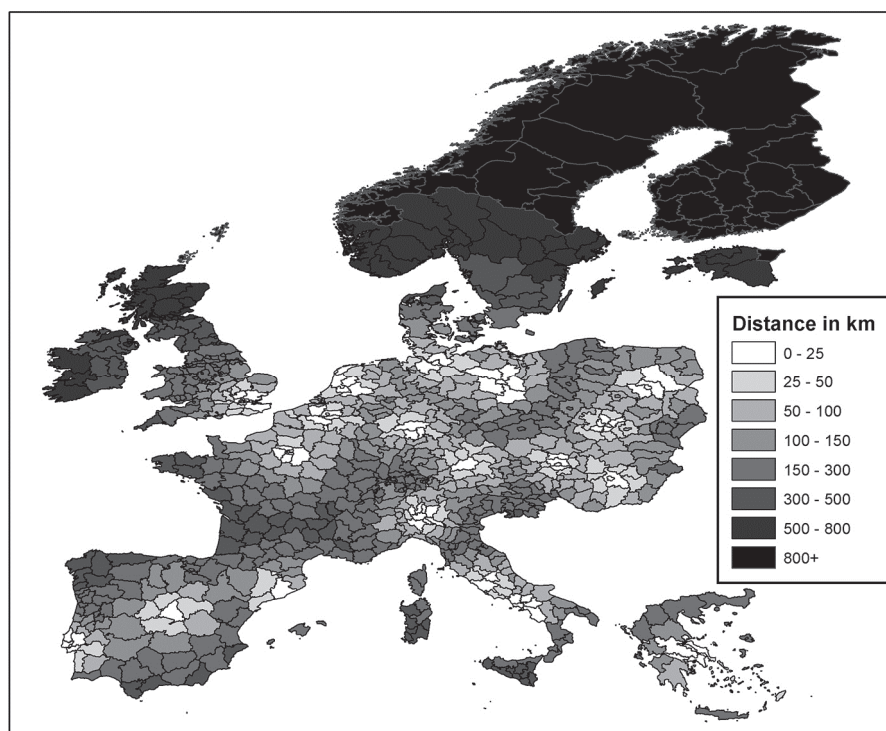
Compared to a baseline scenario, and with no changes in policies in other agglomerations, a congestion charge as described above would increase population in 2050 by roughly 0.7% in Paris, while leading to population decreases in the other French metropolitan areas in the order of 0.9%. The policy in Paris would thereby also reduce congestion levels in other cities, reducing the negative effects from congestion on well-being in those places. Should other French agglomerations put in place policies to match the increases in attractiveness of the Paris agglomeration, well-being increases across all French cities would be even greater. This would include Paris, as in the absence of population shifts between the different agglomerations, a congestion charge in Paris would decrease congestion levels in Paris – and thereby commuting times – even further.

*Notes:* 1. In practice, new arrivals in Cityville may lead to overly strong house price increases if unduly restrictive land-use regulation unnecessarily slows down increases in housing supply. 2. More precisely, the congestion charge is modelled to increase the costs of private car transport by 40%. 3. <http://mythesis.alwaysdata.net/gemse>.

Smaller cities can also “borrow” agglomeration from neighbouring cities. For a doubling of the population living at a given distance in urban agglomerations within a 300-kilometre radius around a city, the productivity of the city in the centre increases by 1-1.5%. This is sizeable, given that for a doubling of the population size within the urban agglomeration, productivity increases by 2-5%.<sup>46</sup> This may also explain why productivity in US cities generally increases more strongly with city size than in European countries. Basically, smaller cities in Europe are not that much disadvantaged, as they can simply “borrow” agglomeration from neighbouring cities. Given the lower city density, this is much harder in the United States. But even across Europe, the nearest large city might not be within easy commuting distance. If cities with more than 2 million inhabitants are considered, a core-periphery or north-south divide emerges for the regions in most countries (Figure 3.15).

Positive spillovers are not limited to cities; cities typically increase the prosperity of the whole region in which they are located (Box 3.4). Regions that include large metropolitan areas of more than half a million inhabitants grew approximately 0.2 percentage points per year faster between 1995 and 2010 than those that did not. More generally, population density of the most densely populated parts of a region is a very good predictor of per capita GDP growth, and a 100% increase in the maximum population density in a region has been associated with an increase in the annual growth rate of almost half a percentage point.

Figure 3.15. Distance to closest metropolitan area with more than 2 million inhabitants



*Note:* The figure shows the distance in kilometres to the closest functional urban area (FUA) with at least 2 million inhabitants. Darker colours indicate larger distances.

*Source:* Ahrend, R. and A. Schumann (2014), “Does regional growth depend on proximity to urban centres?”, *OECD Regional Development Working Papers*, No. 2014/07, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz0t7fxh7wc-en>.

### Box 3.4. Economic growth in regions is boosted by the presence of cities

European regions with cities with more than 500 000 inhabitants experienced significantly higher per capita GDP growth than regions without large cities once average national growth rates are taken into account. Between 1995 and 2010, the difference in annual per capita GDP growth rates between the two groups of regions was approximately 0.2 percentage points. In addition to gains in per capita GDP levels, regions with large cities also attracted new inhabitants. Therefore, growth rates of absolute GDP levels in such regions were even more above average than the growth rates of their per capita GDP levels.

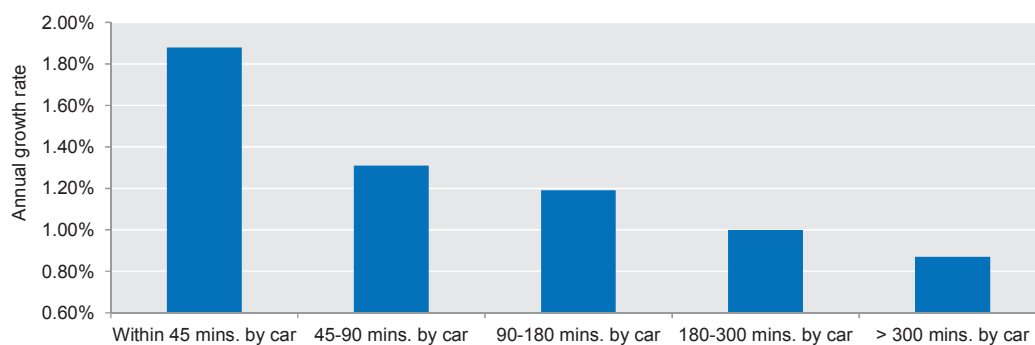
The strong economic growth of regions that contain large cities was – together with other factors – responsible for the widening gap in per capita GDP levels between the best-performing regions and those with an average performance. However, this does not imply that overall inequality in average per capita GDP levels of regions increased. Not only did the best-performing regions record above-average growth rates, regions with the lowest per capita GDP levels in 1995 also performed well in the following 15 years. This led to a shift in the distribution of cross-regional per capita GDP levels. Whereas in 1995 the distance of the worst- and the best-performing regions to the median region was approximately equal, in 2010 the distance between the median region and the best-performing regions had substantially increased. In contrast, the distance between the median region and the worst-performing regions had become smaller. In other words, there are fewer regions with per capita incomes that are substantially below average, but more regions with per capita incomes that are substantially above average.

*Source:* Ahrend, R. and A. Schumann (2014), “Does regional growth depend on proximity to urban centres?”, *OECD Regional Development Working Papers*, No. 2014/07, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz0t7fxh7wc-en>.

Positive spillovers from cities do not stop at regional boundaries. Generally, regions closer to cities – especially larger cities – are more prosperous, and have experienced higher economic growth than regions that are more remote (Figure 3.16). While these positive spillovers decline with distance, large cities of, for example, more than 2 million inhabitants are found to have benefited the economic performance of regions as far as 200-300 kilometres away. The important factor is the actual travel time from a region to the nearest metropolitan area. A halving of that travel time in the region is associated with 0.2-0.4 percentage points higher annual GDP per capita growth.<sup>47</sup>

Rural regions also benefit from proximity to urban centres. Empirical evidence for the OECD in general, and the United States in particular, suggests that rural regions close to cities, or more urbanised regions, experienced faster population growth (Figure 3.17).<sup>48</sup> This implies that there is not necessarily competition among neighbouring urban and rural areas but that joint growth potential exists. Formalising this partnership in a joint governing body can help harness the full benefit of the existing linkages.<sup>49</sup>

Figure 3.16. **Economic growth increases with proximity to large cities**



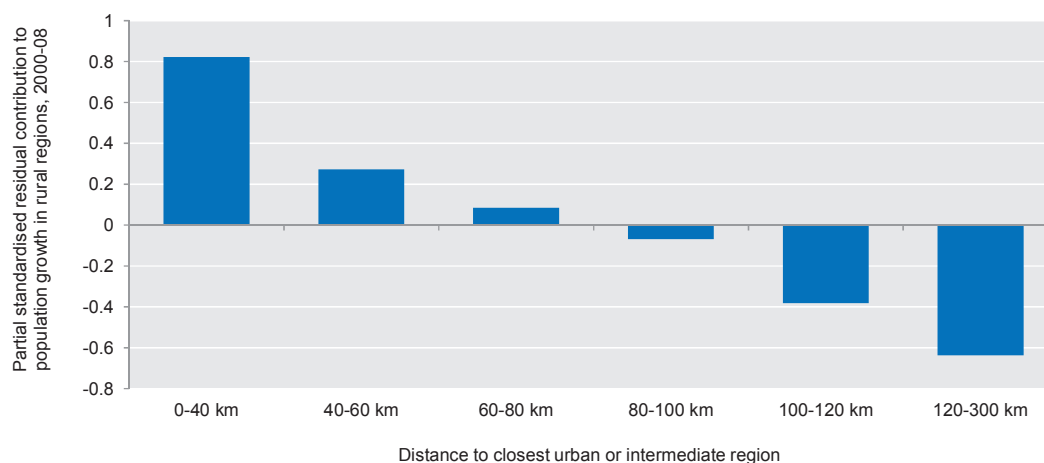
*Note:* Average annual per capita GDP growth rates between 1995 and 2010 controlling for country fixed effects and initial per capita GDP levels.

*Source:* Ahrend, R. and A. Schumann (2014), “Does regional growth depend on proximity to urban centres?”, *OECD Regional Development Working Papers*, No. 2014/07, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jz0t7fxh7wc-en>.

Finally, regions that either include large cities or are closer to them have modernised their economic structure more rapidly, as witnessed, for example, by a more rapid shift from employment in manufacturing or agriculture to the service sector.<sup>50</sup> There is also some evidence that proximity to smaller cities has a positive effect on growth. Being within 30 minutes of a small or mid-sized urban agglomeration seems to have a positive effect, but in contrast to larger urban agglomerations, the effect of distance is not increasing beyond the 30-minute threshold.<sup>51</sup>



Figure 3.17. Population growth in rural regions and proximity to urban or intermediate regions, 2000-08



Note: Figure depicts the residual correlation between rural regions' population growth and distance to the nearest urban or intermediate region, accounting for difference in income, industrial and demographic structure.

Source: Veneri, P. and E. Ruiz (2013), "Urban-to-rural population growth linkages: Evidence from OECD TL3 regions", *OECD Regional Development Working Papers*, No. 2013/03, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k49lcrq88g7-en>.

While proximity to large cities has been a strong factor driving regional growth, some remote regions also managed to achieve above-average growth rates. In most cases, these regions are specialised in natural resources or large-scale farming, and profited from the boom in natural resources and certain agricultural commodities during the first decade of the 21st century.

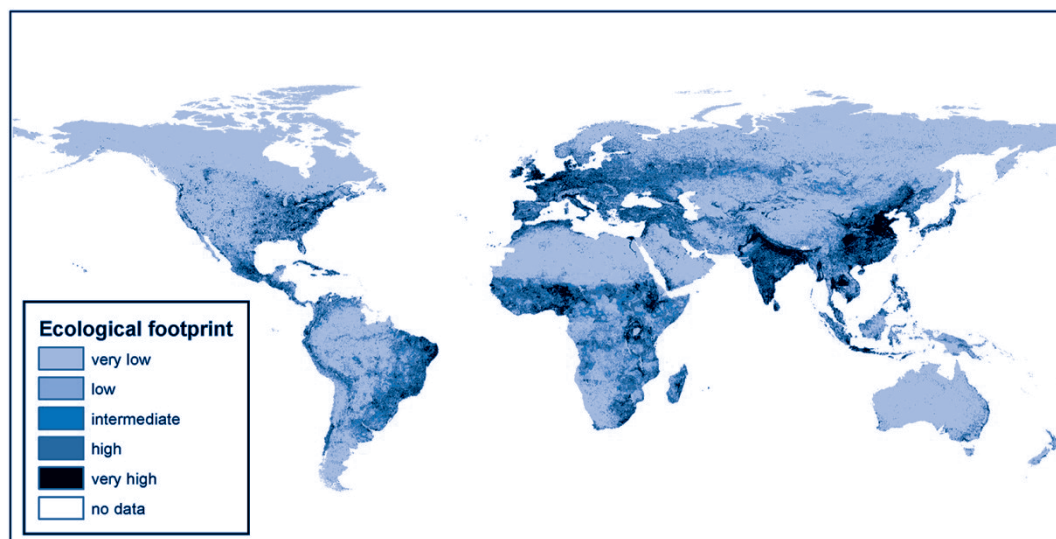
### Are large cities good for our planet?

*"To use a medieval distinction, we are not only patients, whose needs demand attention, but also agents, whose freedom to decide what to value and how to pursue it can extend far beyond the fulfilment of our needs."* (Amartya Sen, 2004)

Having previously explored the impact of cities on their residents and their countries, this section looks at whether and how cities affect environmental sustainability.

The relationship between large cities and human-made CO<sub>2</sub> emissions and other effects on the environment is not as clear cut as it might appear at first sight. Urbanisation has often been described as a driving factor of climate change and other forms of environmental degradation.<sup>52</sup> Transport, energy conversion, wastewater treatment, refrigerants, rural-urban land conversion, and landfill decomposition as well as the incineration of municipal solid waste in urban agglomerations lead directly to emissions of greenhouse gases (GHGs). GHGs are also emitted when producing concrete, steel, glass and other materials that are needed for the building of civil infrastructure, as well as when producing food for urban dwellers.<sup>53</sup> Absolute CO<sub>2</sub> emission levels of cities are indeed particularly large, as is their ecological footprint – the total area required to provide environmental goods and services for a specific region (Figure 3.18).

Figure 3.18. The ecological footprint is highest in urban agglomerations



Source: OECD calculations adapting Hammer, S., Kamal-Chaoui, L., Robert, A. and M. Plouin (2011), “Cities and green growth: A conceptual framework”, *OECD Regional Development Working Papers*, No. 2011/08, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5kg0tflmzx34-en>, based on Ewing et al. (2010), *The Ecological Footprint Atlas 2010*, Oakland, Global Footprint Network, available at: [www.footprintnetwork.org/images/uploads/Ecological\\_Footprint\\_Atlas\\_2010.pdf](http://www.footprintnetwork.org/images/uploads/Ecological_Footprint_Atlas_2010.pdf).

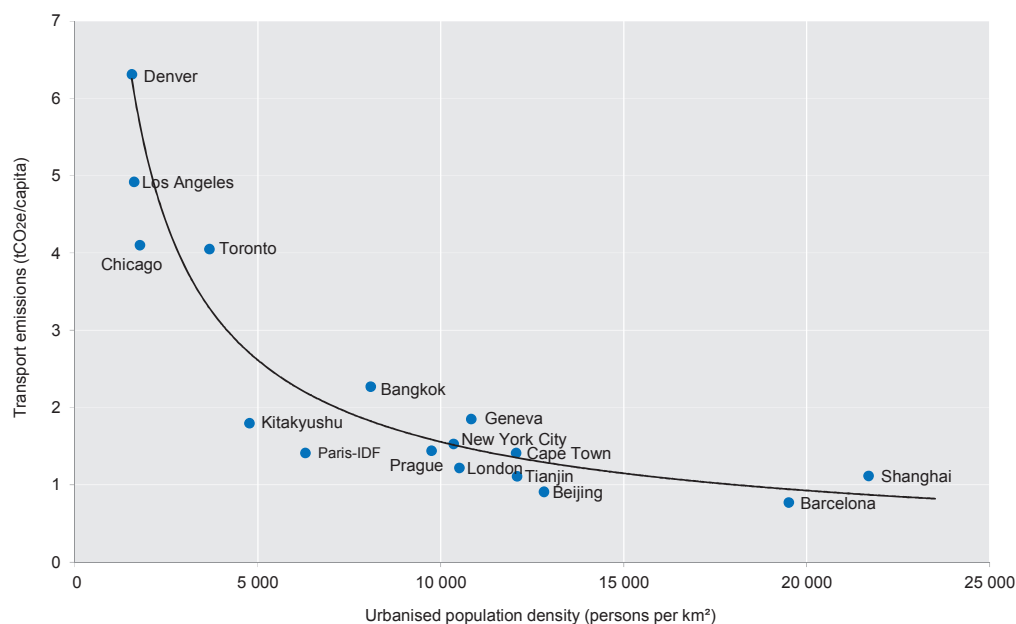
Yet, this does not imply that large cities have particularly negative effects on the environment or carbon emissions. In the absence of large cities, populations would need to live elsewhere, and environmental effects might simply be spread across larger territories or a number of smaller cities. So the question is not whether a city of 5 million inhabitants emits more greenhouse gases than a village of 500 inhabitants – obviously it does – but rather whether, other things being equal, per capita emissions are larger in one of the places. At first glance it may seem that cities contribute relatively more to CO<sub>2</sub> emissions. Cities account for only somewhat more than half of the world’s population, but for 60-80% of overall worldwide energy consumption, together with a roughly equivalent share of global CO<sub>2</sub> emissions.<sup>54</sup> This, however, does not take into account that, especially in emerging economies, cities account for a much larger share of industrial production (which is consumed elsewhere) than other parts of the country, and also that energy consumption rises with income. Larger cities attract more highly educated individuals, who typically have higher income and consumption levels, including of energy.<sup>55</sup>

While in some fields city dwellers may have a larger negative environmental impact, in other areas the opposite is likely to be true. Especially where public transport is well developed, cities are likely to have lower per capita emissions from transport than more less densely populated areas. Proximity between businesses and people’s homes is likely to promote sustainable transport means like walking or cycling. City dwellers also typically live in smaller apartments or houses, and may hence need less energy for heating.<sup>56</sup>

Figure 3.19 compares metropolitan areas with respect to population density and transport CO<sub>2</sub> emissions per capita. It shows that transport-related urban emissions are relatively low in fairly compact cities, such as Shanghai and Barcelona, and especially so

when public transport networks are more dense. In contrast, emissions per capita are a lot higher in spread-out urban agglomerations like Denver or Los Angeles.<sup>57</sup> This suggests that large cities are not high polluters per se, but rather that their impact on the climate and environment depends on urban form and the way they are organised. While urban density is neither a necessary nor a sufficient condition for attaining lower per capita emissions, it can be an important factor.<sup>58</sup>

Figure 3.19. CO<sub>2</sub> emissions from ground transport tend to fall as population density rises



*Notes:* Area in the population density calculation excludes green space. Unit for emissions (tCO<sub>2</sub>e) are tonnes CO<sub>2</sub> equivalent. Analytical units and reference years used in the calculations: Barcelona (city, 2006); Geneva (canton, 2005); London (Greater London, 2003); Paris-IDF (Île-de-France, region, 2005); Prague (Greater Prague, 2005); Chicago (Chicago Metropolitan Area, 2005); Denver (city and county, 2005); Los Angeles (county including 88 towns and cities, 2000); New York (city, 2005); Toronto (Greater Toronto, 2005); Bangkok (city, 2005); Beijing (province, 2006); Shanghai (province, 2006); Tianjin (province, 2006); Cape Town (city, 2006); Kitakyushu (city, 2007); Stockholm (city, 2011).

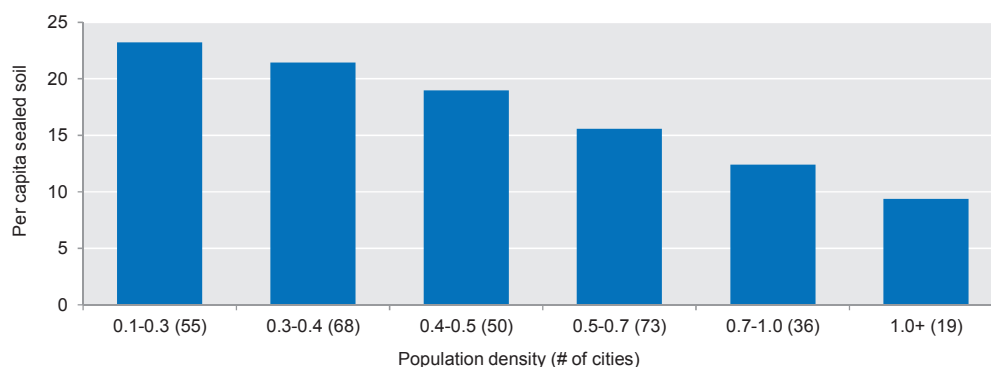
*Source:* OECD (2013d), *Green Growth in Kitakyushu, Japan*, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264195134-en>, p. 56; based on calculations by Kennedy, C. using the methodology from Kennedy, C. et al. (2009), “Greenhouse gas emissions from global cities”, *Environmental Science and Technology*, Vol. 43, No. 19, American Chemical Society, pp. 7 297-7 302.

From the beginning of the 20th century, cities experienced a trend towards more urban sprawl and the expansion of settled areas outside their limits. Urban land area in the OECD actually doubled in the second half of the last century.<sup>59</sup> Nonetheless, the amount of land used per resident, in Europe, decreases with the size of cities (Figure 3.20).

The problem with sprawl is not that cities are growing. It is normal that the land covered by cities increases to a certain degree with large increases in population. Also, if newly added suburbs either are well connected to the city centre by public transport (which, however, requires a certain minimum density for efficiency reasons) or inhabitants use renewable energy for their transport needs, sprawl will not have much of a negative impact, neither on carbon emissions nor the liveability of the city. The problem is rather that with urban sprawl, the use of individual fossil fuel-based vehicles usually

risers. In a large majority of cities, negative externalities of this transport mode, such as pollution and congestion, are not (correctly) priced. This implies that transport-related policies actually incentivise sprawl. In many cities, tax and regulatory policies similarly promote sprawl – usually as an unintended side effect in the pursuit of some other policy objectives. As a consequence, people are pushed further apart than they would otherwise wish to be. Correcting such policies and setting a realistic carbon price would hence make an important contribution towards achieving more compact development and improved environmental outcomes. However, as long as these policy changes are not implemented, imposing minimum densities in land-use regulations and urban planning exercises may be a reasonable second-best policy.

Figure 3.20. Per capita sealed soil in European cities



*Note:* Population density is the number of inhabitants (in thousands) per square kilometre in 2006 in the (functionally defined) city.

*Source:* European Union (2014), “Investment for jobs and growth: Promoting development and good governance in EU regions and cities”, *Sixth Report on Economic, Social and Territorial Cohesion*, European Commission, Directorate-General for Regional and Urban Policy, Publications Office for the European Union; and Batista e Silva, F. et al. (2013) “Direct and indirect land use impacts of the EU Cohesion Policy: Assessment with the Land Use Modelling Platform”, *JRC Scientific and Policy Reports*, Report EUR 26460, Publications Office of the European Union.

In many areas where cities can undertake policies that would reduce carbon emissions (transport, land-use/urban planning), decisions are often subject to approval by a multitude of actors (e.g. all the concerned municipalities). As mentioned in Chapter 2, metropolitan areas with institutions dedicated to overcoming related co-ordination problems have experienced better outcomes in terms of urban sprawl, air pollution and public satisfaction with public transport.<sup>60</sup>

Besides climate impacts, large cities also affect the habitats of species, which may in turn endanger biodiversity. The interplay of biodiversity and urbanisation is a highly complex field, and it is difficult to distinguish the idiosyncratic effects of large cities from those associated with economic growth and related changes in consumption patterns. Studies suggest that urbanisation leads to more biodiversity loss, in particular as both in developing and developed countries’ cities are predicted to evolve close to protected areas and areas of high biodiversity.<sup>61</sup> Whether a specific city poses particular risks to biodiversity may hence depend both on the local environment and on how development takes place. Many studies that claim a direct link from urbanisation to biodiversity, however, fail to take into account that in the absence of urbanisation many city settlers would locate in more rural areas, where they may also contribute to substantial

biodiversity loss. Overall, it seems fair to say that there is not much conclusive evidence about the impact that urbanisation per se may have on biodiversity.

In several countries, urbanisation has certainly contributed to water pollution and scarcity. Overexploitation of water resources and the construction of dams, as well as inter-basin water transfers, have contributed to water scarcity. Between 1960 and 2000, the rate of groundwater depletion more than doubled, reaching over 280 km<sup>3</sup> per year worldwide.<sup>62</sup> However, the impact of large cities on pollution and ground water levels has largely been determined by population growth and the quality of water management in the respective areas. Fractionalization of local actors in water policy has resulted in co-ordination problems in water governance, which have a large share of responsibility for observed degradations. Also, in many places water stress has not primarily been caused by cities, but by extensive irrigation that has required unsustainably high amounts of water.

Water quality has also suffered from bad sanitation systems and insufficient wastewater clearing. Wastewater was – and in many cities still is – flowing untreated into groundwater, rivers and coastlines. In developing countries, up to 90% of all wastewater is released in an untreated form.<sup>63</sup> This reinforces water shortages as polluted water is not available for the supply of drinking water. However, while for some cities scarcity of water is a real problem, as available water resources have to be brought over fairly long distances, problems with wastewater are not genuine to large cities per se, but simply result from bad policies and often lack of co-ordination.

Finally, large cities are important actors for green growth policies. Urban policy makers are typically in charge of land-use planning, infrastructure spending on social housing or other buildings, as well as for public transport infrastructure.<sup>64</sup> Thus, local governments have important levers to influence outcomes with respect to urban form, energy use and connectivity within the city. The introduction of “green” policies at the city level is usually less in tension with economic growth than at the aggregate level, and there are even a number of policy complementarities that facilitate green growth. For example, while stricter emission standards may render certain industries less competitive, the connected decrease of air pollution improves health outcomes for the local urban dwellers, thereby increasing their productivity. With regard to policy complementarities, a better public transport network may not only decrease CO<sub>2</sub> emissions but also increase the well-being of the urban population as congestion and pollution levels decline.

Overall, it is hard to make a conclusive assessment of the environmental impact of urbanisation, but it would seem that urbanisation can, in principle, make a positive contribution. Urbanisation may negatively affect biodiversity and water resources. However, it is likely that such negative effects could be generally prevented with sufficient financial resources and under well-designed and well-functioning governance structures at the metropolitan level and beyond. While metropolitan areas might be associated with higher GHG emissions per capita than smaller cities or rural areas due to, for example, differences in production and consumption patterns, there is also evidence that suggests that residents of large cities may actually contribute less to global CO<sub>2</sub> emissions where they live than if they moved elsewhere. In any case, GHG emissions in cities depend on urban form and policies. This, together with their large share in global CO<sub>2</sub> emissions, implies that cities have a crucial role in fighting climate change (Box 3.5).

### Box 3.5. Urban policies and climate change

Given emission levels and their capacity to take concrete actions, cities are a very important player for combating climate change, including through:

- Setting congestion charges, variable parking fees and toll lanes.
- Reforming local property tax provisions that favour single-family dwellings or otherwise contribute to sprawl, and greening the local tax system (e.g. in the Netherlands). Both local and national taxation policies can shape behaviour and environmental outcomes.
- Setting urban cap-and-trade mechanisms (e.g. in Chicago, Los Angeles and Santiago).
- Providing intergovernmental grants for local environmental spending (e.g. in Brazil, Germany, Portugal, Sweden and the United States).

Source: OECD (2010), *Cities and Climate Change*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264091375-en>.

## Notes

1. City sizes according to the EU-OECD definition for functional urban areas (see OECD, 2012a).
2. The indicators considered are broadly in line with indicators used to assess the quality of life across countries used by the OECD's Better Life Initiative for measuring individual well-being (OECD, 2011).
3. See De la Roca and Puga (2014) for details.
4. See Abel and Deitz (2012) for evidence on the impact on wages and Boualam (2014) for job satisfaction. A job is more likely to be perceived as professionally fulfilling when the worker's field of education and job are better matched.
5. See Bleakley and Lin (2012) for details.
6. See Costa and Kahn (2000) for details.
7. Rare properties often also have a subjective value to certain buyers that is way above expected market values. A recent example is the Korean car manufacturer Hyundai's September 2014 acquisition of a parcel of land for its headquarters in the sought-after Gangnam district of Seoul. The company was willing to pay triple the assessed land value for the property (The Wall Street Journal, 2014).
8. See Combes, Duranton and Gobillon (2012) for details.
9. Studies for France (Combes, Duranton and Gobillon, 2012), Germany (Ahrend and Lembcke, 2015) and the United Kingdom (Gibbons, Overman and Resende, 2011) find that (on average) higher prices curtail the wage increases from agglomeration economies.

10. See Handbury and Weinstein (2015) for details.
11. See Combes, Duranton and Gobillon (2012) for details.
12. See Moretti (2014) for details.
13. TomTom Traffic Index (Europe) for 2013 by TomTom International B.V., [www.tomtom.com/lib/doc/pdf/2014-05-14%20TomTomTrafficIndex2013annualEur-mi.pdf](http://www.tomtom.com/lib/doc/pdf/2014-05-14%20TomTomTrafficIndex2013annualEur-mi.pdf).
14. TomTom Traffic Index (Europe) for 2013 by TomTom International B.V., [www.tomtom.com/lib/doc/pdf/2014-05-14%20TomTomTrafficIndex2013annualEur-mi.pdf](http://www.tomtom.com/lib/doc/pdf/2014-05-14%20TomTomTrafficIndex2013annualEur-mi.pdf).
15. Data from ONS (Q1 2014).
16. See Ahrend and Lembcke (2015) for Germany, and Gibbons, Overman and Resende (2011) for the United Kingdom.
17. See Ahrend and Lembcke (2015) for evidence on the willingness of university educated workers to (implicitly) pay higher prices for amenities.
18. See Glaeser and Sacerdote (1999).
19. See Zenou (2003) for the concentration of crime within cities.
20. See OECD (2014c) for details. Costs are estimated in terms of people's willingness to pay to avoid death, using the value of statistical life.
21. The values are about USD 1.4 trillion in China and about USD 0.5 trillion in India in 2010 according to the best available estimates (OECD, 2014c).
22. PM<sub>10</sub> are particulates smaller than 10 microns, the WHO limit is 20 mg/m<sup>3</sup>.
23. See WHO (2011) for details.
24. For example, in 2012, 70% of Vienna's 1.7 million residents were exposed to daily road noise in excess of 55 decibels (the lower bound after which noise seems to create adverse health effects [WHO, 2011]). Data: European Environment Agency – Noise Observation and Information Service for Europe (NOISE) <http://noise.eionet.europa.eu/viewer.html> (accessed 8 October 2014).
25. See Glaeser, Gottlieb and Ziv (2014) for details.
26. See also OECD (2012c).
27. See Gaynor, Moreno-Serra and Propper (2013) for details.
28. See Cooper et al (2011) for evidence on mortality rates and Gaynor, Moreno-Serra and Propper (2013) for evidence on costs.
29. See Bloom et al. (2010) for details.
30. Average inequality increases with concentration of population in large cities. Around the average, however, regions exhibit significant heterogeneity. See Royuela, Veneri and Ramos (2014) for details.
31. See Chetty et al. (2014) for details.
32. See OECD (2013a) for details.
33. See for example Hoxby (2000) and Sacerdote (2001).
34. See UN DESA (2010 and 2014) for long-term demographic trends and forecasts.

35. See OECD (2012a) for a detailed exposition of the methodology.
36. See, e.g. UN DESA (2014).
37. See OECD (2013b) for detailed statistics.
38. See Brezzi and Veneri (2014) for details.
39. See Aghion and Howitt (2005) for details.
40. See OECD (2012d) for details.
41. See Carlino and Kerr (2015) for details.
42. See Carlino et al. (2012) for details.
43. Duranton and Puga (2014) provide a review of the literature.
44. See Rodríguez-Pose and Crescenzi (2008) for details.
45. Tiebout (1956) formalised this idea for the context of public goods provision by local governments. Sub-national governments can compete for residents by offering a basket of public goods and a price (in the form of taxes or fees); if there are enough competing governments, an optimal level of public good provision, which reflects individuals' preferences, is possible.
46. See Ahrend et al. (2014) for details.
47. See Ahrend and Schumann (2014).
48. See Veneri and Ruiz (2013) for evidence for the OECD and Partridge et al. (2008) for the United States.
49. See OECD (2013c) for details.
50. See Ahrend and Schumann (2014) for details.
51. See also World Bank (2008) for a general discussion of the relationship between urban and rural development.
52. See Dodman (2009).
53. See OECD (2010).
54. See OECD (2010).
55. See Kahn (2009).
56. OECD (2012c).
57. Large differences in per capita CO<sub>2</sub> emissions can even be found within countries. In Italy, for example, Genova has a smaller population size than Palermo but emits about four times more CO<sub>2</sub> per capita.
58. OECD (2013e).
59. See Hammer et al. (2011) for details.
60. See also Ahrend, Gamper and Schumann (2014).
61. See for example Güneralp and Seto (2013).
62. See Wada et al. (2010).
63. Corcoran et al. (2010).
64. See OECD (2013e).



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## *Chapter 4*

### **The cities of the 21st century**

*This chapter examines the main challenges connected with 21st century urbanisation. It looks both at challenges that are similar across the globe, as well as those that are specific to a certain country or group of countries. It then turns to the more specific question of what are the important features of liveable and environmentally friendly cities, and the policies that are needed in this respect. The chapter finally speculates about the shifts in power that are likely to result from 21st century urbanisation, and discusses the best way for governments to deal with them.*

## Chapter Synopsis

The 21st century wave of urbanisation creates both great opportunities and challenges. Some challenges are global, but many differ across countries. In the developing world, many cities struggle to provide basic infrastructure, such as drinking water, sanitation or electricity, to all of their residents. While not restricted to the megacities and metropolises in emerging and developing countries, pollution is an especially grave problem in many of them. Many cities, in particular in the United States, face the challenge of reducing the carbon footprint of large agglomerations that are based on car travel, and of organising the effective transport of large, and often increasing, populations. Japan, as well as a number of other countries, will have to adapt cities to ageing populations. Europe needs to deal with the fact that – in global comparison – its large cities are relatively small, which implies a specific need for cities to be well connected to each other. Last but not least, existing or emerging middle classes all across the globe increasingly ask for cities not only to provide for good jobs and livelihoods, but also to become more liveable. A higher level of well-being in the context of a city includes less pollution and congestion, good access to the places where residents need or want to go, and a generally attractive and secure city environment with a good choice of leisure activities.

While in large parts of Europe and Northern America the bulk of urbanisation has already taken place and is embodied in city forms and existing infrastructures, developing and emerging countries currently have an unprecedented opportunity to shape their urban futures. The decisions taken by governments at national, sub-national and city levels now will have consequences for the functioning, liveability and environmental sustainability of their cities for decades, if not centuries, to come.

The important challenges connected to urbanisation may explain why many countries still have policies in place that attempt to prevent or contain urbanisation. However, governments would be better advised to accompany and shape urbanisation to ensure that it results in well-functioning, liveable and environmentally sustainable cities. For example, reserving public space for infrastructure, including for roads or rail tracks, in advance, and gradually and proactively developing infrastructure is much cheaper, both financially and politically, than installing it once areas have been settled. Also, most large metropolitan areas will not be able to function well without good public transport systems, as evidenced by the congestion levels that can be observed in many of the fastest growing cities in emerging economies. The quality and efficiency of public transport, in turn, is closely connected to good land-use and transport planning, and adequate metropolitan governance structures can be critical to allow for this. But the success of cities depends not only on local institutions and actors; the framework set by national governments is also of critical importance. Only when national policy settings are sufficiently supportive can city-level initiatives have sufficient impacts and pay-offs. National policies typically determine both what cities can do and what cities have an incentive to do.

It would appear to be just a question of time before the economic strength of most OECD countries will have been overtaken by numerous urban agglomerations. Taken together with an increasing importance of large cities within countries, this will imply some shifts in power. It would seem in the best interest of central governments to accompany these shifts by modernising and adapting administrative structures to better reflect the needs of metropolitan agglomerations, and to ensure that functions which are best carried out at the metropolitan level are actually located there. Several national governments have recognised this, and are actively pursuing such an agenda.



*“A city is not gauged by its length and width, but by the broadness of its vision and the height of its dreams.”* (Herb Caen, 2010)

## The challenges of 21st century urbanisation

The preceding chapters have documented the great potential of urbanisation to benefit residents, countries and the planet at large. They have, however, also highlighted important challenges that need to be met so that the benefits of 21st century urbanisation accrue on all these levels. Some of these challenges are the same around the globe, though possibly at varying intensity. For example, all cities face environmental challenges, not least lowering their carbon footprint. All cities would also be well advised to increase their levels of resilience to various types of shocks, such as global warming, natural catastrophes, and terrorist or hacking attacks on vital infrastructure. A large number of cities around the globe – and especially those with rapidly growing populations – face the challenge of providing affordable housing with good access to transport.

But as cities and urbanisation trends differ across the world, so do many of the connected challenges.

- Many cities in the developing world struggle to provide basic infrastructure such as drinking water, sanitation or electricity to all of their residents. In many cases, this is not simply a question of affordability but also of repressed demand: many people would be willing to pay for such services, but are unable to get them. In addition to the obvious reductions in well-being, lack of basic services contributes to low levels of productivity, and perpetuates inequality. Basic infrastructure is critical not only for the current generation, but will also affect the possibility of the young to develop good health and education, and thereby will have long-lasting effects.
- The number of premature deaths resulting from particulate matter is estimated to rise from current levels of nearly 1.5 million to 3.5 million by 2050, highlighting the need to bring down local pollution levels in most cities around the globe. Water and air pollution are an especially grave problem in many of the megacities and metropolises in emerging and developing countries. Typically, pollution levels are particularly high in places that have benefited from strong increases in industrial activity in recent decades. Also, some of the megacities in the emerging world that have seen rapid population growth are the most congested cities, indicating the need for further developing transport infrastructure, in particular for public transport.
- In the United States, a big challenge will be to reduce the carbon footprint of large agglomerations which are based on car travel, and to organise the effective transport of large, and often increasing, populations. Especially, but not exclusively, in the largest agglomerations it is doubtful that this can be achieved without a stronger reliance on public transport. Given the recent trend of highly educated young professionals to locate in city centres, and the importance to cities of attracting talent, it would also seem in the interest of US cities to increase the attractiveness of their city centres.

- Japan, as well as a number of European and other countries, will have to adapt cities to ageing populations that require an even stronger focus on connecting residents with social and health services and on providing opportunities for elderly residents to maintain a social network and to remain active.
- Europe will have to deal with the fact that – in global comparison – its large cities are relatively small. This is not only in comparison with megacities in the emerging world: while overall levels of urbanisation in Europe are not that dissimilar from those in American OECD countries, the population share in metropolitan areas is almost 20 percentage points lower in Europe. The size of European cities will not allow them to reap agglomeration benefits to the level this can be achieved elsewhere. In such a context, “borrowed” agglomeration benefits from neighbouring cities become particularly important, implying a specific need for Europe to ensure that it has well-connected networks of cities.
- Last but not least, existing or emerging middle classes all across the globe increasingly ask for cities not only to provide for good jobs and livelihoods, but also to become more liveable. A higher level of well-being in the context of a city includes less pollution and congestion, good access to the places where residents need or want to go, and a generally attractive and secure city environment with a good choice of leisure activities. Especially in countries where many new large cities are arising, or where old, smaller cities are demolished to make way for modern high-rise developments, central authorities and city planners may want to keep in mind that residents – beyond tangible improvements of their daily lives – also like to identify with the city they live in. This is easier if the city has attractive features that differentiate it from other cities.

In large parts of Europe and Northern America, the bulk of urbanisation has already taken place and is embodied in city forms and existing infrastructures. The scope for changes in such an environment will be more limited, and by necessity have a tendency to take place fairly gradual. Developing and emerging countries, by contrast, have an unprecedented opportunity to shape their urban futures. The decisions taken by governments at national, sub-national and city levels now will have consequences for the functioning, liveability and environmental sustainability of their cities for decades to come.

### **Preparing the cities of the future**

The important challenges connected to urbanisation may explain why many countries still have policies in place that attempt to prevent, slow or contain urbanisation. Such policies often resemble the mythical fight of Don Quixote against windmills. But while attempts to prevent urbanisation are futile, policies to accompany urbanisation are certainly needed. Rather than trying to fight a global trend, national, sub-national and city governments need to focus on ensuring that urbanisation results in well-functioning, liveable and environmentally sustainable cities.

Even though smaller cities in rich countries may be able to function by relying on individual transport (and their main challenge may be to “green” it), large metropolitan areas will not be able to function well without good public transport systems. The congestion levels that can be observed in many of the fastest growing cities in emerging economies amply attest to this. The quality and efficiency of public transport, in turn, are closely connected to good city planning. Transport-oriented city development is certainly

not a luxury that large cities can ignore without significant reductions in the well-being of their residents. In this context, reserving public space (including for roads or rails) in advance and developing infrastructure in an organised way as a city grows is much cheaper, both financially and politically, than installing it once areas have been settled.<sup>1</sup> All in all, good city and transport planning have a big role to play, and adequate metropolitan governance structures can be critical to allow for this.

But the success of cities depends not only on local institutions and actors, the framework set by national governments is also of critical importance. Only when national policy settings are sufficiently supportive can city-level initiatives have sufficient impacts and pay-offs. National policies typically determine both what cities can do, and what cities have an incentive to do. For example, a strong national framework based on a carbon tax or price broadens the range of environmentally effective options available to cities and reduces the costs, or increases the returns, to any investment in climate change mitigation (e.g. green infrastructure, energy efficiency measures).

#### Box 4.1. Liveable metropolises in the 21st century

So what does a liveable 21st century metropolis look like? There may be some controversy around the issue, and in any case differences across cities are desirable insofar as preferences differ, so that people can opt for cities with the qualities they most care about. It is also important for metropolises to remain open to new inventions and developments.

However, at this point in time, some basic principles for liveable metropolises could look like this: A metropolis with an attractive, dense core which contains poles of activity both for business and leisure, which has some areas of high-rise buildings, and which is effectively connected to the other parts of the city by public transport. This core also features (areas of) apartment housing to ensure that it is an active and attractive place around the clock, and to give residents who like to be close to the city centre the choice to live there.

In addition to this core, there likely are other centres of high activity and (labour) density, which are also relatively well accessible by public transport. Population density will gradually decrease when moving away from the city core(s), thus allowing all individuals to choose how “urban” they want their life to be. Areas generally are mixed developments, i.e. featuring enterprises, shops, leisure activities and housing, though the choice of amenities will necessarily be lower in less densely populated areas.

Even when moving away from the core, developments are constructed such that residents have the possibility to access the city centre(s) via public transport, even though in the less densely populated parts the role of individual transport will be higher than in the more central, more densely populated parts. Access to preschools, elementary schools and other amenities of daily life (doctors, pharmacies, supermarkets) is quick. Most other amenities can typically be accessed from most parts of the city within a reasonable amount of time (maybe half an hour, but “reasonable” may depend on local circumstances and preferences). This should not be misunderstood as implying that each type of amenity or all parts of the city need to be reachable from everywhere in the city in such a time, which especially in large cities is obviously unrealistic.

Walking and biking are safe and agreeable, thus complementing public and individual motorised transport. Especially in areas of high population density, private car ownership is both unnecessary and expensive (as public transport is well developed and public space is too valuable to be used for parking at subsidised rates that do not take into account all of the negative externalities). Many residents of these areas rely on taxis or car-sharing arrangements when they need motorised individual transport services. At least in the large metropolitan areas, access by individual transport to the more densely populated central areas of the city is regulated and adequately taxed in some form (e.g. congestion charges). Water and air quality are high. All across the metropolis, attractive public spaces and attractive “going out” areas with cinemas, restaurants or cultural amenities are available.

## The political economy of the metropolitan century

When thinking about the political changes in the metropolitan century, it may be useful to start by looking at some basic facts. Within the OECD, eight metropolitan areas have larger populations than the median OECD country, and the population level of the 10 smallest OECD countries is surpassed by more than 60 metropolitan areas worldwide. Already today, only a dozen OECD countries have populations as large as Tokyo, Guangzhou, Shanghai, Delhi, Jakarta or the Seoul agglomeration.<sup>2</sup> Of course, OECD countries often still have higher GDP than cities in non-OECD countries. But many of these cities have been experiencing fast population and economic growth in the recent past. With the number of megacities (i.e. cities above 10 million inhabitants) projected to grow to more than 40 by 2030 – and with many of them in fast-growing countries – it would appear to be just a question of time before the economic strength of most OECD countries will have been overtaken by numerous urban agglomerations.

Within countries, the relative weight of metropolitan areas is also increasing, though less rapidly in the most developed ones. This shift of power towards large cities would potentially be amplified if increases in the number of countries, as could be observed over the last two decades, were to continue. More importantly, in coming decades, economic competition between countries is likely to increasingly turn into economic competition between their large agglomerations. Also, to respond to the needs of residents and global competition, and to correct outdated governance arrangements, countries will need to give increasing levels of responsibility to large urban agglomerations. It has, for example, been argued that the increased partisan divide in US politics has *de facto* increased the importance of the actions of the mayors of the large US agglomerations.<sup>3</sup> Last but not least, with increasing urbanisation, the share – and thereby the weight – of urban voters is going to increase.

All this does not mean the end of the nation state in its current form – or unions of nation states – as the dominant ways of political organisation, but it certainly implies a shift in power. It would seem in the best interest of central governments to accompany these shifts by modernising and adapting administrative structures to better reflect the needs of metropolitan areas and to ensure that functions which are best carried out at the metropolitan level are actually located there.<sup>4</sup> Staying with outdated, fragmented metropolitan structures could certainly delay shifts in power from central governments to large cities within a given country but would come at a hefty price. Constraining metropolitan areas – the motors of economies and societies – would weaken not only the economic and political might of those areas, but also of the country at large.

For the time being, the main mechanisms of international co-operation are at the national level (G7, G20, European Union, Mercosur, WTO, NATO, OECD, IMF and other international organisations). Given how complex and slow especially governance reforms of such entities are, this will likely stay so for at least a considerable time to come. However, the dominance of this form of international co-operation should not necessarily be taken for granted, as the spectrum of possible outcomes is wide. At one extreme of the spectrum, large metropolitan areas could take on a key role in international co-operation. While current networks of cities are mainly for establishing contacts, exchanging information and to lobby for common aims, there have been historical precedents where city networks played a much larger political, and military, role. At the other end of the spectrum, nation states (or associations of them) may maintain their dominance in international and diplomatic affairs, while further integrating and representing the interests of their large metropolitan areas at this level.

In the international context it may also be of importance that the lifestyle of high-skilled professionals in a metropolitan area with global reach is often in many respects more similar to the one in comparable metropolises in other countries than to the life in more rural places within the same country. This is to some degree connected to a larger set of professional choices, but more widely also related to a wider offer of amenities provided in large cities, and more generally a question of preferred lifestyles. A concrete sign of this trend is that many high-skilled young professionals from the European metropolises such as Paris, London or Berlin are more inclined to move to other globally important metropolises than to, for example, rural areas in their own country.

Overall, it would seem important that politicians on all levels, as well as other professions involved with city development, keep in mind that cities are, in a certain way, living organisms. Cities have a dynamic of their own, and what makes a metropolis special is not mainly its buildings and streets, but the combination and abilities of all its residents, and the interactions among them. As long as a city is compatible with the sustainability of this planet and provides high levels of well-being to its residents, its exact composition and aspects matter little. After all, cities have been, and will be, evolving and changing over time. It is hence of limited use to narrowly aim for some city ideal that at least in part will reflect the past. Instead, constructively accompanying future developments and rapidly responding to arising new challenges would seem a more promising strategy for metropolises – and thereby their countries – to ensure that the changes underway in the metropolitan century will benefit city dwellers and, more generally, humankind.

## Notes

1. On this issue see e.g. Angel (2012).
2. Comparisons based on OECD (2014a; 2014b) and UN DESA (2014).
3. See Katz and Bradley (2013) for details.
4. See City Growth Commission (2014) for an outline of strategies to provide greater autonomy to metropolitan areas in the United Kingdom.

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## *Annex A*

### **Glossary**

**Administrative fragmentation:** The degree to which an **urban agglomeration** is divided into different local governments. The OECD uses the number of municipalities per 100 000 inhabitants as a proxy for administrative fragmentation.

**Agglomeration economies:** Several different effects that increase labour productivity of workers in larger cities.

**City:** Not used in a strict administrative sense, but rather referring to an **urban agglomeration** or metropolitan area. When specific reference to the core city of an urban agglomeration or metropolitan area is made, this is specifically indicated in the text.

**Central business district (CBD):** The centre of economic activity within a city. In quantitative studies that need to define the centre of a city, the central business district is often used as an approximation for the city centre.

**Conurbation:** Several (typically larger) cities in close proximity to each other that have grown into a nearly continuously developed area. Examples are the Greater Tokyo Area, the New York Tri-State Area, the Randstad and the Ruhrgebiet. Conurbations may consist of one or of many **functional urban areas**.

**Externality:** Externalities are side effects of economic activities on other people that do not affect the actor. Because it does not affect the actor, he or she will not take the externality into account when deciding what to do. For example, air pollution is an externality of driving. Few people take it into account when deciding whether or not to use a car. Because people usually do not take externalities into account, activities that have negative externalities are undertaken too often and activities that have positive externalities are undertaken too rarely. If possible, an efficient solution is to tax activities that have negative externalities and subsidise activities that have positive externalities according to the value of the externality.

**Functional urban area (FUA):** According to the EU-OECD definition, a functional urban area consists of a city and its commuting zone. A city consists of one or more municipalities with the majority of their population in an **urban centre**. Urban centres are defined as areas with contiguous high-density grid cells with a minimum population of 50 000 (100 000 for Korea and Japan). The high density threshold is at least 1 500 inhabitants/km<sup>2</sup> (1 000 for Canada and the United States). An area outside the city belongs to a functional urban area if at least 15% of the employed residents commute into the city. For details, see OECD (2012), *Redefining “Urban”: A New Way to Measure Metropolitan Areas*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264174108-en>.

**Metropolitan governance:** Co-ordination mechanisms aiming at organising responsibilities among different public authorities in metropolitan areas.

**Modal share:** Share of transport carried out by a specific transport mode.

**Monocentric urban agglomeration:** **Urban agglomeration** with a single urban core.

**Public good:** A good or service that can be used by anybody and whose use by one person does not restrict the use by another person. A typical public good is street lighting. Street lighting can be used by anybody and its use by one person does not diminish its usefulness to another person. Because it is not possible to restrict the use of public goods, it is not possible to charge for them. Therefore, they are not provided by the private sector.

**Polycentric urban agglomeration:** **Urban agglomeration** with two or more urban cores.

**Rapid transit:** All modes of public transport in **urban agglomerations** that operate on infrastructure separated from other traffic.

**Urban agglomeration:** Generic term for a city and its surrounding areas with close socio-economic connections. **Functional urban areas** are an example for urban agglomerations. Since functional urban areas are only available for 29 OECD member countries, “urban agglomeration” is used in this report to loosely describe a city and the surrounding area that is connected through substantial daily population flows.

**Urban centre:** Within the EU-OECD definition of **functional urban areas**, urban centres are contiguous grid cells of 1 km<sup>2</sup> with a high density. The high-density threshold is at least 1 500 inhabitants/km<sup>2</sup> (1 000 for Canada and the United States). The contiguous grid cells (with gaps filled) should have at least 50 000 inhabitants.

**Zipf’s law:** Statistical regularity between the size of the city and its rank in a ranking of a country’s largest cities that can be observed in most countries.



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# The Metropolitan Century

## UNDERSTANDING URBANISATION AND ITS CONSEQUENCES

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