

COMPANION PAPER 1

CITY ANALYTICS

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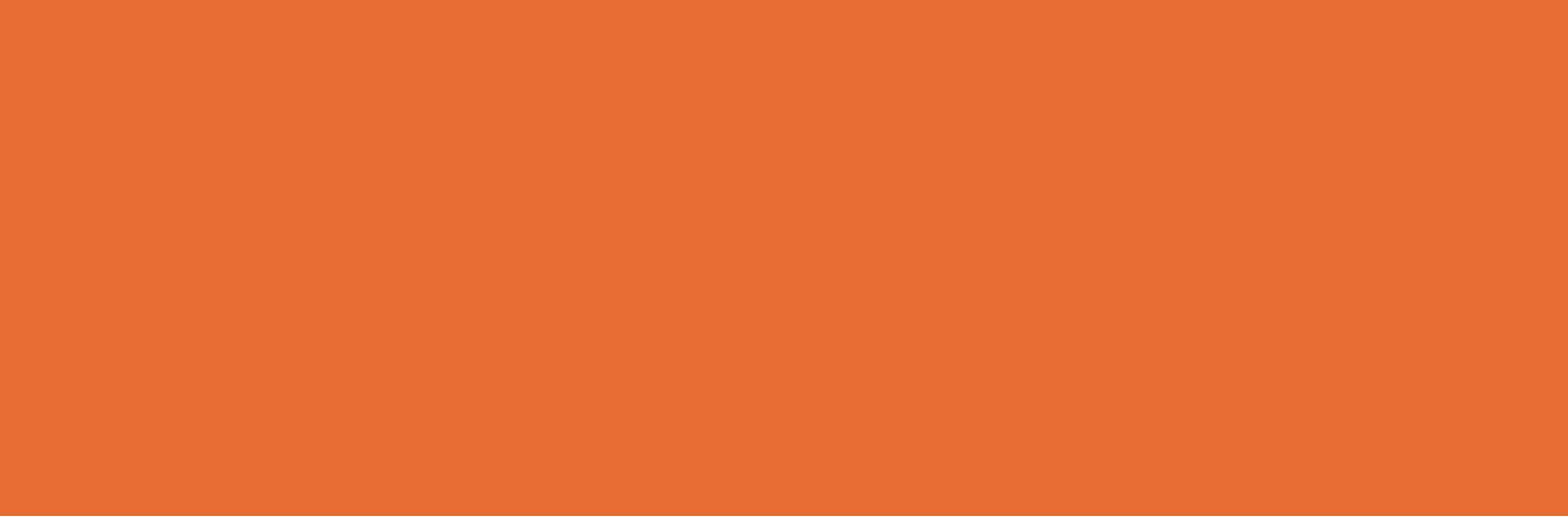


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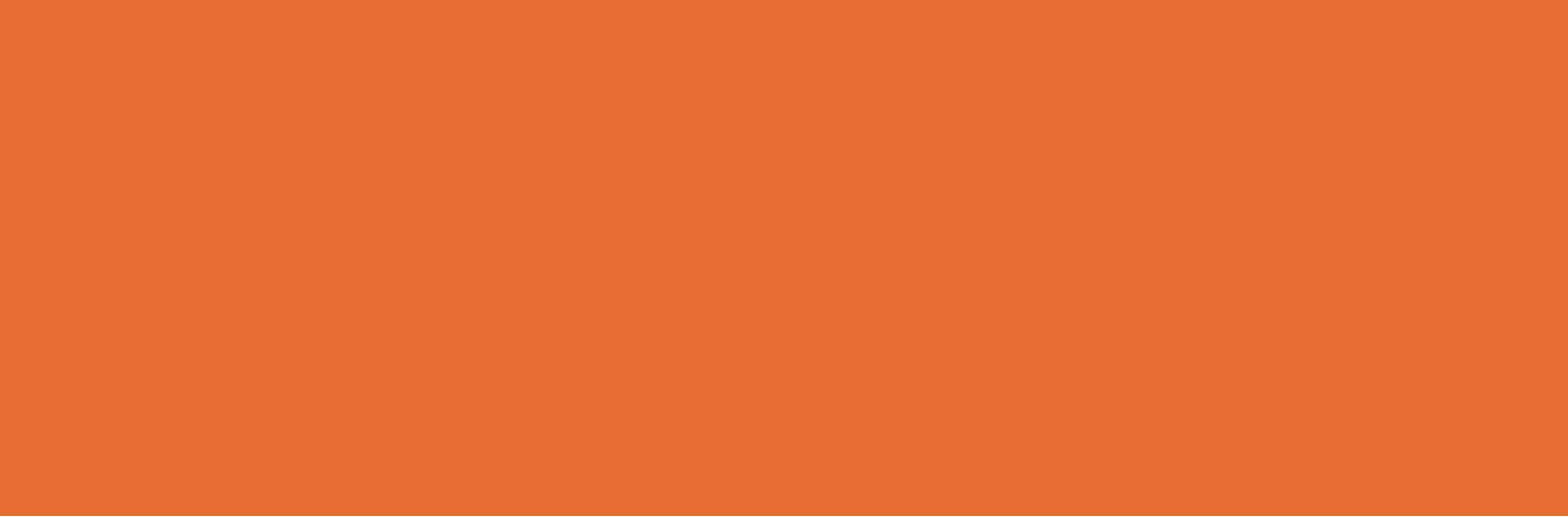
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BACKGROUND AND ACKNOWLEDGEMENTS

Interest in studying city competitiveness has skyrocketed in the past few years, although the topic itself is far from new. Mayors and city leaders have long worried about the obstacles to job creation, competitiveness, and economic growth that plague their cities.

This paper is part of a broader research initiative, the Competitive Cities Knowledge Base, which is managed jointly by the Trade and Competitiveness Global Practice and the Social, Urban, Rural, and Resilience Global Practice of the World Bank Group. Its objective is to create a knowledge base on competitive cities, to improve the understanding of job creation at the city level and as a foundation for a community of practice on this topic for World Bank staff, academia, donor partners, and practitioners.

Our attempt in this initiative has been to focus our energies on bringing to our clients a robust body of knowledge that will address their questions on benchmarking their performance, on understanding what has worked elsewhere and what has not, and on looking at ways to organize for delivery in different contexts.

Our approach has focused on using different methodologies to tackle these questions. These methodologies are based on best practices, data availability, replicability, and simplicity. In many cases, we have leveraged new and existing data sources to shed new light on some unanswered questions; in others, we have conducted primary research because available data were inadequate. We looked at global and regional trends, comparing different typologies of cities by

income, sector, region, and so on. And we have buttressed these findings with econometric deep dives and case studies in selected countries and cities. We are able to inform the ongoing debates on what really matters for economic outcomes in cities with analysis of overarching trends and associations, supplemented with rigorous analyses to identify causal relationships. We also try to “stand on the shoulders of giants” where possible: that is, we use and reference existing resources (research, analysis, toolkits, and experts). The summary findings of the overall research are presented in the framework report, *Competitive Cities for Jobs and Growth* (World Bank, 2015).

The objective of this paper is to present key findings from the quantitative analysis of the drivers of competitiveness in cities around the world.

This note was prepared by Kenan Fikri and T. Juni Zhu, with contributions from Anca Rusu and guidance and assistance from Austin Kilroy and Megha Mukim. The joint task team leaders of the Competitive Cities Knowledge Base project are Austin Kilroy and Megha Mukim. Stefano Negri, Sameh Wahba, Ceci Sager, and Somik Lall have provided overall guidance on the project as senior advisers.

The team would like to acknowledge gratefully the European Commission; the African, Caribbean, and Pacific Group of States Secretariat; and the governments of Austria, Norway, and Switzerland for financing this study through the Competitive Industries and Innovation Program.

EXECUTIVE SUMMARY

Cities today are home to 54 percent of humanity (UN-DESA 2015). They cover only a fraction of the world's landmass but concentrate 80 percent of global gross domestic product (GDP) (World Bank 2013).¹ Since the Industrial Revolution, country after country has witnessed urbanization lift entire generations out of poverty and into the middle class. Cities combine their societies' resources into something more than the sum of their parts. For countries, cities are the engines of productivity and the workhorses of development. For individuals, cities mean opportunity.

Yet what makes a city thrive and its residents prosper—in short, what makes a city competitive—remains a frustratingly difficult question to answer. To some extent, every city has its own secret sauce. But some sauces do seem to be more potent than others, a fact that suggests certain ingredients and combinations may matter more than others in determining economic outcomes. This paper aims to track down some elusive common threads by assessing the state of cities in the world today and identifying factors that appear to be correlated with better economic outcomes. We explore these issues globally, across all cities, as well as within regions and across different city typologies. The paper is designed to summarize the project's findings and demonstrate how the database and analytic tools can be used in other contexts—for example, in regional deep dives.

The analysis presented here begins by benchmarking the economic performance of 750 cities across the globe. It assesses not only how quickly those cities are growing but also how their economies are changing, how their performance compares with that of peers at home and abroad, and where these cities fit in their national urban systems. We draw from these findings common development pathways and then plot individual cities along them. The explanatory portion of the analysis starts by taking stock of the existing knowledge base on city competitiveness with a review of secondary sources. It proceeds to explore the factors associated with better competitiveness outcomes across multiple posited buckets of determinants through a simple correlation analysis. Then we use regression analysis to explore how facets of local government autonomy relate to city competitiveness. We find no holy grail for city competitiveness, but we do find many hints.

Key findings from the global quantitative analytics work stream are as follows:

- The story of the world's cities from 2000 to 2012 was one of rising prosperity. Powered by China, GDP per capita across cities in the data set grew by 4.6 percent on average each year. Of the 750 cities under study, 36 percent achieved annual average growth rates above 5 percent. GDP per capita fell in 46 cities under study—a small fraction of the total that includes not only the recession-hit cities of the developed world but also struggling cities in Sub-Saharan Africa and beyond, thus reminding us that development does not always proceed as linear advancement.
- The world's cities remain extremely heterogeneous, and the results presented here argue emphatically against a one-size-fits-all approach to city competitiveness. The most populous city in the data set had a population 144 times that of the smallest, and the richest city enjoyed a GDP per capita level 384 times that of the poorest. Although China's cities achieved astonishing growth rates, income levels and living standards fell in parts of Europe and Central Asia and of Sub-Saharan Africa.² Even where growth was robust, productivity, incomes, and employment were not guaranteed to follow suit.
- Cities generate a disproportionate share of new private sector jobs. From 2006 to 2012, 750 of the world's largest cities analyzed here created 87.7 million private sector jobs, accounting for 58 percent of all new private sector jobs in their 129 countries over the period despite collectively being home to only one-quarter of total private sector employment. Beijing and Chongqing (in China) and Jakarta (in Indonesia) created the most private sector jobs in sheer numeric terms, with more than 2 million new jobs each.
- The competitiveness opportunity is huge. If each city had elevated the local rate of job creation to that achieved by the average city in the top quarter of performers in its region, 18.9 million extra jobs would have been created in 2012 alone.

- The manufacturing sector is slowing as an engine of growth, particularly for low-income cities. The rate of job growth in the industrial sector of the economy has slowed significantly for low-income countries over the past 12 years, prompting the question whether the services sector will prove to be as powerful an engine of development.
- Strong tradable sectors characterize competitive cities. In the 10 percent of cities in which GDP per capita grew fastest from 2005 to 2012, tradable sector employment growth outstripped non-traded sector employment growth by 2.5 percent on average annually. By contrast, in less competitive cities, tradable and non-tradable industries grew, both at a slower rate.
- Foreign direct investment (FDI) remains highly concentrated in a relatively small number of elite cities. However, in terms of FDI inflows per dollar of GDP from 2003 to 2012, two-thirds of the top FDI destination cities could be found in Sub-Saharan Africa, South Asia, and East Asia and Pacific (excluding China). Nonetheless, the economic development potential of FDI should not be overstated. In every city, local firms still create the majority of jobs.
- The dominant economic sector in a city changes only over very long time horizons. When it does change, cities typically—but not always—follow a well-established pathway. Four of five cities saw no change in the largest sector of their economy from 2000 to 2012. Of those that did change, almost half transitioned from industry to high-end services. Several South Asian cities transitioned from high-end services to consumer services, thus challenging the assumption of a linear development pathway.
- As incomes rise and cities progress along the development pathway, their functions evolve. Up to approximately US\$2,500 GDP per capita, cities serve primarily as market towns and central points for the exchange of basic services. At GDP per capita levels of about US\$2,500 to US\$12,000, industry dominates the economy, and cities take on a new role as production centers and agglomerations of people, capital, and suppliers. As cities progress to higher income levels, the tertiary services sector grows to dominate the economy. These creative and financial services hubs thrive on human capital and innovation.
- Cities rarely change their position in a national urban hierarchy except in large countries. National urban hierarchies typically exhibit remarkable stability, but when changes do occur they are either dramatic (for example, New Orleans or Detroit in the United States) or in fast-growing countries with large urban systems (for example, China, India, or Nigeria). In five countries, the primary city in terms of population was displaced by 2012 by the city that ranked highest in 2000 in terms of GDP.
- The factors associated with positive competitiveness outcomes in cities vary by income level. Institutions and regulations matter at all levels of income and economic structures, whereas physical infrastructure appears to boost growth at low income levels; social infrastructure supports productivity at middle income levels; and innovation, human capital, and financial infrastructure all contribute to growth, productivity, and living standards in high-income cities.
- Competitive cities are good at mopping up inequality. Even without significant increases in administrative powers, competitive cities—especially cities that attract a large influx of migrants—are good at reducing inequality. Although global city-level data confirm that in-migration contributes to intracity inequality in the short term, we observe that inequality tends to decline over time as cities develop and new migrants are absorbed into the labor force.
- Maximizing the quality and pace of economic development may call for a nuanced approach to devolution. Regression analysis found that expanding the scope of a mayor's administrative remit is associated with improved competitiveness in cities, but the same is not true for financial autonomy. In-depth research carried out in China suggests that local government capacity is also a determining factor.

1. Introduction

This technical note concluding the global quantitative analytics portion of the Competitive Cities Knowledge Base project at the World Bank Group begins by reviewing the available data on cities and analyzing the recent economic performance of cities across regions and select typologies. It then presents the findings from correlation and regression analyses studying the predictors of city competitiveness. Finally, this paper attempts to identify development pathways and plot cities along them to help inform advisory or technical work across World Bank Group stakeholder communities in the future.

The technical, descriptive, and analytic findings discussed in this paper are intended to uncover global trends, given available data, while at the same time illustrating a city-based approach to development analysis. The work presented here can be tailored or deepened in whole or in part to explore city performance across regions or topic areas.

2. City Profile and Performance

What data on cities are available?

Numerous organizations have attempted to rank cities across the world on one combination of metrics or another, but city-level data sets with detailed raw data on city economic structure and performance over time and with global coverage are few and far between. The World Bank Group purchased a comprehensive data set for this project: the Global Cities Historic Database from Oxford Economics (OE). Euromonitor International maintains an alternative database called Passport: Cities that offers a comparable range of indicators for 126 large cities but a much more limited range (covering population and household characteristics) for more than 1,000 smaller cities. The Euromonitor data set extends back only to 2005 but does offer forecasts to 2020 on certain indicators.

The OE database used in this paper covers 750 cities (defined as metropolitan areas) across 140 different countries. The data set is not intended to be comprehensive; the cities were selected from the United Nations list of urban agglomerations with at least 750,000 inhabitants and then supplemented with other strategic cities such as country capitals.³ The data set contains 12 years of historical data, covering the period from 2000 to 2012, and includes 90 different variables covering demographics, output and employment (each by sector), household income, consumer spending, and retail sales, among others. This analysis uses only the small number of indicators that deal directly with economic outcomes.

Findings presented here are derived from the OE database unless otherwise stated. Additional sources include data on public finances (revenues and expenditures) that were obtained from the International Monetary Fund and patenting data from the Global Urban Competitiveness Project. See tables 4.1 and 4.2 for a list of the variables and their sources that were used in the correlation and regression analysis.

Exploring the Oxford Economics data

Even within OE's sample of the world's 750 largest cities, the basic characteristics of cities vary hugely across regions, and before we dive into the analysis, it will be instructive to take stock of the heterogeneity. Table 2.1 provides a profile of the average city in each World Bank Group region contained in the data set.⁴ The *n* reports the number of cities from each region.

Table 2.1 Profile of the average city in each World Bank Group region

Indicator (2012)	OECD (n = 176)	East Asia and Pacific (n = 206)	Europe and Central Asia (n = 71)	Middle East and North Africa (n = 46)	Latin America & the Caribbean (n = 94)	Sub-Saharan Africa (n = 69)	South Asia (n = 88)
Income level	High	Upper middle	Upper middle	Upper middle	Upper middle	Lower middle	Lower middle
Size (population, million)	2.8	5.5	1.4	2	2.3	2	2.7
Population growth (%)	0.6	0.8	0.2	2.3	1.2	3.4	2.3
Working-age population share (%)	67.1	71.7	71.4	70.4	67	60.5	68.4
Youth population share (%)	17.2	19.3	16.2	24.9	25.8	36.8	26.6
Labor productivity (GVA/worker, US\$)	91,500	33,000	22,400	30,500	21,500	8,200	6,700
Job growth rate above national rate (%)	0.2	1.5	0.3	0.3	0.45	1.4	0.8
GDP growth rate above national rate (%)	0.2	2.1	0.2	0	0	2	0.8
Share of national GDP (%)	8.2	3.8	10.8	12	8.6	15.5	1.2

Source: Oxford Economics Dataset

Note: GDP = gross domestic product; GVA = gross value added.

Profile of the average city in the data set by region

In 2012, the average Organisation for Economic Co-operation and Development (OECD) city in the data set was a high-income city of 2.8 million inhabitants that had extremely high levels of labor productivity by global standards that was growing slightly faster than its national economy.⁵ From figure 2.1, we see that high-end services dominated the average OECD city economy, accounting for almost 40 percent of value added.

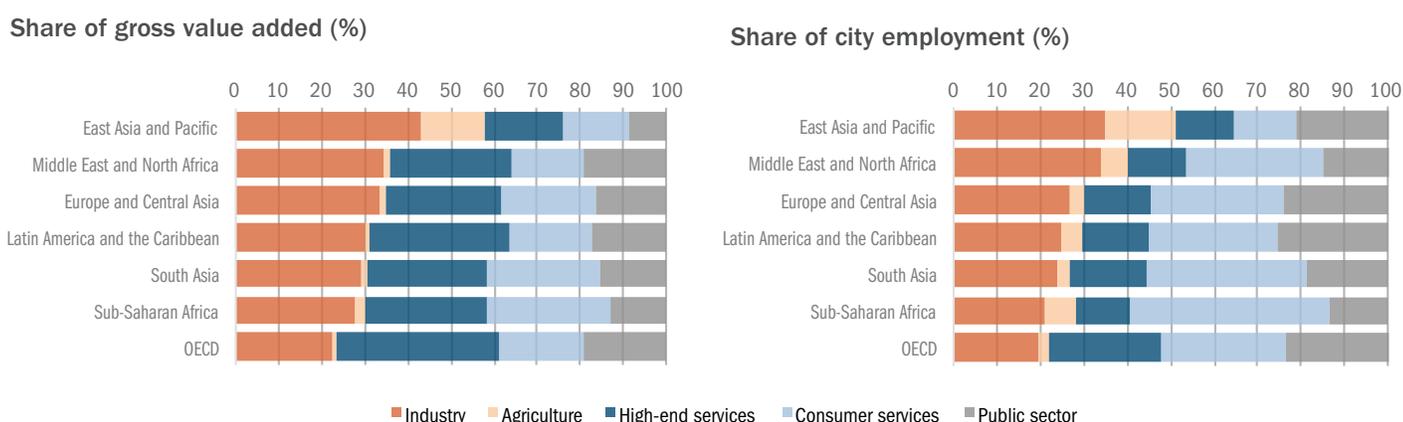
The average East Asian and Pacific city in the data set in 2012 was an upper-middle-income city with 5.5 million people—more than in any other region—and labor productivity of US\$33,000 in value added per worker per year, second behind OECD cities. Job growth rates in East Asian and Pacific cities exceeded their national averages by 1.5 percent and output growth rates by 2.1 percent. Industry and mining dominated the economy of the average city and accounted for over 35

percent of employment and nearly 50 percent of gross value added (GVA)—far above the average in any other region. Consumer services and high-end services sectors were under-sized.

From Europe and Central Asia, the average city in the data set was upper-middle income with 1.4 million people. Many cities dominated their national economies, with the average city generating over one-tenth of country GDP. In terms of population, European and Central Asian cities were the slowest growing in the world. In terms of employment and GDP, they grew slightly faster than their national economies in 2012.

The average city of the data set in the Middle East and North Africa was upper-middle income with 2.0 million people. Such a city had relatively high labor productivity, at US\$30,500 in value added per worker per year, and a relatively high population growth rate. The average city in the Middle East and North Africa played a significant role in its national

Figure 2.1 Industrial profile of the average city in each region, 2012



Source: Oxford Economics Dataset

Note: OECD = Organisation for Economic Co-operation and Development.

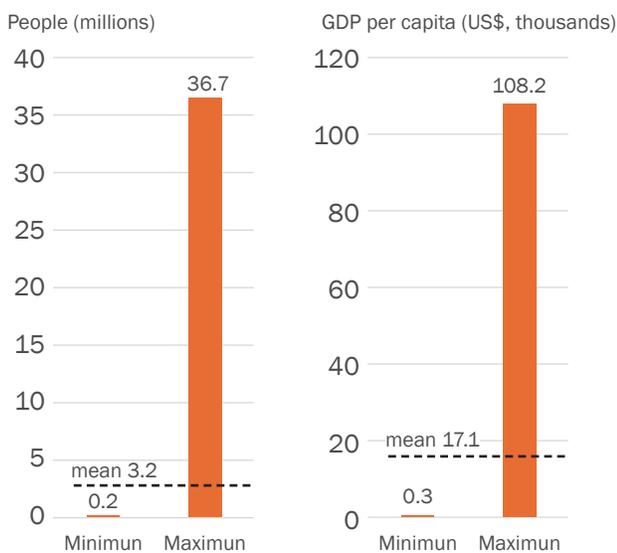
economy, accounting for 12 percent of total GDP. It also had a large public sector—smaller only than OECD cities—and a comparatively small consumer sector.

The average Latin American and Caribbean city in the data set was upper-middle income with 2.3 million inhabitants and a relatively young demographic profile. Consumer services employed the largest share of workers, but industry and high-end services accounted for the largest shares of value added.

In South Asia, the average city was lower-middle income with 2.7 million inhabitants. In a region with relatively well-developed urban systems, the typical city accounted for only 1.2 percent of its national GDP. In productivity, workers still lagged far behind their peers in all other regions, including Sub-Saharan Africa. Labor productivity in the average South Asian city stood at US\$6,700 in value added per worker per year.

Finally, the data set's typical city in Sub-Saharan Africa was lower-middle income with 2.0 million people. The region itself experienced faster population growth than any other region. The average city in Sub-Saharan Africa was adding jobs and increasing output at a significantly faster rate than its country, and the typical city's impact on national economic performance mattered more in Sub-Saharan Africa than elsewhere because the typical city accounted for over 15 percent of its country's GDP.

Figure 2.2 Spectrum of city starting points within the Oxford Economics data set



Source: Oxford Economics Dataset

Global variation in the data set

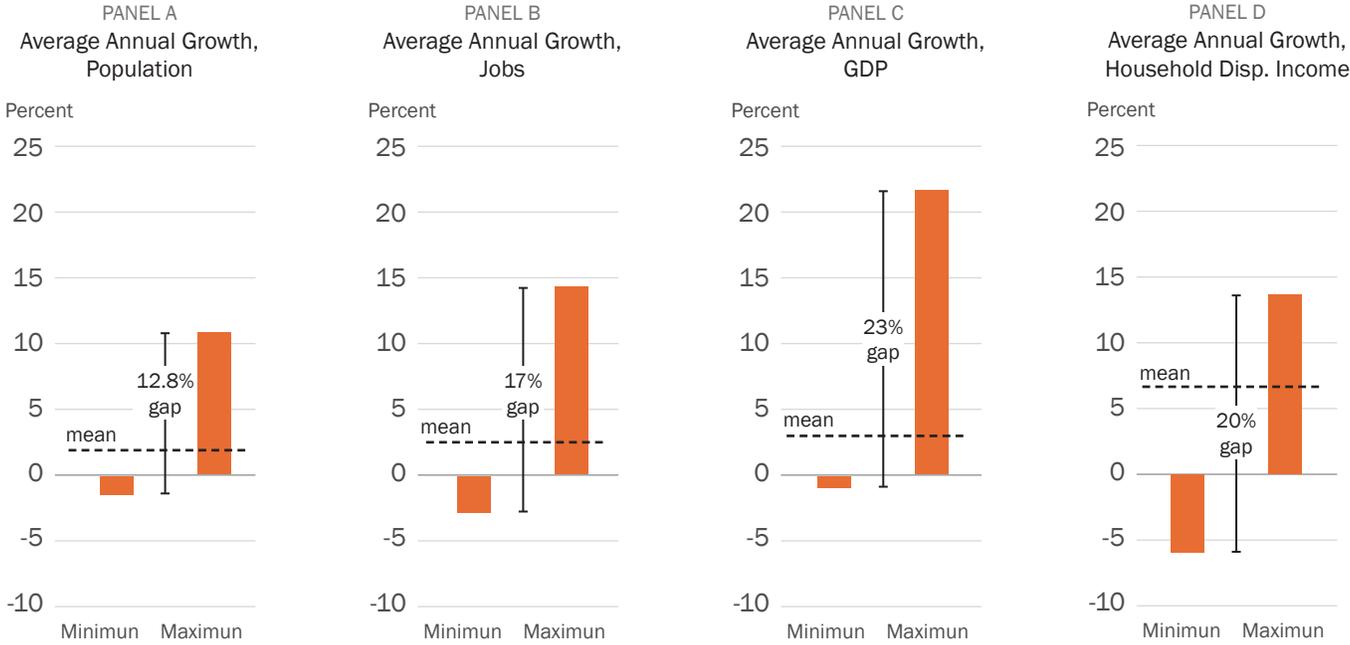
The cities in this global sample vary greatly, and their diversity serves as a useful reminder that this paper analyzes 750 heterogeneous units. Cities differ across many dimensions: size, economic vocation, geographic location, natural endowments, income level, history, planning model, political system, and so on. Furthermore, each city strives to solve dramatically different issues with different starting points. A city in Europe and Central Asia may be trying to manage deindustrialization, whereas in South Asia or Sub-Saharan Africa, a city may be struggling to integrate new migrants into the job market, social fabric, or built environment. In OECD countries, a city may be preoccupied with attracting talent through amenities or with rekindling fading entrepreneurial zeal.

Figures 2.2 and 2.3 underscore this point. The largest city in the data set, Tokyo (Japan), has 144 times the population of the smallest, Gaborone (Botswana). Even more starkly, the richest city in the data set, Basel (Switzerland), enjoys a GDP per capita that is an astonishing 384 times higher than that of the poorest city, Kinshasa (Democratic Republic of Congo).

Nor are the cities different only across static measures. The four panels of figure 2.3 show the maximum, minimum, and mean city performance across four economic indicators for the period from 2000 to 2012. While in the United Arab Emirates, Dubai's population grew by 11.3 percent per year, in Latvia, Riga's population fell by 1.5 percent. Putting the competitiveness imperative in stark relief, one notes that as average household disposable income grew by 13.7 percent per year in Guigang (China), it fell by 6.0 percent per year in Yamoussoukro (Cameroon).

These disparities are not entirely driven by outliers. The difference between the average city in the top and bottom 10 percent globally on these metrics ranged from 5.2 percent for population growth to 13.7 percent for GDP growth. Population, employment, and living standards all shrank from 2000 to 2012 in the bottom 10th of the world's cities analyzed here.

Figure 2.3 Measuring the disparities in city performance observed in the data set, 2000-2012



Source: Oxford Economics Dataset

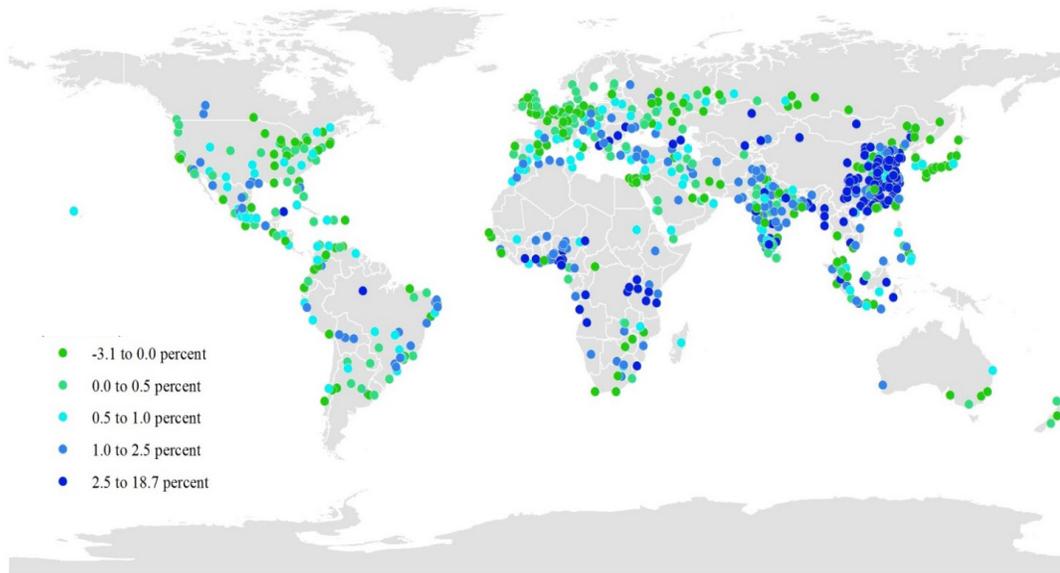
Comparing city and national economic performance

At the country level, identifying outlier cities is the first step in determining what differentiates the most competitive cities within their peer group. The city profiles from table 2.1 show that across regions the average city outperformed its country in terms of job growth from 2011 to 2012, and except for the average city in Latin America and the Caribbean and the Middle East and North Africa, this metric also held for GDP growth. Certain individual cities far outper-

formed their national economies and peers. These cities are of particular interest because of their particular capacity to achieve high growth rates no matter the characteristics of their national economies.

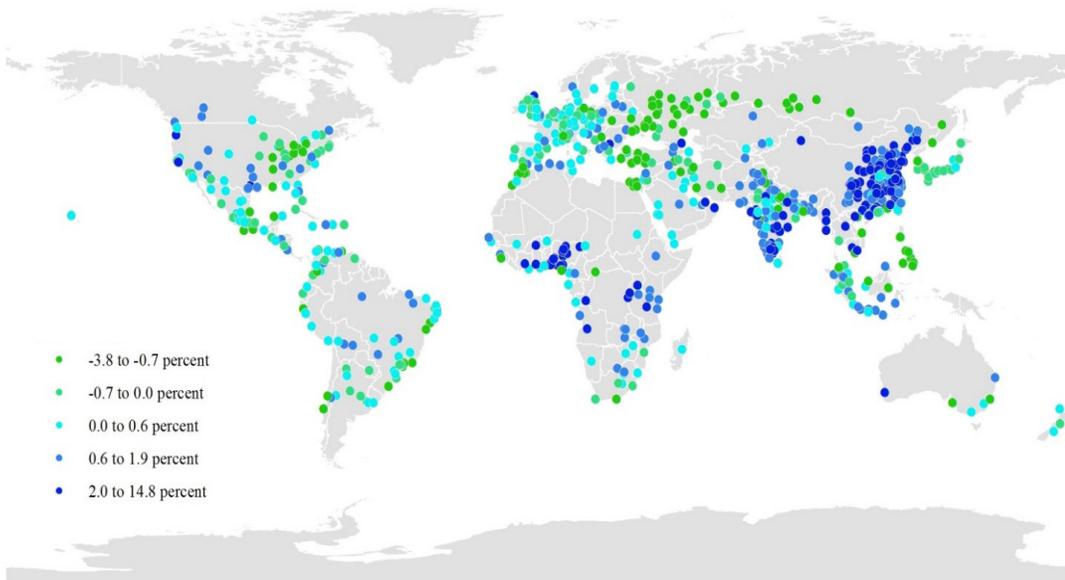
Figure 2.4 compares the average difference between city and country employment growth each year over the 12-year period. Several pockets of over- and underperformance stand out. Cities performed much better than their national economies in parts of West Africa centered on Nigeria, in East Africa, in coastal and inland China, in parts of Bangladesh and India, and in portions of Southeast Asia. Cities in Europe;

Figure 2.4 Annual city employment growth rates relative to national economy, 2000–12 average



Source: Oxford Economics Dataset

Figure 2.5 Annual city GDP growth rates relative to national economy, 2000–12 average



Source: Oxford Economics Dataset

Cities in Latin America and the Caribbean and the Middle East and North Africa were less likely to outperform their national economies than peers from other regions.

the Russian Federation; much of the United States; and portions of Australia, Latin America, the Arab Republic of Egypt, Japan, South Africa, and northeast China underperformed their national economies—in some cases, significantly so.

The output map (figure 2.5) tells a largely similar story, with a few exceptions: joining the underperformers were a number of cities in the Islamic Republic of Iran, the Philippines, and Turkey. This time cities in northeast China far outperformed the country, and European cities did better in terms of GDP as well.

Table 2.2 lists the top 10 outperformers from each region over a shorter period—from 2006 to 2012. The top 10 were determined by summing each city's average annual employment and GDP growth rates above the national average over the same time period. The shorter period was chosen (a) to reduce the number of economic cycles that the measurement cut across and (b) because data before 2006 are unavailable for some cities. Chinese cities have been excluded to let other outperformers in East Asia and Pacific rise to the top. The table shows that the vast majority of cities in South Asia and Sub-Saharan Africa outperform their national economies. This outcome stands in stark contrast to the situation in the OECD, where fewer than half of cities outperform their national economies in terms of GDP. Outperformers are relatively rarer in Latin America and the Caribbean and the Middle East and North Africa.

Table 2.2 Top 10 outperformers by region, ranked by combined average annual outperformance on output and jobs (2006–12)

Rank	East Asia & the Pacific	Europe & Central Asia	Latin America & the Caribbean	Middle East & North Africa	OECD	South Asia	Sub-Saharan Africa	
1	Nay Pyi Taw, Myanmar	Makhachkala, Russian Federation	Cancún, Mexico	Sharjah, United Arab Emirates	Austin, United States	Pondicherry, India	Onitsha, Nigeria	
2	Kota Kinabalu, Malaysia	Sofia, Bulgaria	Santa Cruz, Bolivia	Algiers, Algeria	Portland Oregon, United States	Patna, India	Enugu, Nigeria	
3	Vientiane, Lao PDR	Tbilisi, Georgia	Saltillo, Mexico	Muscat, Oman	Aberdeen, United Kingdom	Tiruppur, India	Abuja, Nigeria	
4	Mandalay, Myanmar	Krasnodar, Russian Federation	Cochabamba, Bolivia	Oran, Algeria	San Jose, California, United States	Surat, India	Benin City, Nigeria	
5	Yangon, Myanmar	Kazan, Russian Federation	Teresina, Brazil	Marrakesh, Morocco	Houston, Texas, United States	Ghaziabad, India	Abeokuta, Nigeria	
6	Ujung Pandang, Indonesia	Bucharest, Romania	Campo Grande, Brazil	Riyadh, Saudi Arabia	Perth, Australia	Raipur, India	Ilorin, Nigeria	
7	Hanoi, Vietnam	Chisinau, Moldova	San Luis Potosi, Mexico	Constantine, Algeria	Edmonton, Canada	Hyderabad, India	Ogbomosho, Nigeria	
8	Pekan Baru, Indonesia	Yerevan, Armenia	Recife, Brazil	Abu Dhabi, United Arab Emirates	Salt Lake City, United States	Bangalore, India	Kano, Nigeria	
9	Ho Chi Minh City, Vietnam	Penza, Russian Federation	Curitiba, Brazil	Meknes, Morocco	Calgary, Canada	Vijayawada, India	Ibadan, Nigeria	
10	Ulaanbaatar, Mongolia	St. Petersburg, Russian Federation	Chihuahua, Mexico	Mosul, Iraq	San Antonio, Texas, United States	Coimbatore, India	Aba, Nigeria	
	Number of average annual GDP outperformers	40 out of 56	51 out of 71	53 out of 94	22 out of 46	75 out of 176	78 out of 88	63 out of 69
	Number of average annual jobs outperformers	40 out of 56	50 out of 71	69 out of 94	35 out of 46	93 out of 176	71 out of 88	59 out of 69

Productivity differentials across cities and within countries

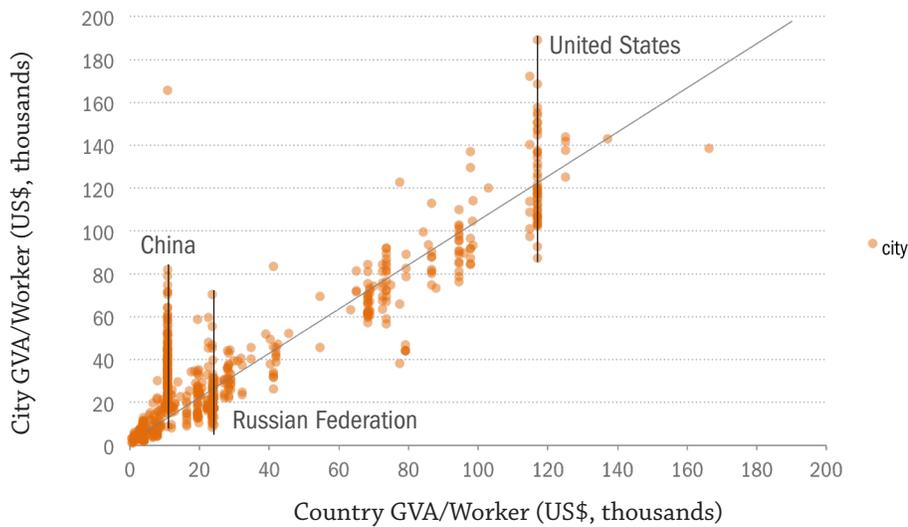
Worldwide, 70 percent of cities were more productive than their countries as a whole in 2012 (measured as GVA per worker). Considerable variation can be found within countries, however. In a country with a mature urban system, such as the United States, city productivity runs below the national average in nearly as many cases (23 in this data set) as it runs above (27). Output per worker in San Jose (California), the most productive U.S. city, is more than twice that of the least productive, Buffalo (New York), at over US\$210,000 per worker compared with US\$87,500. In rapidly developing China, by contrast, output per worker is below the national

average in only one city in the database—large, inland Chongqing. Output per worker is nearly six times the national average in Jilin (Jilin) and Weihai (Shandong) and approaches seven times the national average in Tangshan (Hebei) and Maanshan (Anhui), where it rises above US\$70,000 per year.

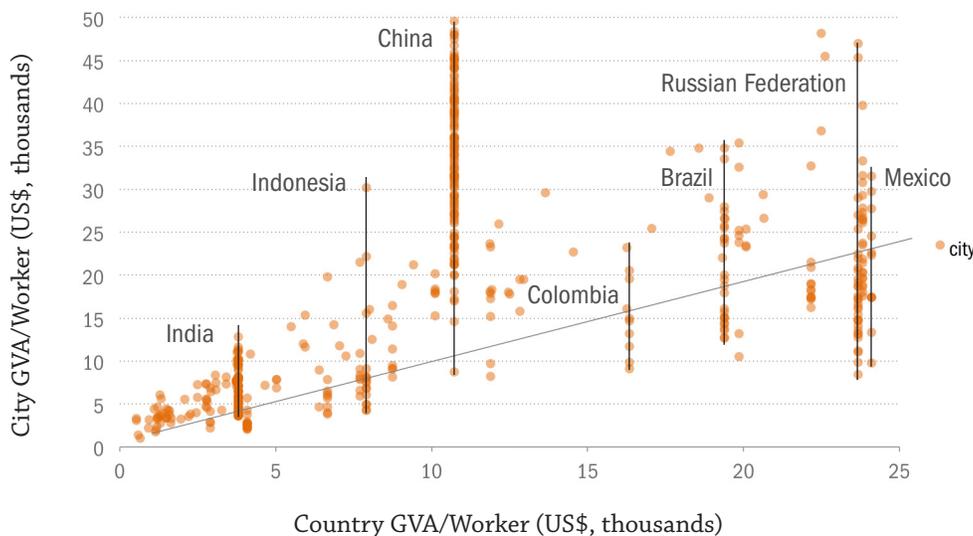
In a country with a relatively mature urban system, such as the United States, city productivity runs below the national level in nearly as many cases as it runs above.

Figure 2.6: City versus country productivity levels, 2012

a. All cities vs. all countries



b. Cities with less than US\$50,000 GVA per worker vs. countries with less than US\$25,000 country GVA per worker



Source: Oxford Economics Dataset

The OE data show that although cities are typically the productive engines of their national economies, many exceptions exist. Large (and typically rural-based) natural resource sectors change the story in some countries: cities such as Sharjah (United Arab Emirates) and Jeddah, Mecca, and Medina (all in Saudi Arabia) register productivity levels only slightly above half the national value. City productivity can lag in countries such as Indonesia and Nigeria, where economic development is progressing rapidly nationally but unevenly across subnational regions. And, of course, not all cities power economic development at all times; a city such

Individual city productivity can lag in countries such as Indonesia and Nigeria, where economic development is progressing rapidly nationally but unevenly across subnational regions.

as Buffalo, which prospered in one era of industrial development, may experience relative decline in the next. Multiple such forces appear to be at work in Russia, where only one-fifth of cities, led by Moscow and Tyumen, produce greater output per

worker than the national economy. Russia is, in fact, home to four of the five cities with the lowest ratio of city to national productivity in the world—Penza, Orenburg, Makhachkala, and Barnaul.

Panel b of figure 2.6 takes a closer look at the distribution of city productivity levels within countries where GVA per worker is less than US\$25,000 annually. That national productivity in China still trails so far behind productivity in the country's large cities betrays just how much urbanization has coincided with productivity gains. Most cities in India are also more productive than the national economy, but the distribution is far more compressed: productivity in

That national productivity in China still trails so far behind productivity in its large cities betrays just how much more urbanization the country stands to undergo.

highest-ranking Delhi is only three-and-one-half times productivity in lowest-ranking Varanasi. In comparison, in Indonesia, Pekanbaru is more than five times as productive as Yogyakarta (and seven times as productive as Samarinda, an outlier).

Brazil and Mexico exhibit a more balanced distribution of cities above and below the national average. In Mexico, Monterrey stands out with US\$39,800 GVA per worker, ahead of the capital, Mexico City (US\$30,800), and more than double the national average of US\$23,800. Colombia, one of the recent past's development success stories, boasts only two cities more productive than the national economy as a whole (US\$16,300 GVA per worker): Bogotá and Bucaramanga.

Private sector job creation

The private sector in the OE cities created 87.7 million jobs over the six years from 2006 to 2012 (range chosen because 2006 is the first year for which all 750 cities report data). These cities accounted for 58 percent of all new private sector jobs created in their 140 countries taken together, despite containing only one-quarter of total private employment.

In absolute terms, Beijing and Chongqing (in China) and Jakarta (in Indonesia) created the most private sector jobs over the period, Jakarta and Beijing each with nearly 2.9 million and Chongqing with 2.3 million. China was home to 10 of the 12 cities that created more than 1 million private sector jobs each. Outside East Asia and Pacific, Lagos, Nigeria, saw the greatest private sector job creation, with 1.5 million new private jobs in six years, followed by São Paulo, Brazil (950,000 jobs); Bogotá, Colombia (816,000 jobs); Lima, Peru (807,000); Dhaka, Bangladesh (766,000); and Dar es Salaam, Tanzania (754,000). In Europe and Central Asia, Moscow, Russia, saw the greatest absolute increase in private sector jobs (617,000 jobs), whereas Tokyo, Japan, led OECD countries (525,000 jobs). All together and in absolute terms, the 7 percent of cities where job creation was most voluminous created as many private sector jobs as the remaining 93 percent combined. For context, these cities were home to just over one-quarter—27 percent—of total employment in the sample in 2005.

In percentage terms, China claimed 39 of the 50 cities with the fastest average annual rates of private sector job growth, which ranged from 17.0 percent in Hefei (Anhui) to 7.5 percent in Baotou (Inner Mongolia). Other cities in the top 50 were oil-rich city-states, such as Doha (Qatar) and Abu Dhabi and Sharjah (United Arab Emirates), as well as Myanmar's newly created capital, Nay Pyi Taw. Six Nigerian cities, including Onitsha, Enugu, and Abuja, joined the top 50, as did Dar es Salaam, Tanzania. Santa Cruz (Bolivia) posted the fastest private sector job growth in Latin America and the Caribbean (5.8 percent), Tbilisi (Georgia) the fastest in Europe and Central Asia (5.6 percent), Pondicherry (India) the fastest in South Asia (5.0 percent), and Perth (Australia) the fastest in OECD countries (3.2 percent). All together and in relative terms, the 16 percent of cities that grew jobs the fastest over the period created as many private sector jobs as the bottom 84 percent combined. For context, these cities were home to only 14 percent of total sample employment in 2005.

Developing countries may be threatened by a process of premature deindustrialization whereby manufacturing's share of the economy begins to decline at much lower income levels than ever before.

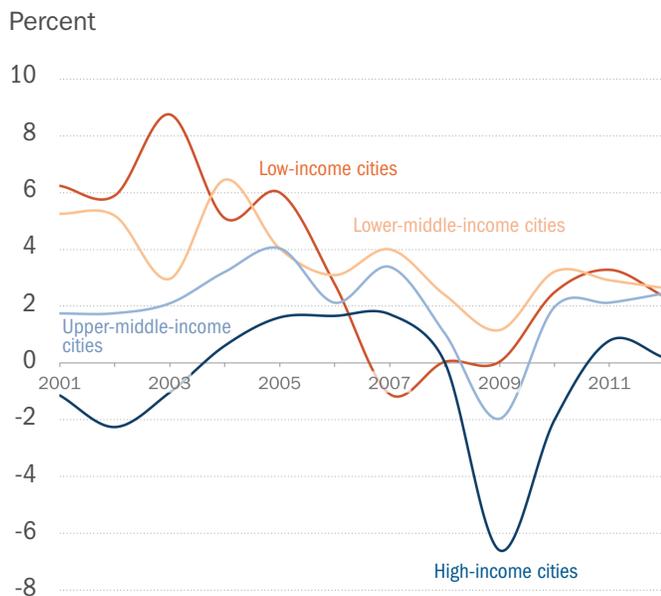
Mainly as a result of the recession and Euro Area crisis, private sector employment declined across half of OECD cities over the period. The largest absolute declines took place in

U.S. cities hit hard by the housing crisis, such as Los Angeles (California), Phoenix (Arizona), and Riverside (California); in cities of struggling Euro Area economies, such as Athens (Greece), Dublin (Ireland), Lisbon (Portugal), and Madrid and Barcelona (Spain); and in industrial cities such as Osaka (Japan), Birmingham (United Kingdom), and Chicago (United States). In percentage terms, private sector employment fell fastest in struggling Euro Area and in U.S. Sun Belt cities.

When their rates of private sector job growth are compared to the national rate, Chinese cities again come out on top. Attesting to the incredible pace and scale of urbanization in the country, nationwide the number of private sector jobs grew by only 0.2 percent a year from 2006 to 2012—a rate that 138 of the 150 Chinese cities in the dataset beat easily. Tbilisi (Georgia), Kumasi (Ghana), Pekan Baru (Indonesia), Onitsha (Nigeria), and Dar es Salaam (Tanzania) also registered private sector job growth rates far above (5.0 percent or higher) their countries.

Boosting city competitiveness has the potential to drastically accelerate job creation globally. Cities perform unequally within regions. For example, cities in the top quartile of Sub-Saharan African cities created jobs 4.5 percentage points faster than did their peers in the region. In each of the other regions, the gap between the top quarter and the rest stood at 3.0 percentage points or more in 2012. If all cities in a region grew at least as fast as the average city in the top quartile, however, 18.9 million extra jobs—on top of the 13.4 million actually witnessed—would have been created in 2012 alone.

Figure 2.7 Industrial sector rates of job growth by city income bracket, 2001–12



Source: Oxford Economics Dataset

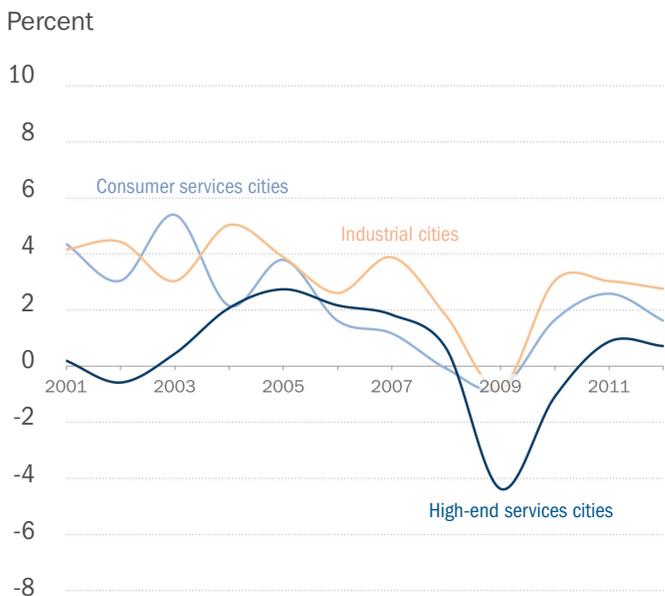
Industrial sector job creation

First, a definitional note: OE groups the mining and extraction, manufacturing, utilities, and construction industries together into its “industrial” sector aggregate, and it does not break out data for any of these individual subsectors. We refer to the sector as the industrial or manufacturing sector, keeping in mind that the measure itself is broader and that its composition likely varies across cities.

We take a special look at industry because of manufacturing’s historical role as a ladder for economic development. The export-led growth model that has propelled so many countries up the income ladder is at its core a labor-intensive, manufacturing-led growth model, in which countries take advantage of their low initial labor costs (the primary variable cost in low-end manufacturing) to attract export-oriented production capital. The heavily urbanized sector absorbs population from the hinterlands, and this steady flow of labor from the countryside keeps wages low. Eventually this process slows as urbanization rates taper off and wages begin to rise, but at that point companies have typically spent years learning and building the capacity to move to higher-value-added activities. In this way, industrialization and urbanization unleash a positive development spiral.

Development economist Dani Rodrik (Rodrik, D. (2015). *Premature Deindustrialization* (No. w20935). National Bureau of Economic Research), however, raises the disturbing specter that the export-led growth model may have run its course.

Figure 2.8 Industrial sector rates of job growth by city specialization, 2001–12



Source: Oxford Economics Dataset

Several converging trends concern him. First, manufacturing today is more capital- and skill-intensive than it used to be and is growing less labor-intensive even at lower ends of the value chain as rote automation technologies become less expensive. Second, the rapid growth in international logistics has segmented supply chains to an extraordinary degree, thereby enabling companies to separate discrete tasks across locations rather than move the entire process—from which countries could learn—as in previous waves of moving manufacture offshore. High-value-added activities, meanwhile, remain in the developed world. Third, global financial markets encourage and enable “plug in, plug out” behavior whereby companies pick up and move on to the next, cheaper, location at the slightest change in cost calculus. In such a world, any country that begins to move up the value chain will have the proverbial rug pulled out from under it as the foreign capital supporting its industrial base departs swiftly. Compounding the problem is Rodrik’s fourth concern: that China’s unprecedented scale crowded other countries off the development ladder just when they could have gotten ahead of these dynamics.

As a consequence, goes the hypothesis, developing countries may be threatened by a process of premature deindustrialization whereby manufacturing’s share of the economy begins to decline at much lower income levels than ever before. Whether traded services will be able to generate the surplus, productivity gains, and investment capital needed to drive the economic growth as manufacturing historically has done remains to be seen.

The data presented in figure 2.7 lend tentative support to the deindustrialization hypothesis. At the beginning of the 2000s, cities in low-income countries registered average industrial sector job growth rates of 6.5 percent per year (recall, however, that the sector encompasses manufacturing plus construction, mining, and natural resources). After tumbling severely from 2005 to 2007 before climbing back, the sector’s growth rate in low-income cities appears to have converged with that of lower-middle-income and upper-middle-income cities at just above 2.0 percent annually. If such low job growth rates persist, the sector will indeed have lost its traditional role as a sponge for excess labor, an engine of productivity, and a ladder of development.

The data also show that, globally, industrial job growth rates have held up slightly better in cities where manufacturing is the dominant sector, averaging 3.9 percent from 2001 to 2003 and 2.9 percent from 2010 to 2012 (figure 2.8). In comparison, industrial sector job growth rates are low in cities dominated by high-end services, suggesting that the two sectors may have competing needs and accordingly that a natural sorting of activities occurs into cities specialized in one sector or the other. Primary cities narrowly outperform secondary cities globally for industrial sector job growth, but the two growth rates tend to move together.

If we compare cities by region, those in the Middle East and North Africa typically post the fastest industrial sector job growth rates, a finding that is presumably tied to the price of oil and the natural resources component of the aggregate sector. Cities in Sub-Saharan Africa began the study period with high growth rates averaging 5.8 percent from 2001 to 2004 before falling toward zero in 2009 and rising back to about 2.0 percent in 2012. South Asian cities have seen the sector’s job growth rate decline more or less steadily from over 5.0 percent early in the decade to 2.0 percent in 2012, while cities in Europe and Central Asia and especially OECD cities have struggled to maintain positive growth rates throughout the period.

Tradable sector job creation

Strong tradable sectors characterize competitive cities. In the OE data, the *tradable sector* can broadly be defined as the industrial sector (manufacturing, mining, and construction); the transportation and warehousing, communications, and information sectors; and the financial and business services sectors combined. In the 10 percent of cities in which GDP per capita grew fastest from 2005 to 2012, tradable sector employment growth outstripped non-traded sector employment growth by 2.5 percent on average annually: 6.2 percent growth compared with 3.7 percent growth. By contrast, in the remaining 90 percent of cities, tradable and non-tradable industries grew at effectively the same rate: respectively 2.4 percent and 2.3 percent on average annually. Thus, robust tradable sector growth characterizes competitive cities and appears to be a prerequisite for rapid growth in the economy as a whole.

Faster growth in the traded sector goes hand in hand with growth in the non-traded sector. The 10 percent of cities in which traded sector employment grew fastest from 2005 to 2012 average 9.8 percent annual job growth in the sector, 6.6 percent outside the sector (that is, the non-traded sector), and 8.1 percent economy-wide. By contrast, the bottom 90 percent of cities average 2.0 percent annual job growth in each sector respectively and citywide. Low- and middle-income cities hoping to use exports to move up the value chain and develop their economies are not the only places where tradable sector growth differentiates competitive cities from their peers. Vibrancy in the traded sector appears to benefit higher-income cities too: in cities with a GDP per capita above US\$20,000, annual job growth averaged only 0.9 percent. However, the 10 percent of cities experiencing the fastest job growth in the traded sector achieved, on average, 5.7 percent annual growth in the traded sector and 5.3 percent growth economy-wide. That is more than a fivefold increase in annual growth rates in what are typically mature economies.

Foreign direct investment

Foreign direct investment is frequently thought to both signal and reinforce city competitiveness. Multinationals can typically select from a world of locations for their operations and, therefore, tend to locate in cities that offer the right mix of quality inputs, knowledge assets, infrastructure, supply chains, and market access they need to thrive—in short, competitive cities. At the same time, because of their presumptive superior technology, management know-how, marketing prowess, and other proprietary assets, multinationals are thought to offer special promise for locales wishing to upgrade their local economies and accelerate development. However, the evidence is mixed on the extent to which productivity spillovers and technology transfer truly materialize from FDI and when.⁶ Nevertheless, because cities are eager to attract FDI and are learning how to better integrate it into their local economies, we examine its geography here.

To examine FDI performance at the city level, we were able to obtain data for 673 of our 750 cities from fDi Markets, a proprietary database maintained by the *Financial Times* that aggregates data from press releases and other sources about announced green field investments. The database neither claims to achieve universal coverage nor tracks the fate of investments over time to revise its estimates. Sometimes an announcement contains too little information for a project to be assigned to a city. In other cases, fDi Markets must impute investment details using proprietary methods. Its cities may not always coincide with the boundaries of our OE cities either. For these reasons, the database is best regarded as a good-quality but not comprehensive record of FDI announcements.

The three metrics contained in the database—number of projects, associated capital expenditure, and associated jobs—are flow variables based on new announcements each year. The data are therefore lumpy, subject to volatility, and highly cyclical. For that reason, much of the following analysis looks at city FDI performance aggregated over the entire period for which data were available (2003–12), because city competitiveness should transcend economic cycles. The downside of this approach is that the world looked very different in 2012 than it did in 2003—the dramatic fall of Cairo (Egypt) from the investor interest league tables being a case in point—and the method accordingly sacrifices some recency.

FDI is spreading to more cities, but it remains highly concentrated. In 2003, the top 10 percent of city destinations captured 71 percent of all FDI projects, 77 percent of all FDI jobs, and 78 percent of all FDI expenditures. By 2012, those numbers had fallen to 67 percent, 67 percent, and 70 percent, respectively. By comparison, the top 10 percent of cities concentrated only 56 percent of GDP.

In absolute terms, the top destinations for FDI over the period were the expected global centers of business, finance, or production; trade entrepôts; and locales that have made FDI a pivotal part of their development model. Table 2.3 lists the top 10 destinations for FDI in terms of cumulative capital expenditure from 2003 to 2012.

Controlling for GDP yields a very different list of places where FDI factors most significantly in the local economy. Dividing the total amount of FDI received over the 10-year period by GDP in the average year reveals cities—some expected, some unexpected—that punch well above their weight in terms of FDI attraction. Table 2.4 lists the top 10 locales on this measure. Abuja (Nigeria) ranks first, drawing in more than a US\$1 billion less FDI than its larger compatriot, Lagos, but over a much smaller denominator. Factory Asia features prominently; cities from East Asia and Pacific populate nearly half the table. Tangier (Morocco) likely combines strong local fundamentals with relative stability and proximity to the large European market to rise to the top of the list. Among the better-known case studies in globalization, only Indian cities, such as Hyderabad and Bangalore, and Vietnamese cities, such as Da Nang, Hanoi, and Hai Phong register here.

FDI has its largest influence in market towns and production centers. East Asia and Pacific, South Asia, and Sub-Saharan Africa each contain 15 cities (or 22 percent of cities) in the top 10 percent of all cities on this measure (figure 2.9, panel a). In contrast, the OECD is home to only one city with such an FDI-oriented economy, Wrocław (Poland). Services hubs in general constituted only 6 percent of the top echelon of performers; production centers, conversely, constituted nearly half (figure 2.9, panel b). Even on this measure, however, FDI remains concentrated: the average city in the top 10 percent on this measure received over 11 times more FDI per dollar of GDP than the average city in the bottom 90 percent.

The economic development potential of FDI should not be overstated, however. In fact, in the average city that received any FDI at all in 2012, foreign investors created only 1,400 jobs directly. That represented 0.1 percent of the average city's employment base, or only a small fraction of the 2.0 percent *net* job growth that occurred on average in these cities. The truth remains that the majority of jobs, in every city, are still created by local, incumbent firms.

Table 2.3 Top 10 cities for FDI capital expenditures (cumulative 2003–12)

Rank	City	Country	Region	Typology	FDI jobs, 2003–12	FDI projects, 2003–12	FDI capital expenditures, 2003–12 (US\$, millions)
1	Shanghai	China	East Asia and Pacific	Production center	469,901	2,992	157,653
2	Singapore	Singapore	East Asia and Pacific	Services hub	251,785	2,614	125,467
3	Beijing	China	East Asia and Pacific	Production center	221,664	1,510	76,084
4	London	United Kingdom	Organisation for Economic Cooperation and Development	Services hub	100,789	2,346	72,827
5	Dubai	United Arab Emirates	Middle East and North Africa	Services hub	167,227	1,988	63,614
6	Hong Kong SAR	China	East Asia and Pacific	Services hub	104,261	1,666	48,391
7	Cairo	Egypt, Arab Rep.	Middle East and North Africa	Production center	52,054	210	40,268
8	Guangzhou	China	East Asia and Pacific	Production center	127,854	528	38,534
9	Bangalore	India	South Asia	Production center	254,815	1,075	38,315
10	Suzhou, Jiangsu	China	East Asia and Pacific	Services hub	150,716	520	34,933

Source: fDi Markets, Financial Times

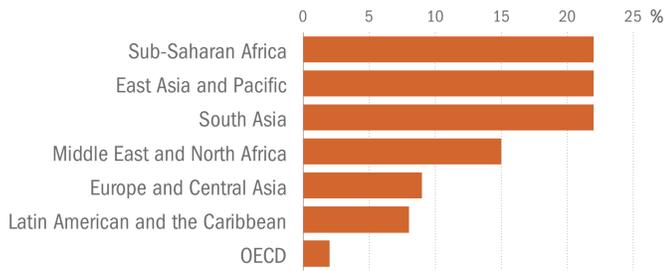
Table 2.4 Top 10 cities for FDI inflows controlling for GDP (cumulative FDI 2003–12)

Rank	City	Country	Region	Typology	FDI jobs 2003–12	FDI projects 2003–12	FDI capital expenditures 2003–12 (US\$, millions)	FDI capital expenditures / average GDP (US\$)
1	Abuja	Nigeria	Sub-Saharan Africa	Market town	12,744	16	4,393	8.21
2	Da Nang	Vietnam	East Asia and Pacific	Market town	22,328	49	3,901	4.09
3	Ujung Pandang	Indonesia	East Asia and Pacific	Market town	3,532	8	7,249	3.76
4	Phnom Penh	Cambodia	East Asia and Pacific	Market town	15,065	96	4,820	3.29
5	Tangier	Morocco	Middle East and North Africa	Production center	27,219	61	5,694	2.92
6	Hyderabad	India	South Asia	Market town	136,323	431	21,428	2.46
7	Bangalore	India	South Asia	Production center	254,815	1,075	38,315	2.37
8	Vientiane	Lao PDR	East Asia and Pacific	Market town	3,277	29	1,621	2.32
9	Hanoi	Vietnam	East Asia and Pacific	Market town	83,940	346	18,442	2.02
10	Hai Phong	Vietnam	East Asia and Pacific	Market town	31,874	57	4,279	1.95

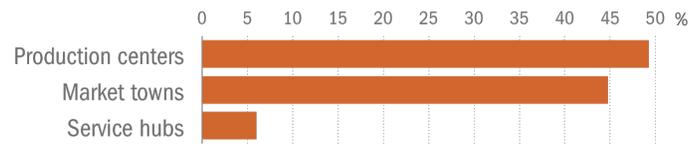
Source: fDi Markets, Financial Times

Figure 2.9 Distribution of the top 10 percent of cities in terms of FDI, controlled for GDP

By region



By city economic structure



Source: fDi Markets, Financial Times

Note: See the discussion under industry pathways in section 3 of this paper for an explanation of this typology.

3. Development Pathways: How Do City Economies Evolve over Time?

This work stream hypothesizes development pathways followed by cities and tests whether groupings of cities based on characteristics such as population size, region of the world, stage of development, or industry specialization could be useful in diagnosing opportunities and constraints. Three pathways based on the following characteristics were used: (a) city income level, hypothesizing that economic development is a linear process through which cities move from low to high income; (b) industry specialization, hypothesizing that cities, as they develop, would first industrialize and then grow to specialize in high-end service industries; and (c) primacy or population size within a national context, hypothesizing that a city’s position within its national urban system should, all else equal, remain stable as both develop.

Income pathway

The most important development pathway for cities is arguably the progression from low-income to lower-middle, upper-middle, and finally high-income status. This pathway is important because GDP per capita is still the most widely accepted indicator of welfare and human development available.

The income pathway itself needs very little description: if we assume that cities strive to achieve ever higher levels of GDP per capita for their residents—again, a proxy for citizen welfare and prosperity—then the relevant pathway is a simple linear progression from a lower-income status to a higher-income status.

Income brackets may be useful for grouping cities according to their stage of development, as is commonly done for countries, but such brackets are static in nature, and the spectrum itself is discontinuous: a US\$1 increase in GDP per capita could result in a city’s reclassification to a higher state of development. For this reason, our analysis focuses on the idea of development trajectories, classifying cities into groups on the basis of their annual average GDP per capita growth rates over the 12-year period in the OE data set. The characteristics of cities growing at roughly similar rates—that is, on roughly similar trajectories—can then be studied for similarities or differences.

The 46 cities in which GDP per capita fell over the period provide a cautionary reminder that development is neither guaranteed nor a process of steady advancement.

To conduct this analysis, we divided the 750 cities in the OE data set into five groups according to the rates of GDP per capita growth registered over the period. At the top was a group of 135 cities that achieved GDP per capita growth rates above 10.0 percent on average each year—astonishing rates of economic development. Below them was another group of 133 cities that were on a slightly less rapid but still impressive trajectory, with annual average GDP per capita growth rates between 5.0 and 10.0 percent. In the middle was a cohort of 229 cities that achieved steady average annual advances in GDP per capita of between 2.0 and 5.0 percent. Below that was a group of 207 cities that registered only modest but still positive improvements in GDP per capita with growth rates below 2.0 percent. Finally, GDP per capita fell in 46 cities in

the sample set over the period. These cities, which had a negative annual average growth rate, provide a cautionary reminder that city development—at least as measured by output per worker—is not always unidirectional.

The following subsections examine the cities in each group by region, income level in 2000, and industrial profile in 2000.

City GDP per capita growth by region

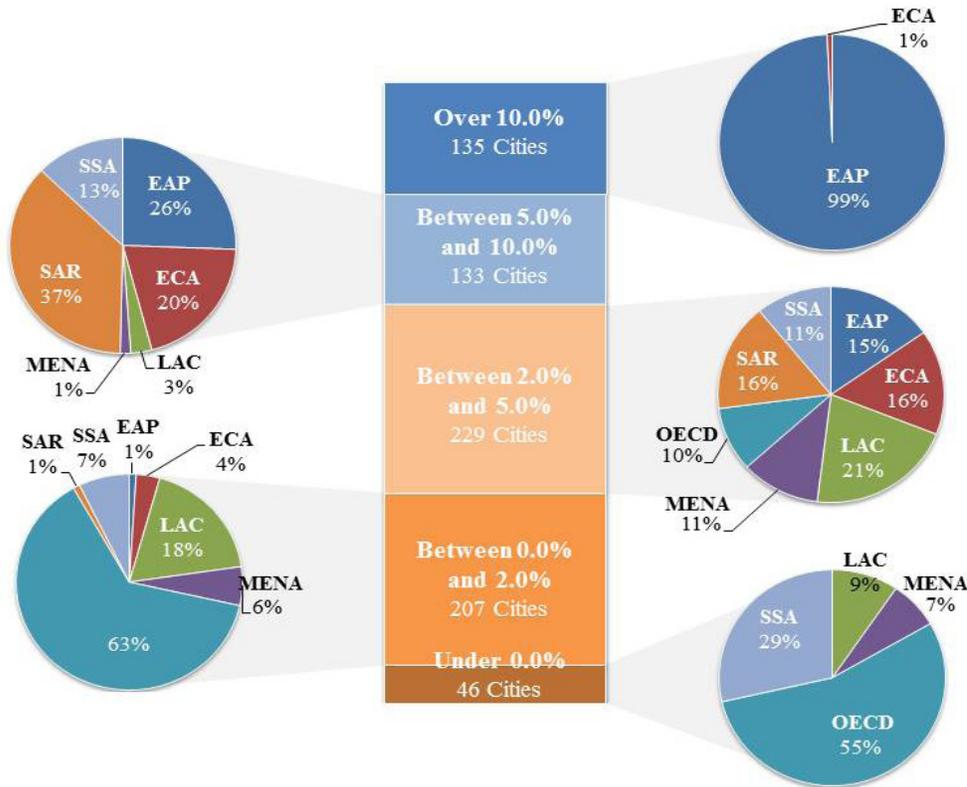
Powered almost exclusively by China's rise, nearly all cities that achieved greater than 10 percent annual average GDP per capita growth from 2000 to 2012 could be found in East Asia and Pacific (figure 3.1). The lone city from outside the region was Baku (Azerbaijan), where GDP per capita increased by 10.6 percent annually.

Indian cities constituted the largest national bloc in the second-fastest group of developers. Several East Asian and Pacific cities outside China joined this group as well, including Vientiane (Lao People's Democratic Republic); Ulaanbaatar (Mongolia); and multiple cities in Indonesia, Malaysia, and Vietnam. Nigerian cities dominated the contingent from Sub-Saharan Africa but were joined by Huambo and Luanda (Angola), N'Djamena (Chad), and Addis Ababa (Ethiopia)—three of the latter being national capitals. Marrakesh and Meknes (Morocco) both made it into this group from the Middle East and North Africa, and Panama City (Panama)

and three Peruvian cities—Arequipa, Lima, and Trujillo—represented Latin America and the Caribbean. Cities from all across Europe and Central Asia landed in this group: Yerevan (Armenia), Sofia (Bulgaria), Riga (Latvia), Chisinau (Moldova), St. Petersburg and Vladivostok (Russia), Dushanbe (Tajikistan), Tashkent (Uzbekistan). No OECD cities passed the 5.0 percent threshold, however.

In the middle group of cities—those achieving 2.0 to 5.0 percent GDP per capita growth on average annually—we find the first OECD cities, a large contingent from Latin America and the Caribbean, and shrinking numbers from the fast-developing regions of East Asia and Pacific and South Asia. In general, however, representation in this group was fairly broad based across regions and countries. The OECD cities encompassed a broad mix: resource-intensive Perth (Australia) and Aberdeen (United Kingdom); high-tech Portland Oregon and San Jose (both in the United States); and Brisbane (Australia) and Quebec (Canada) in the most developed countries. The Republic of Korea's cities, Poland's cities, and other strongly performing cities in Eastern Europe, such as Prague (Czech Republic), Tallinn (Estonia), and Bratislava (Slovak Republic), completed the group. Several Russian cities and most Turkish cities rank in this middle group and are joined by Tirana (Albania), Sarajevo (Bosnia and Herzegovina), Zagreb (Croatia), and Belgrade (Serbia) in the Balkans; Astana (Kazakhstan) and Bishkek (Kyrgyz Republic) in Central Asia; and Dnipropetrovsk, Kharkov, and Odessa (all in Ukraine). Wealthy Hong

Figure 3.1 Annual average GDP per capita growth rates by region for 750 cities, 2000–12



* Or first year data was available

Source: Oxford Economics Dataset

Note: If data were not available for 2000, the first available year was used.

Kong SAR, China, and Singapore joined peers from across East Asia and Pacific.

The OECD contingent balloons in the bracket from 0.0 to 2.0 percent annual average growth. Laggards from other regions without the luxury of already high levels of GDP per capita include Samarinda (Indonesia) and Kuching (Malaysia) from East Asia and Pacific, Srinagar (India) and Kathmandu (Nepal) from South Asia, and Skopje (former Yugoslav Republic of Macedonia) and several Ukrainian cities from Europe and Central Asia. Politically and economically struggling Egypt populates most of the contingent from the Middle East and North Africa, alongside Mosul (Iraq), Casablanca (Morocco), and Sfax (Tunisia) as well as three Iranian cities. Several cities of Sub-Saharan Africa remained mired here with near-stagnant development rates, including Cotonou (Benin), Brazzaville (Republic of Congo), Banjul (The Gambia), Conakry (Guineau), Nairobi (Kenya), Dakar (Senegal), and Harare (Zimbabwe). South Africa's cities joined them. The second-largest contingent in this group comes from Latin America and the Caribbean, where many Brazilian and Mexican cities eked out growth alongside numerous other cities spread throughout the region.

At the bottom of the distribution are 46 cities in which GDP per capita actually fell over the 12-year period studied. The bulk of these cities could be found in the OECD and were badly hit by the 2009 financial crisis in Greece, Italy, Portugal, Spain, and the United States. The Hague (Netherlands)

joined too. More troubling were the 12 cities from Sub-Saharan Africa in which development retrogressed on this measure. These struggling cities included Yaoundé (Cameroon), Bangui (Central African Republic), Abidjan (Côte d'Ivoire), Bamako (Mali), Niamey (Niger), Port Harcourt (Nigeria), and Lomé (Togo). In the Middle East and North Africa, Aden and Sanaa (both in the Republic of Yemen) were accompanied—probably through a quirk of the data—by oil-rich United Arab Emirates cities Abu Dhabi, Dubai, and Sharjah as well as Kuwait City (Kuwait), where the shortcomings of our GDP-based measure become apparent. Unsurprisingly Port-au-Prince (Haiti)—still reeling from the earthquake and a larger institutional breakdown—landed here, too. São José dos Campos in Brazil and Tampico and Tijuana from Mexico also registered negative GDP per capita growth over the period.

A few interesting patterns emerge to summarize. Nearly every East Asian and Pacific city managed to post annual average GDP per capita growth rates over 2.0 percent—in most cases well over. Nearly all cities of South Asia and of Europe and Central Asia, for their part, fell between 2.0 and 10.0 percent annual average growth. Cities of Sub-Saharan Africa appeared up and down the ranks of the distribution—too many too low, given their relatively low starting levels of development. Cities of Latin America and the Caribbean and of the Middle East and North Africa found company in each other in most brackets, whereas OECD cities—in large part because of high starting levels of GDP per capita—populated the lower half of the distribution.

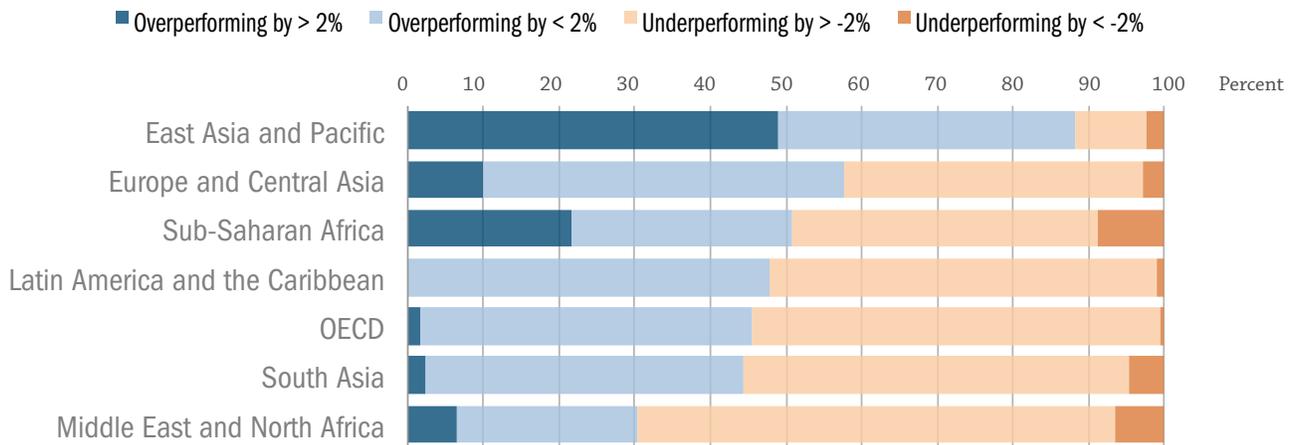
City GDP per capita growth by region, controlling for country effects

Disentangling city GDP per capita growth from country GDP per capita growth enables us to identify the outlier cities whose rapid development trajectory stands apart against backdrops of national economic growth or stagnation.

As figure 3.2 shows, in East Asia and Pacific, nearly 90 percent of cities experienced faster GDP per capita growth than their national economies. Moreover, in almost half of East Asian and Pacific cities GDP per capita rose annually above national rates by more than 2.0 percentage points on average—a remarkable testament to the wealth-generating power of cities. Elsewhere in the world, only in Europe and Central Asia did a majority of cities similarly outpace their national economies on this measure. In Sub-Saharan Africa, as many cities outpaced their national economies in terms of GDP per capita growth as fell behind.

The cities of the Middle East and North Africa appeared remarkably less vibrant by contrast. GDP per capita grew more slowly than it did at the national level in 70 percent of the region's cities—an illuminating finding in a socially unstable region. Marrakesh stands apart with an annual average GDP per capita growth 3.0 percentage points above that of Morocco. It is followed by Abu Dhabi and Sharjah in the United Arab Emirates and then Constantine in Algeria. In Latin America and the Caribbean, the OECD group, and South Asia, GDP per capita increased slower than it did nationally in a majority of cities. In South Asia, the Indian cities of Surat and Varanasi both achieved GDP per capita growth rates more than 2.0 percentage points higher than that of India itself.

Figure 3.2 Share of cities over-performing or underperforming their national economies in terms of average annual GDP per capita growth, by region, 2000–12



Source: Oxford Economics Dataset

City GDP per capita growth by income level

As alluded to in the previous section and throughout this technical note, a city's starting point goes a long way in explaining its economic performance vis-à-vis other cities globally. The poorer a city is, the higher its potential growth rate tends to be; the richer a city is, the lower its potential growth rate will be. Figure 3.3 supports that rule broadly but shows that exceptions do exist.

For this exercise, cities were slotted into income brackets on the basis of their GDP per capita in 2000. The income brackets were defined by the same cutoffs that the World Bank Group's official country classification scheme uses; these cutoffs are based on gross national income (GNI) per capita. Although GDP and GNI are clearly different measures, no equivalent classification scheme could be found for GDP per capita, and applying the GNI cutoffs to GDP has produced intuitive, reasonable, and nonarbitrary results. For the sake of simplicity, income brackets as defined in 2012 were used to classify cities in 2000.

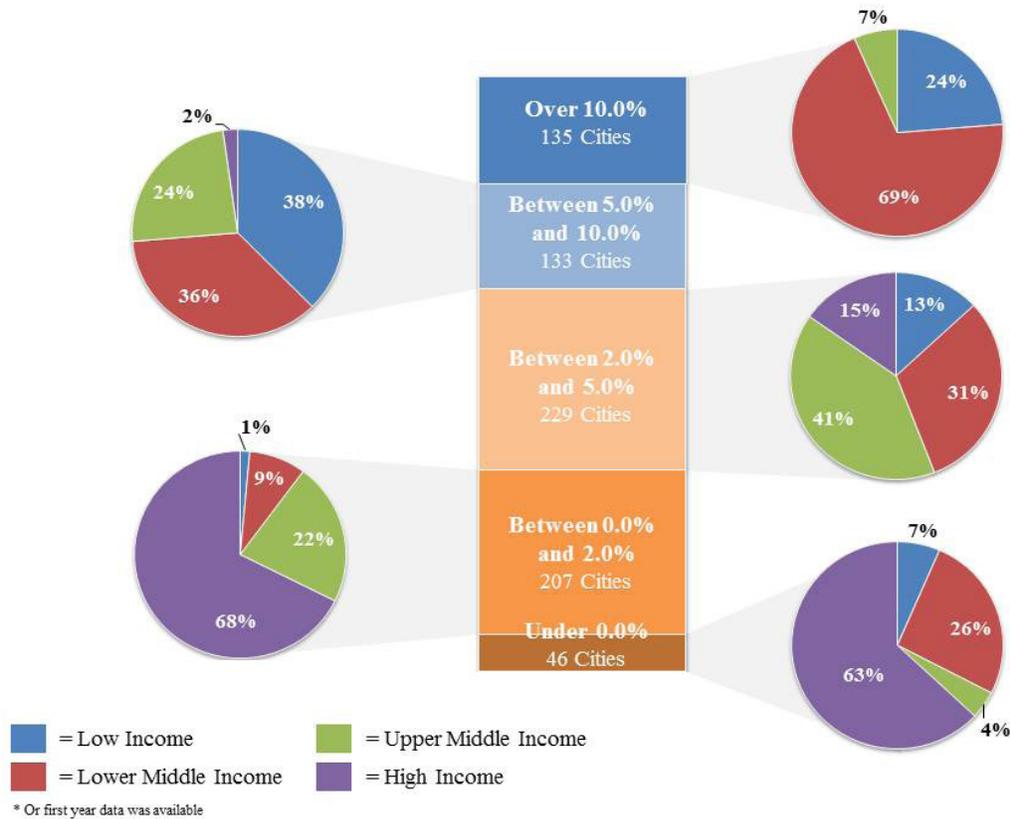
A first striking finding is that more than two-thirds of the fastest-growing cities were lower-middle-income cities rather than low-income cities. This outcome may be because the process of development benefits from momentum, and cities very quickly graduate into lower-middle-income status once

industrialization begins. More clearly, though, the finding stands as a reminder that China—home to nearly every city posting GDP per capita growth over 10.0 percent—contains cities at all stages of development.

Low-income cities do account for the largest share of cities in the second-fastest growth group, with Indian and Nigerian cities well represented. Three high-income cities posted very high average annual growth rates as well: Macao SAR (China), Almaty (Kazakhstan), and Perm (Russia).

This finding suggests the existence of a global convergence or catch-up story at the city level. In fact, the speed of city convergence is faster than that of country convergence. This suggests that cities lead economic growth and poverty reduction, a finding that is consistent with regional growth literature (see Gennaioli and others 2014). A five-year lagged regression model controlling for fixed effects is used to calculate city economic convergence rate. A conditional convergence rate of 1.4 percent to 9.0 percent per year is observed for the 750 largest cities in the world from 2000 to 2012. In other words, cities with a lower per capita GDP are catching up at a rate of 1.4 to 9.0 percent per year.⁷ The unconditional convergence rate is also calculated at an interval of 1.9 to 4.5 percent per year.

Figure 3.3: Annual average GDP per capita growth rates by starting income level for 750 cities (2000–12)



Source: Oxford Economics Dataset

Note: If data were not available for 2000, the first available year was used.

For the group of cities where GDP per capita grew between 2.0 and 5.0 percent on average annually between 2000 and 2012, cities at all starting income levels could be found, which means an annual per capita GDP growth rate of 2.0 to 5.0 percent is commonly observed among a variety of cities, from low income to high income (figure 3.3).

Among the 207 cities that eked by with slow but still positive GDP per capita growth were only three low-income cities: Cotonou (Benin), Banjul (The Gambia), and Srinagar (India). More than two-thirds of the cities falling into this group were high-income cities, attesting to the challenge of maintaining high per capita growth rates at high starting levels of income. Of course, the 2009 financial crisis that struck high-income cities (generally the same as OECD cities, as mentioned previously) would also have contributed to these low growth rates.

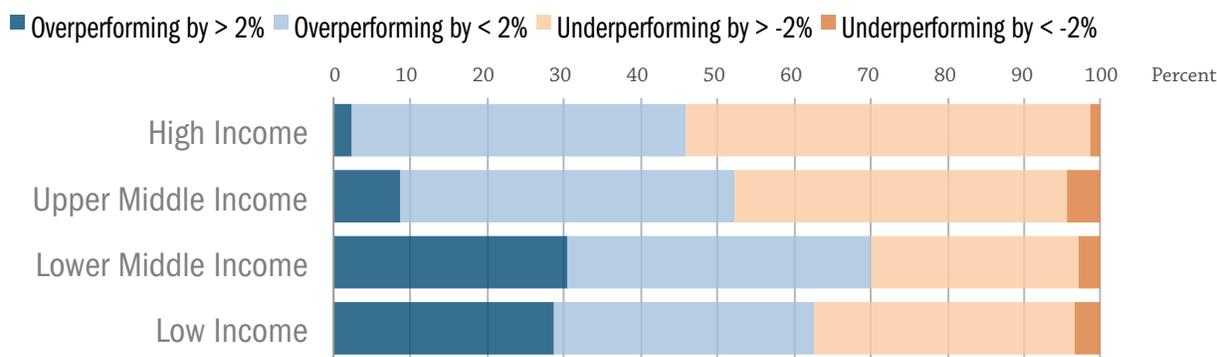
Evidence of the so-called poverty trap could be found in the three cities—Bangui (Central African Republic), Bamako (Mali), and Niamey (Niger)—that experienced negative GDP per capita growth rates and were already low-income cities in 2000. Lomé (Togo), too, had the inglorious distinction of being the only city to regress to an earlier stage of development according to this measure and the World Bank Group’s official

cutoffs over the period, falling from lower-middle-income to low-income status. A comparatively large number of lower-middle-income cities were among these negative growers, too. In general, though, high-income cities dominated the ranks of those struggling to maintain standards of living.

City GDP per capita growth by income level, controlling for country effects

Lower-middle-income cities are most likely to have experienced faster GDP per capita growth than their countries. Figure 3.4 shows city GDP per capita growth outperformed national GDP per capita growth in 70 percent of the cities that were lower-middle income in 2000. China accounted for almost three-fifths of those cities. Outperforming the rate of national development appears to be harder in high-income cities: only 2 percent did so by more than 2 percentage points per year, and it is the only income grouping in which fewer than half outperformed national rates at all. By the same token, high-income cities were less likely to lag far behind their national economies in terms of GDP per capita growth, suggesting a stable, if slow and inertial, trajectory. Upper-middle-income cities, for their part, were most susceptible to severe underperformance (GDP per capita growth rates more than 2 percentage points below the national rates).

Figure 3.4 Share of cities by income bracket overperforming or underperforming their national economies in terms of average annual GDP per capita growth, 2000–12



Source: Oxford Economics Dataset

Note: If data were not available for 2000, the first available year was used.

City GDP per capita growth by industrial profile

Finally, we categorized cities by annual average GDP per capita growth rates according to the industrial profile—the largest sector in terms of share of GVA. In general, an orientation toward industrial pursuits (which encompasses manufacturing, energy, mining, and construction) was associated with faster GDP per capita growth rates, whereas cities with lower GDP per capita growth rates were more likely to have economies oriented toward high-end services. By contrast, cities in which consumer (or basic) services were the dominant sector tended to fall into the second- and third-fastest groups of growers—in part because of their tendency to be low- and lower-middle-income cities.

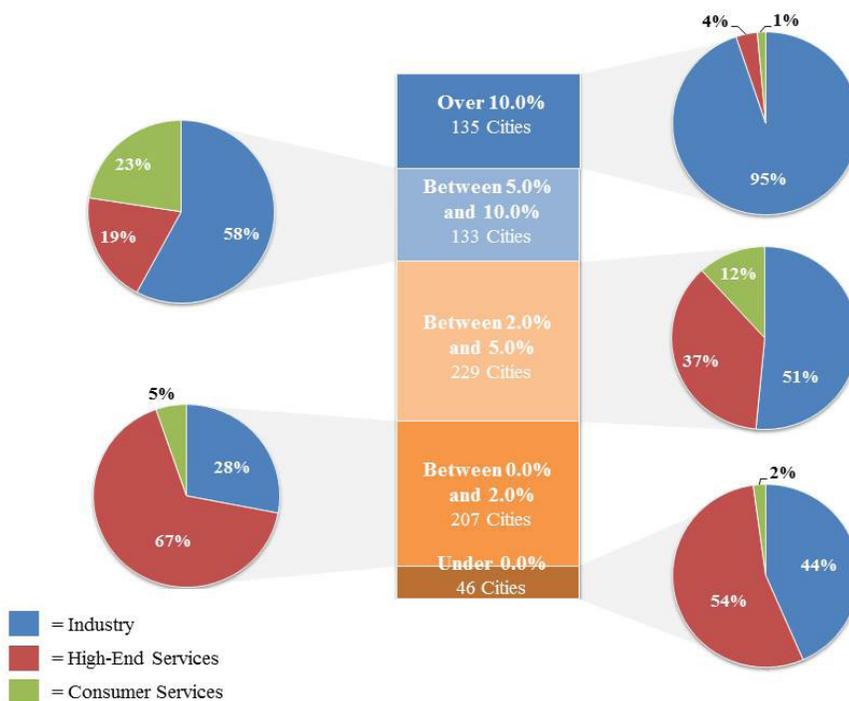
Thanks to the dominance of manufacturing and construction in China’s economy, 95 percent of cities registering 10.0 percent or higher GDP per capita growth were industrial cities. That number fell to 58 percent in the 5.0 to 10.0 percent growth bracket. Cities with large consumer services sectors accounted for the second-largest contingent in this bracket. We posit that these cities’ growth may not be driven by this specialization, however, but rather that many cities in the early stages of industrialization begin the process with a dominant low-end services sector serving an increasingly urbanized population. Some of these fast-growing cities specializing in high-end services are Beijing (China); Addis Ababa (Ethiopia); Bangalore Hyderabad, and Mumbai (India); Riga (Latvia); Vilnius (Lithuania); and Panama City (Panama).

The high-income OECD cities that populate the lower rungs of the distribution also tend to specialize in high-end services, which figure 3.5 makes clear. Causal interpretations of this connection must be limited, however: a specialization in a certain sector does not cause a city’s GDP per capita growth rate to be what it is. Instead, sector specialization is more likely to be associated with the level of development rather than to be a driver of economic performance. As subsequent sections of this paper discuss, another key development pathway for cities is that from basic services to industry and, finally, to high-end services. Later sections expound on this idea in greater detail.

Income traps

Income pathways can also be depicted by plotting cities’ growth rates by their initial level of development (or GDP per capita). Figure 3.6 does this, plotting all cities by average GDP growth from 2002 to 2012 against GDP per capita at the start of the decade, in 2002. The graph shows that growth rates tend to decline as income levels rise in an economy. This slowdown takes place for a variety of reasons, including the fact that richer societies at later development stages tend to have fewer underused resources to marshal because the formal sector already dominates, the urbanization process is far along, and population levels stabilize. In addition, more developed societies tend to operate at the technological frontier and therefore have less capacity for growth that takes advantage of technologies developed elsewhere to accelerate

Figure 3.5 Annual average GDP per capita growth rates by industrial profile for 750 cities, 2000–12



Source: Oxford Economics Dataset

Note: If data were not available for 2000, the first available year was used.

the development process. In other words, easy efficiencies have mostly been exploited in wealthier cities, and growth rates regress to the rate of technological change.

Maintaining growth rates high enough to keep the economy moving forward and up the income ladder is a priority—and worry—for many cities and countries. The frequently mentioned *middle-income trap* refers to the symptom of growth that slows before an economy becomes truly wealthy. Such a slowdown may occur when an economy exhausts the easy dividends of integrating additional factors into the production process more efficiently and fails to cultivate a technology-driven engine for the economy.

In figure 3.6, cities potentially afflicted by such a middle-income trap are the ones with low average annual growth rates over the decade—possibly below 4.0 percent but more stringently below 2.0 percent—and landing between approximately US\$5,000 and US\$12,000 in GDP per capita. By this definition, several Brazilian, Egyptian, and South African cities may be stuck in the middle-income trap as well as San Salvador (El Salvador), Kingston (Jamaica), Asunción (Paraguay), and Caracas (República Bolivariana de Venezuela).

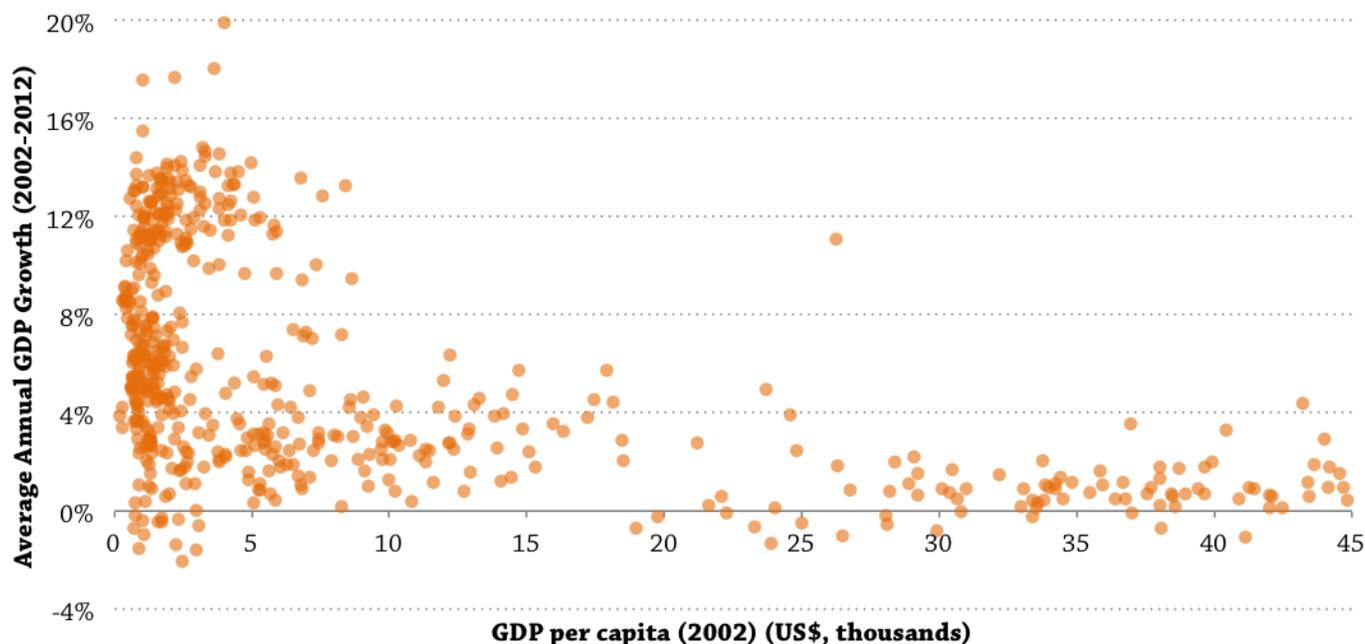
Cities may also find themselves in poverty traps, growing very slowly even at extremely low levels of GDP per capita, and post-middle-income traps, where city growth rates plummet before they approach the OECD average. By that definition, Yaoundé (Cameroon), Bangui (Central African Republic), Abidjan (Côte d'Ivoire), Port-au-Prince (Haiti), Antananarivo

(Madagascar), and Niamey (Niger), among others, may be mired in a poverty trap. The post-middle-income trap could be defined flexibly, and here we posit that it begins just after US\$12,000 GDP per capita and extends past US\$20,000. By these criteria, Porto Alegre and Rio de Janeiro (Brazil), Thessaloniki (Greece), and Szczecin (Poland), to name a few, may all find themselves in the post-middle-income trap, struggling to rekindle growth that prematurely petered out.

A city may find itself in the so-called middle-income trap if its economy exhausts the easy dividends of integrating additional factors into the production process more efficiently and fails to cultivate a technology-driven engine for the economy.

At the same time, a number of upper-middle-income and high-income cities in East Asia and Pacific, Europe and Central Asia, and Latin America and the Caribbean enjoyed annual average GDP growth of more than 5.0 percent over the decade. These stars—42 in total—include several Chinese cities as well as Mendoza (Argentina), Panama City (Panama), and Arequipa and Lima (Peru) in Latin America and Caribbean and Baku (Azerbaijan), Sofia (Bulgaria), Almaty (Kazakhstan), and Bucharest (Romania) in Europe and Central Asia.

Figure 3.6 Average GDP growth rates by GDP per capita in 2002, 2002–12



Source: Oxford Economics Dataset

Industry pathways

Globally and measured broadly, the industrial composition of city economies remained relatively stable over the 12-year period, suggesting that significant changes to the distribution of economic activity across sectors in cities typically occurs over longer time horizons. Excluding China, where the industrial sector dominates, the same sector accounted for the largest share of GVA in 2012 as it did in 2000 in 80 percent of the cities in the data set. Of those cities that did change, just below half underwent a transition from specializing in industry to specializing in high-end services. Sixteen mostly South Asian cities transitioned directly from basic consumer services into high-end services, bypassing the process of industrialization for the time being (see figure 3.7). These cities could be considered sector leapfroggers, although their continued progression up the economic development ladder without a strong industrial base may not be guaranteed.

Note: Blue blocks represent all cities with industry as the largest sector in 2012, gray blocks are those where high-end services are the largest sector, and red blocks represent cities with consumer services as the largest sector.

Theory would suggest that cities embark on a slightly different development process than do countries. Cities tend to bypass the earliest agrarian stages of development because they are, by nature, marketplaces for the exchange of goods and services. Accordingly, at the earliest stages of development,

cities specialize in a mix of basic and some higher-level services. Once industrialization takes hold, cities take on a new role as aggregators of inputs and generators of economies of scale and agglomeration forces. Eventually, as development continues, economies transition into higher-level services functions while the consumer services sector falls into an equilibrium size to support more dominant traded sectors. Accordingly, the size of the consumer sector appears to be a function of the size of other sectors at all stages of development. At early stages of development, a relatively large share of city value added in the consumer services sector is more a symptom of the underdevelopment of industry than it is the sign of a thriving consumer economy. Large consumer services sectors may also appear when the process of urbanization precedes that of industrialization.

At early stages of development, a relatively large share of city value added in the consumer services sector is more a symptom of the underdevelopment of industry than it is the sign of a thriving consumer economy. Large consumer services sectors may also appear when the process of urbanization precedes that of industrialization.

Figure 3.7 City sector pathways from 2000 to 2012

In contrast to income growth path, stability in aggregate-level sector composition in cities appears to hold over the medium-long (12 year) period studied



Sample set excludes cities from Argentina, China, Malaysia, Morocco, Peru, Russia, Serbia, South Africa, Turkey, United Arab Emirates, Ukraine, United States, Venezuela because of data availability.

Source: Oxford Economics Dataset
Note: Line width is only indicative.

As figures 3.8 and 3.9 show, industrialization appears to take off very quickly at the lowest levels of development, where it remains a dominant force, on average, well into upper-middle-income status. At the city level, industry's share of GVA appears to peak around US\$11,000 GDP per capita. The transition from industry to high-end services then takes place gradually as countries grow richer.

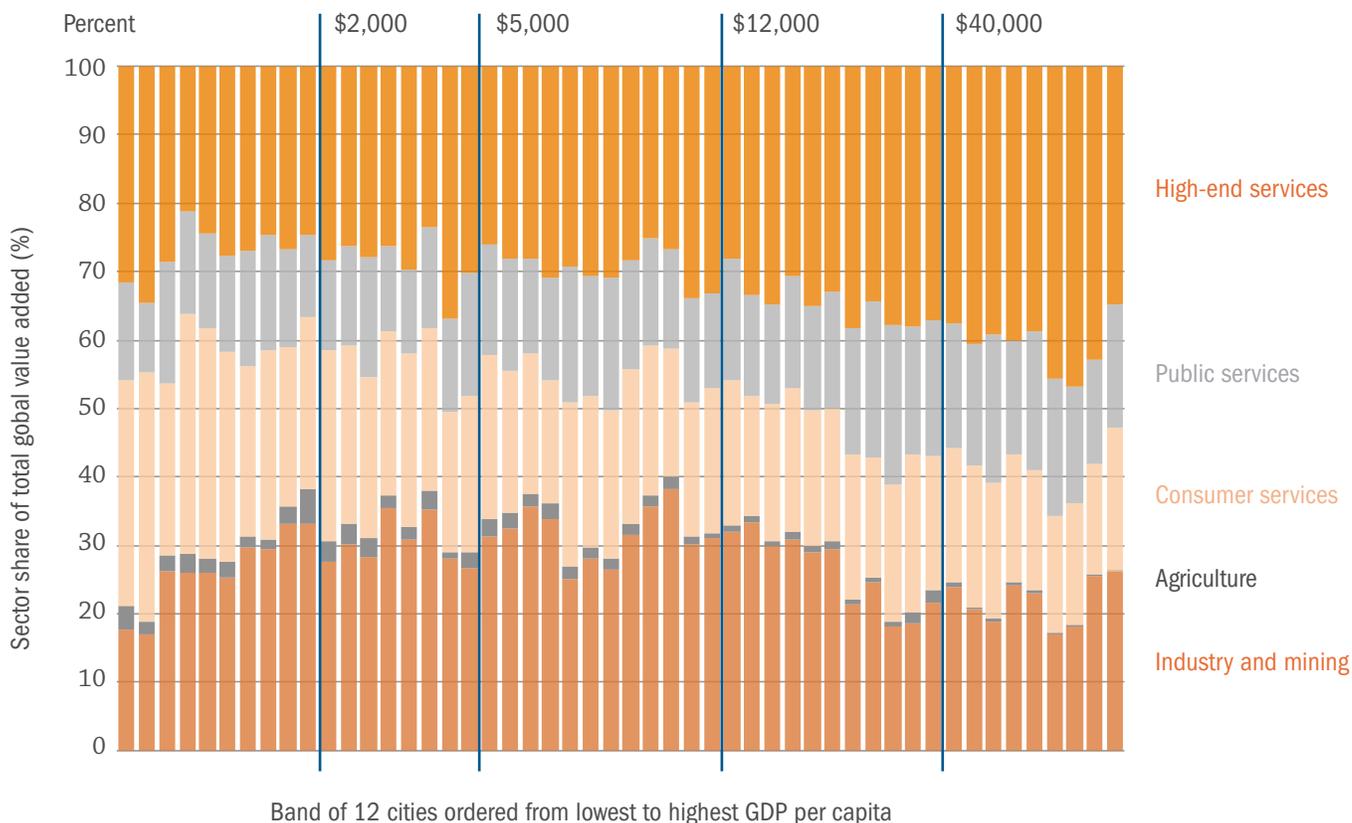
Figure 3.8 also implies that, structurally speaking, economic development is a progression toward high-end services—even if industry may be development's engine. (The figure sorts cities according to ascending GDP per capita and places them into bands of 12 cities. It then stacks each band's column according to the average size of each sector of the economy, producing the picture shown.)

On the basis of figure 3.9, we posit that cities can generally be classified into three different categories according to their stage of development. Until GDP per capita reaches approximately US\$2,500 per year, cities fundamentally serve as market towns in the classic sense; they are centers of exchange for people trading their wares on a small scale and from a surrounding hinterland. At this stage, consumer services dominate the economy. Then, as GDP per capita rises to about US\$20,000 per year, industry's share of the economy also begins to rise and remains dominant. At this stage, cities serve as industrial agglomerations and benefit from traditional Marshallian externalities.⁸ We label cities in this

category as productive centers. Finally, once GDP per capita surpasses the US\$20,000 level, high-end services take over as the largest sector of the economy and presumptive driver of growth and wealth creation. In these hubs of creative services, innovation-stimulating Jacobian externalities likely increase in importance.

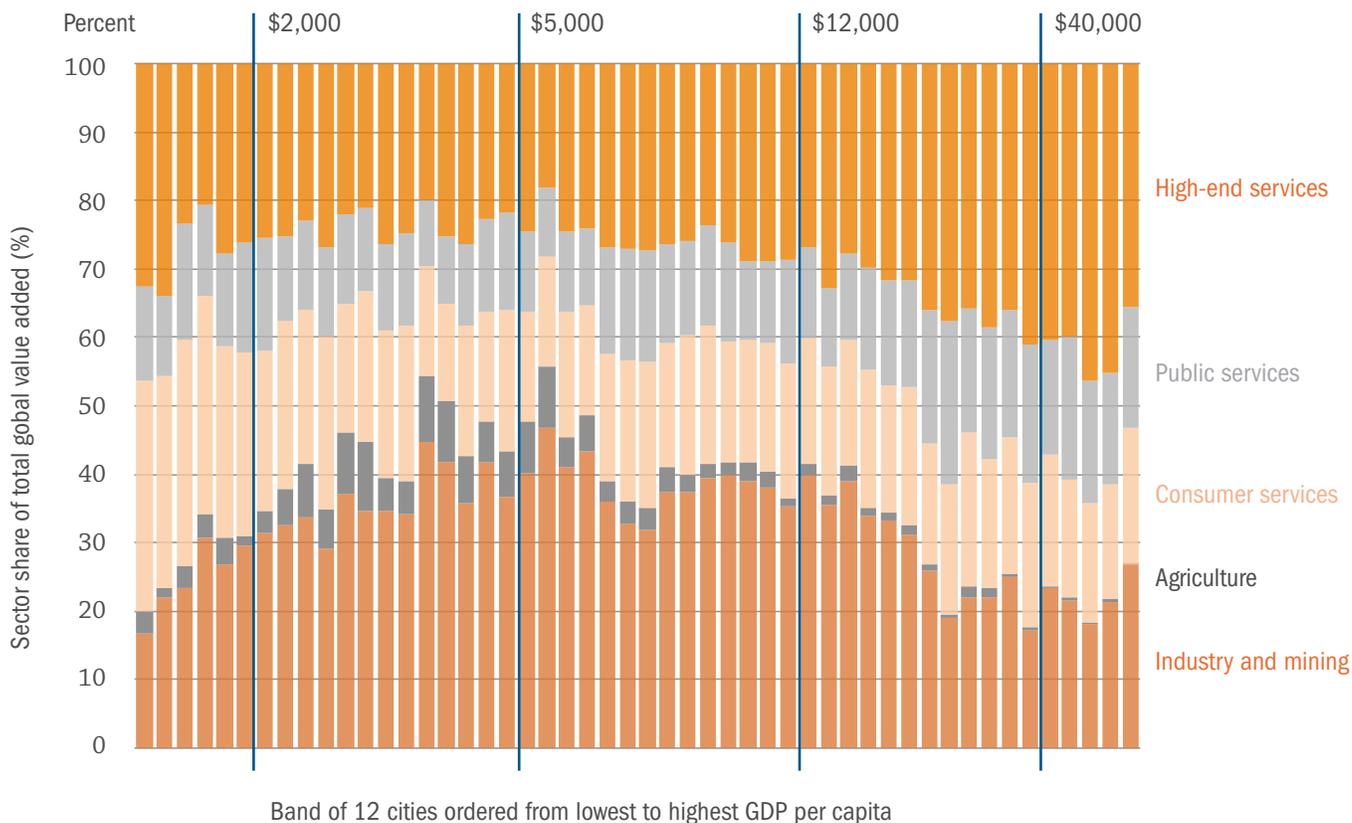
As an aside, the pronounced differences between figures 3.8 and 3.9 (the latter incorporates China's 150 cities in the sample) may lend further support to Rodrik's proposition that the historical pathway to prosperity via industrialization is closing for low-income cities today. This closure may be in part because of changes to the labor intensity of the manufacturing sector worldwide but also because of the sheer scale of China's manufacturing enterprise. However, we have no historical period with which to compare the data in figure 3.9, and we cannot assess whether crowding out is taking place without knowing whether the amount of industrial activity the world economy can support at any given time is finite. One could therefore arrive at two very different conclusions on the basis of these figures. One potential conclusion is that the graph including China reflects the global steady state—one in which Chinese cities are winning the biggest pieces of the global industrial pie. The other possible conclusion is that China is an anomaly—indeed, it is worth recalling that construction, in addition to mining, is included in the “industrial” aggregate, a sector that has seen very large booms in China—and its cities buck the normal trend observed in figure 3.8. The truth, of course, may also lie somewhere in between.

Figure 3.8 The changing distribution of GVA across sectors as GDP per capita rises, 2012, excluding China



Source: Oxford Economics Dataset

Figure 3.9 The changing distribution of GVA across sectors as GDP per capita rises, 2012, including China



Source: Oxford Economics Dataset

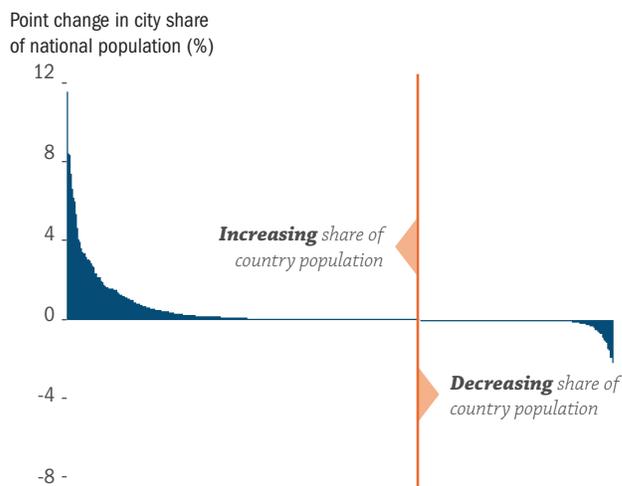
Size pathways

Stability reigns at the top of national urban hierarchies (see figure 3.10). Over the 12-year period studied, no city was deposed from the top spot in its national hierarchy in terms of GDP, although five cities that were prime in terms of GDP rose to become prime in terms of population as well, displacing originally larger but less productive cities. In Bolivia, La Paz's population fell behind that of Santa Cruz, just as Lilongwe's population overtook that of Blantyre in Malawi. In the OECD, Milan advanced past Naples to become Italy's most populous city, and Amsterdam displaced Rotterdam atop the Dutch urban hierarchy. Vietnam's Ho Chi Minh City surpassed Hanoi in East Asia and Pacific.

Within large countries with multiple large cities, substantial changes in position were rare but not unheard of. In the United States, cities such as Detroit and New Orleans fell five places in population rank just as Austin climbed five places and Las Vegas and Orlando climbed six places. In terms of GDP, Portland, Charlotte, North Carolina; and Austin, Texas all moved significantly up in the rankings. In Nigeria, Onitsha rose eight places in terms of population. Of 72 major cities in India, 17 substantially (defined as a movement of at least five places in either direction) changed their position in the national hierarchy in terms of population, and 25 did in terms of GDP. In China, fully one-third of 150 large cities rose or fell significantly in the population rankings. In terms of GDP, nearly 60 percent did.

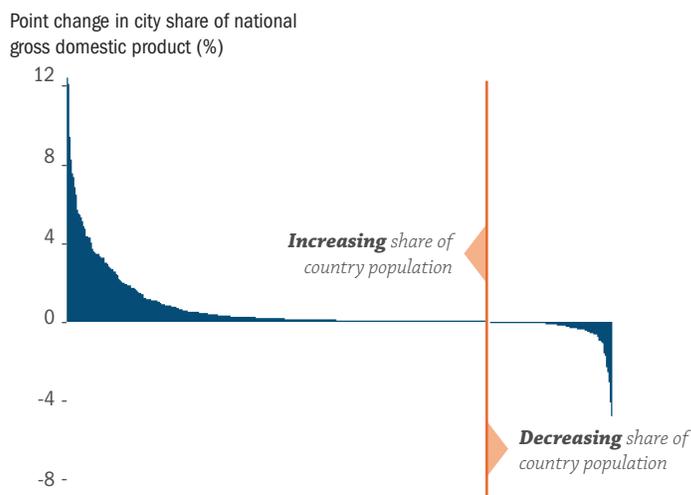
The same general distribution holds for changes in city share of national GDP (see figure 3.11). Of the 553 cities for which data were available, 74 percent saw their share of national GDP increase over the period, 20 percent saw their share decrease, and 6 percent saw their share remain unchanged. More turbulence was found in the distribution of national output among cities than in population. Only 55 percent of cities saw their share of national output remain stable, defined as changing less than 0.2 percentage points in either direction, compared with 71 percent in terms of population.

Figure 3.10 Cities increasing and decreasing their shares of national population worldwide, 2000–12



Source: Oxford Economics Dataset

Figure 3.11 Cities increasing and decreasing their shares of national output worldwide, 2000–12



Source: Oxford Economics Dataset

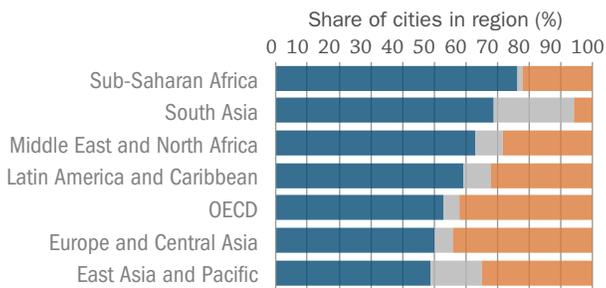
The share of national population increased in nearly 80 per cent of cities in rapidly urbanizing Sub-Saharan Africa from 2000 to 2012. By contrast, in more stable Europe and Central Asia, only 50 percent of cities garnered a larger share of their country's population by 2012 (figure 3.12). Dynamic East Asia and Pacific, for its part, saw significant jockeying among cities, with as many rising in population share as falling or remaining the same. South Asia stands out for a large cohort of cities that neither increased nor decreased their share of country population over 12 years and for the smallest cohort of cities ceding ground. Here a change is any increase or decrease in country population share of 0.01 percentage points or greater.

Regionally, nearly every city in East Asia and Pacific, Europe and Central Asia, and Sub-Saharan Africa increased its share of national GDP from 2000 to 2012. By contrast, in the Middle East and North Africa and the OECD, as many cities saw their share of national output decline as saw it increase. This differential suggests that the relevant growth drivers may operate at the national level in the former group of countries undergoing increasing urbanization broadly, but then operate at the city or particular industry level in countries with more established urban hierarchies, thus leading to shifts in a city's share of output as cities rise and fall with the fate of their base industries.

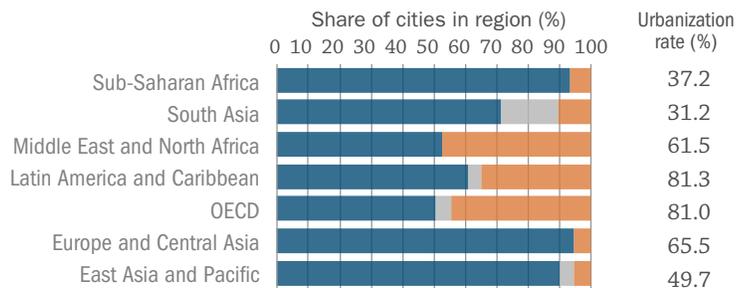
Whereas all city boats rise together in urbanizing countries, industry specializations appear to drive a city's climb or fall in hierarchies of developed countries.

Figure 3.12 Direction of change in city's gain in national population and output as urbanization occurs, by region

Direction of change in city share of national population



Direction of change in city share of national gross domestic product



Source: Oxford Economics Dataset

■ Rising ■ Unchanged ■ Falling

4. Predictors of City Competitiveness

Working definition of city competitiveness

City competitiveness has been defined for the purposes of this project as follows: a competitive city is a city that successfully facilitates its firms and industries to create jobs, raise productivity, and increase the incomes of citizens over time.

The analytics team operationalized city competitiveness with concrete and measurable economic outcomes. Although many different indicators have merit, and each captures a different facet of competitiveness, we have adopted four on the basis of generalizability and availability:

- Annual output growth
- Annual employment growth
- Labor productivity (GVA per worker)
- Household disposable income

These outcomes allow us to explore a city’s ability to add value, grow jobs, raise productivity, and increase residents’ incomes—preoccupations of city leaders across the world—and the factors that are associated with such an ability.

Stocktaking of city indexes

A critical value added of this paper is to take stock of and assess how the various city competitiveness indexes on the market can be most useful for policy. The team therefore inventoried popular indexes covering themes ranging from competitiveness to livability, sustainability, and infrastructure. These indexes vary significantly in terms of methodology and coverage. Several adopt opaque “black box” approaches to ranking cities that do not render them fit for statistical analysis, whereas others show a clear bias toward only a few regions of the world, typically OECD countries. In total, more than 20 different indexes were evaluated according to the robustness of their methodologies as well as their coverage, and six were chosen for folding into the final data set (see table 4.1).

Other data sets used at various points in this analysis include the World Bank Group’s Doing Business Indicators (DBI), the Chinese Academy of Social Science’s Global Urban Competitiveness Report for patent data, and the International Monetary Fund’s Government Finance Statistics Yearbook (GFSY).

Table 4.1 Popular City Indexes Evaluated for Methodological Robustness and Coverage

Evaluated and included in global correlation analysis	Evaluated and not included in global correlation analysis
AT Kearney Global Cities Index (2008, 2010, 2012) (65 cities)	2thinknow Consulting: Innovation Cities Index
Economist Intelligence Unit City Competitiveness Hotspots (2012) (116 cities)	<i>BusinessWeek’s</i> America’s Best Cities
Economist Intelligence Unit Liveability Index (2012) (68 cities)	Cisco Broadband Quality Index
Global Financial Centers Index (2006–12) (62 cities)	fDi Intelligence: Cities of the Future
Mercer Quality of Life Index (2010, 2012) (46 cities)	<i>Forbes</i> Best Places for Business and Careers
UN-Habitat City Prosperity Index (2012) (70 cities)	IDB Emerging and Sustainable Cities Initiative
	Mercer Infrastructure Index
	Milken Institute’s Best-Performing Cities
	<i>Monocle</i> Quality of Life Survey
	NUMBEO Cost of Living and Quality of Life Indexes
	PWC Cities of Opportunity
	Siemens Green City Index
	Urban Sustainability Index
	World Knowledge Competitiveness Index

How well do city indexes predict competitiveness outcomes?

Ultimately the team chose six indexes to test for their predictive power. The selection was based on transparency, data accessibility, coverage, and popular use. To assess whether an index was a strong predictor of city competitiveness, we ran a straightforward pair wise correlation analysis between the index's 2012 rankings and the four primary performance outcomes in 2012.

Globally, the indexes proved to be far better predictors of the level of city development than predictors of short-term economic performance (see figure 4.1). The Economist Intelligence Unit (EIU) Hotspots and Liveability surveys, AT Kearney's Global Cities survey, and the UN-Habitat City Prosperity Index are all highly correlated with both city labor productivity and household disposable income—two competitiveness outcomes that vary with overall level of development but remain quite stable from year to year. Performance on these same indexes was actually negatively correlated with GDP and employment growth from 2011 to 2012—more strongly so for GDP than for employment. (Negative correlations can be found at the center of the radar; correla-

tions closer to the center are more strongly negative, just as correlations toward the outside of the chart are more strongly positive.) The negative correlations should in many cases be expected: they imply slower rates of growth at higher rankings. If rankings are associated—as is likely—with stage of development, then relatively slow growth rates in developed cities make for an inverse relationship. The Global Financial Centers Index, for its part, positively predicted every competitiveness outcome in 2012.

In general, no city competitiveness index can claim a universal ability to predict the economic performance of the world's cities, especially in the short term. A gap in the market seems to exist for indexes to capture cities' growth potential.

Some indexes perform better in samples narrowed by either region or city typology. The EIU Competitiveness Index, for example, predicts outcomes better in East Asian and Pacific and OECD cities than it does in Latin American and Caribbean or South Asian cities and better in high-income cities than in low-income ones. The AT Kearney Global Cities Index performs better with primary cities, and the Mercer Quality of Life Index does better for secondary cities.

Figure 4.1 Correlations among city index rankings and city performance outcomes, 2012



Source: Oxford Economics Dataset and Various Indices

Note: EIU = Economist Intelligence Unit.

City competitiveness correlates: Factor analysis

Indexes are by nature composite measures of multiple factors. As a result, the information they provide is of only limited use to policy makers, who tend to see the world through discrete issues, subject matters, and areas of expertise. Accordingly, we conducted a second correlation analysis to assess the relationship that particular subcomponents of indexes, as well as additional variables from the World Bank's DBI database (with data for 2005 through 2012), have with city competitiveness outcomes. These subcomponents and measures were bucketed into six conceptual determinants of city competitiveness: institutions and regulations, physical infrastructure, social infrastructure, human capital, innovation, and enterprise support and finance (see table 4.2).⁹

We use the term *determinant* cautiously. Determinants are meant to capture the variables we expect to be associated with positive economic outcomes and city competitiveness. However, any relationships identified here are by no means deterministic. They are associations and correlations and should be interpreted only as such.

Factor analysis: Global results on the determinants of city competitiveness

Each determinant can be represented by multiple indicators or subcomponents of indexes. We used factor analysis methodology to consolidate multiple related variables into a single statistical entity. We then ran pair wise correlation analysis across factors and outcomes to ascertain how the relationship among determinants and outcomes varies by the city's stage of development. The stage of development is defined according to the typology on the basis of stage of industrialization (discussed under industry pathways in section 3 of this paper) that classifies cities according to their GDP per capita levels as market towns, production centers, or creative and financial services hubs. Figure 4.2 summarizes the observed relationships. Only statistically significant associations at the 10 percent level are shown. The analysis incorporates observations spanning several years because the historical coverage of each data set used varies. We decided to retain the full sample to incorporate the largest possible number of observations.

Table 4.2 Determinants and proxies of city competitiveness

<p>Institutions and regulations Ease of Doing Business Index (Doing Business Indicators)</p>	<p>Skills and innovation <i>Human capital</i> Education Index (EIU Livability) Human Capital (EIU Competitive Cities) <i>Innovation</i> Number of Patents by City (Global Urban Competitiveness Report)</p>
<p>Infrastructure and land <i>Physical infrastructure</i> Physical Capital (EIU Competitive Cities) Infrastructure Index (UN-Habitat City Prosperity Index) Cost of Electricity (Doing Business Indicators) <i>Social infrastructure</i> Social and Cultural Capital (EIU Competitive Cities) Healthcare Index (EIU Livability) Quality of Life Index (UN-Habitat City Prosperity Index)</p>	<p>Enterprise support and finance Financial Maturity Index (EIU Competitive Cities) Private Credit Bureau Coverage (Doing Business Indicators)</p>

Source: Competitive cities for jobs and growth: what, who, and how, 2015, The World Bank.

Note: EIU = Economist Intelligence Unit.

We find that the correlates of city competitiveness vary depending on income level and industrial structure as follows:

- *Institutions and regulations* matter at most levels of income and economic structures.
- *Physical infrastructure* is positively associated with job growth in market towns and labor productivity in production centers.
- *Social infrastructure* appears to be important for income growth and labor productivity only in relatively well-developed cities.
- *Financial infrastructure* appears to be important for labor productivity and employment growth in relatively well-developed cities. (We did not find data sets or indexes that cover the provision of enterprise support programs and, thus, could not include this factor in our global analysis.)

- *Innovation* is associated with labor productivity at higher income levels and economic structures.
- *Human capital* is positively associated with household disposable income, labor productivity, and job growth, but only after cities reach high-income status dominated by high-end services sectors.

Our results lead to an intriguing hypothesis, coherent with findings in existing literature (Moretti 2004; Samad, Lozano-Gracia, and Panman 2012; Shapiro 2006; World Bank 2009; World Bank and DRC 2014): cities can use a sequence of interventions. The building blocks of competitiveness— institutions and social and basic physical infrastructure at lower incomes, then innovation capacity— apparently can be sequenced in priority to build the human capital base required to compete, grow, and prosper as a high-income city. In prioritizing these interventions, policy makers should keep in mind the main industrial structure of the city and its competitive advantages.

Figure 4.2 Statistically significant correlations among factors of determinants and competitiveness outcomes by city type



■ **Positive** statistically significant correlation at the 10 percent level
 ■ **Negative** statistically significant correlation at the 10 percent level

Source: Oxford Economics Dataset and Various Indices

Note: DB = Doing Business Indicators; EIU = Economist Intelligence Unit City Competitiveness Hotspots; EIUL = Economist Intelligence Unit Liveability Index; GUC = Global Urban Competitiveness Report; UN = UN-Habitat City Prosperity Index; Disp income - Disposable income; Labor prod = Labor productivity; GDP = gross domestic product; Emp. growth = employment growth.

Breaking the factors down into their component parts, as figure 4.3 does, enables us to isolate in even greater detail the determinants that appear to influence competitiveness outcomes.

Labor productivity appears to benefit most directly from improvements on various determinants, especially in production centers and services hubs. Productivity and income levels in market towns are correlated with lower costs of electricity and more developed financial markets. In production centers, electricity costs, physical capital, and human capital are all positively associated with output growth rates, whereas productivity appears to benefit from improvements on a number of different fronts.

Physical infrastructure and human capital may become increasingly complementary as income levels rise. Lower electricity costs are associated with higher job growth, output growth, and productivity levels even in higher-income services hubs, underscoring the continued saliency of the basic microeconomics of production even in services econ-

omies. Both measures of human capital are associated with job growth and productivity in services hubs, as are mature financial markets. Together, these findings suggest that basic (physical) and more advanced (human and financial) forms of capital may become increasingly complementary as cities develop. Social infrastructure, for its part, appears to be highly correlated to living standards and development levels but exhibits no significant connection to growth rates.

Predictors of city competitiveness by region and city type

We also carried out pair wise correlation analyses between the indexes and competitiveness outcomes by region and types of cities.

Generally across regions and types, the finding holds that city indexes are good at predicting a city's overall level of development but are less useful at explaining differences in performance among cities at the same stage of development.

Figure 4.3 Statistically significant correlations among determinants and competitiveness outcomes by city type

	Market Towns (<US\$2,500 GDP per capita)				Market Towns (US\$2,500–20,000 GDP per capita)				Creative Financial Centers (>US\$20,000 GDP per capita)			
	Disp. income	Labor prod.	GDP growth	Emp. growth	Disp. income	Labor prod.	GDP growth	Emp. growth	Disp. income	Labor prod.	GDP growth	Emp. growth
Institutions and regulation												
Ease of doing business index (DB)	■				■		■					■
Physical Infrastructure				■		■			■	■		
Physical infrastructure (EIU)						■	■		■	■		
Infrastructure index (UN)					■	■	■	■	■	■	■	■
Cost of electricity (DB)	■	■		■	■	■	■		■	■	■	■
Social infrastructure		■				■			■	■		
Social and cultural capital (EIU)						■	■		■		■	
Healthcare (EIUL)				■		■			■	■		
Quality of life (UN)					■	■			■	■		
Financial infrastructure						■						■
Private credit bureau coverage (DB)	■	■	■		■	■	■		■	■	■	■
Financial maturity (EIU)						■				■		■
Human capital									■	■		■
Human capital (EIU)									■	■		■
Education (EIUL)					■		■			■		■
Innovation						■				■		
Number of patents (GUC)						■				■		

■ **Positive** statistically significant correlation at the 10 percent level
 ■ **Negative** statistically significant correlation at the 10 percent level

Source: Oxford Economics Dataset and Various Indices

Note: DBI = Doing Business Indicators; EIU = Economist Intelligence Unit City Competitiveness Hotspots; EIUL = Economist Intelligence Unit Liveability Index; GUC = Global Urban Competitiveness Report; UN = UN-Habitat City Prosperity Index; Disp income - Disposable income; Labor prod = Labor productivity; GDP = gross domestic product; Emp. growth = employment growth.

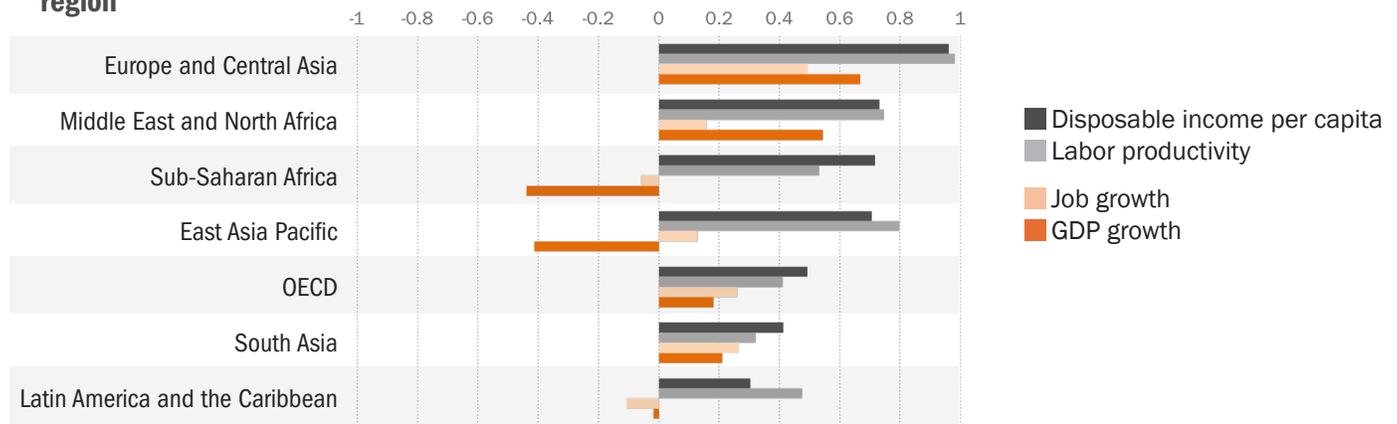
Accordingly, factors are consistently better at predicting labor productivity and disposable income levels than they are at predicting the shorter-term changes in output or employment. With smaller sample sizes, even fewer correlation coefficients are statistically significant. Those caveats aside, correlation analysis by city type constitutes a sound starting point for attempting to explain the variation in competitiveness outcomes across cities.

One can conduct the narrower correlation analysis from one of three different perspectives: that of a region, that of a determinant, or that of a factor. For example, one can try to uncover what factor is most strongly correlated with competitiveness outcomes in groups of different cities. Alternatively, one could approach the analysis by asking where and for which outcome a particular determinant seems to matter. Or finally, a productivity scholar, for example, may wish to know how the relationship between a set of determinants and labor productivity differs across regions.

Figures 4.4, 4.5, and 4.6 illustrate these perspectives with actual data. Figure 4.4 explores the relationship between the EIU's financial maturity measure and competitiveness outcomes across World Bank Group regions. One can see that the measure is positively correlated with labor productivity and disposable income per capita across all regions and with GDP growth in the Middle East and North Africa and Europe and Central Asia.

Figure 4.5 takes only East Asian and Pacific cities into account to show that across a set of indicators representing each determinant, institutional strength and social infrastructure are positively associated with job growth in the region. Observed relationships with GDP growth, in contrast, are all counterintuitively negative—hence suggesting that the indicator may actually be assessing something that is inversely related to the factors driving growth in this particular context. Once again, associations with labor productivity and disposable income levels are stronger and more positive.

Figure 4.4 Example correlation analysis output between financial maturity and competitiveness outcomes, by region



Source: Oxford Economics Dataset and Economist Intelligence Unit

Figure 4.5 Example correlation analysis output between competitiveness determinants and outcomes for East Asian and Pacific cities

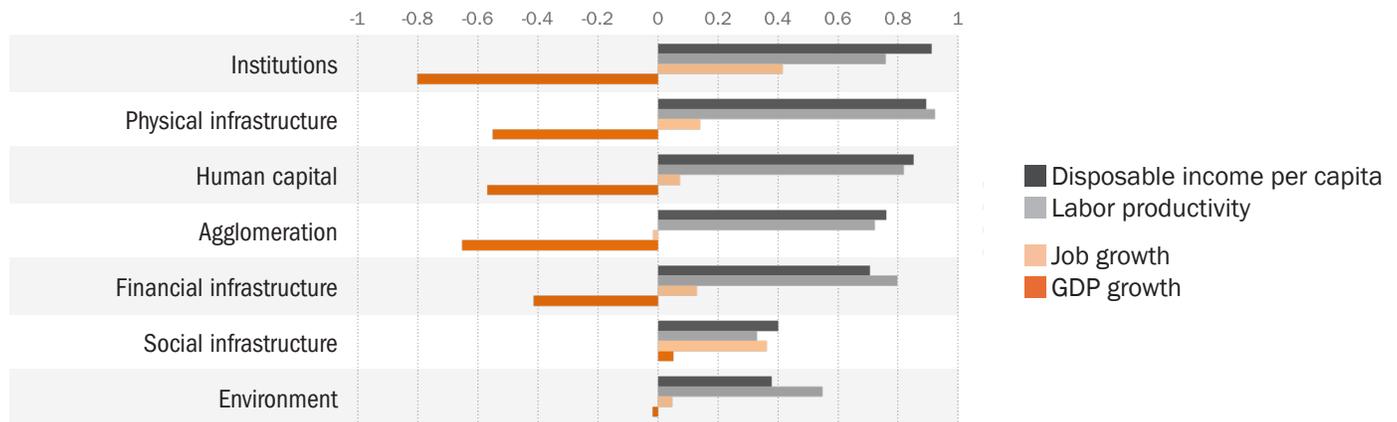


Figure 4.6 displays correlations between the full range of competitiveness determinants and labor productivity by region. The example clearly shows that institutional strength is more highly correlated with labor productivity levels in cities of Sub-Saharan Africa (and less highly correlated in cities of Europe and Central Asia) than in cities of any other region, just as social infrastructure is most strongly associated with higher labor productivity in cities of South Asia and least strongly associated in cities of Europe and Central Asia. In cities of Europe and Central Asia, physical infrastructure and financial infrastructure are most closely associated with higher levels of labor productivity. A chart such as this example could help scholars from different regions identify pertinent and promising issues for their competitiveness inquiries.

Because these are only correlations, and correlations reveal associations but offer little insight into explanatory factors, later stages of this project may conduct a more comprehensive multivariate regression analysis to complement this base.

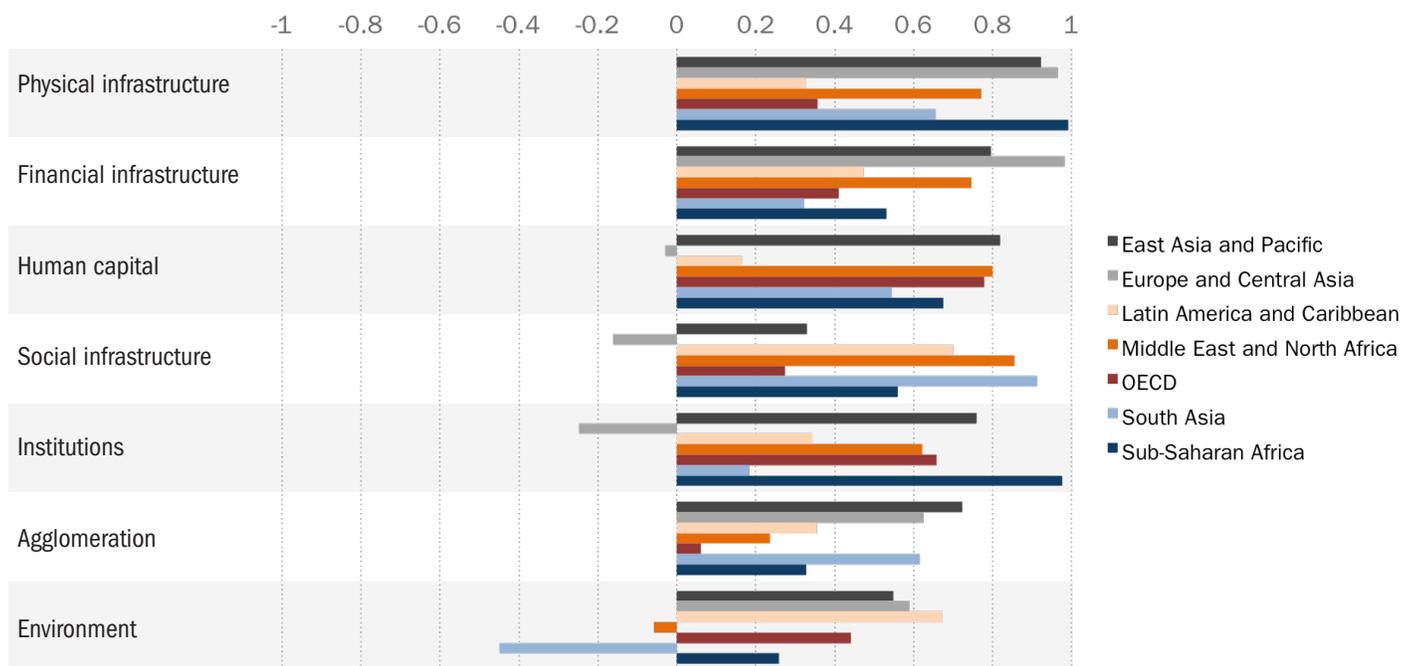
How does the “mayor’s wedge” relate to city competitiveness?

Of particular interest is the idea of the “mayor’s wedge”—that is, the capacity, scope, and autonomy for relevant policy making at the city level—and its relationship with city competitiveness outcomes: GDP and job growth, disposable incomes, and labor productivity.

We explore the mayor’s wedge relationship with city competitiveness using an econometric model. We obtained data from the International Monetary Fund’s GFSY database, which provides information on spending at all levels of government in countries outside Asia. Coverage of this data set expanded with each year, beginning with 100 cities in the sample in 2000 and ending with 286 by 2012. OE data on social infrastructure and agglomeration, which had full coverage, were also used to introduce a series of explanatory variables covering additional competitiveness determinants.

We performed a multivariate regression analysis to test the ability of two components of the wedge—scope and financial autonomy—to explain competitiveness outcomes. The ordi-

Figure 4.6 Example correlation analysis output between labor productivity levels and competitiveness determinants, by region



Source: Oxford Economics Dataset and Various Indices

nary least squares model controlled for city and year fixed effects to render a more robust result and reads as follows:

$$(4.1) \quad \text{City Competitiveness Outcomes}_{ct} = \alpha_c + \beta_t + \delta \text{Mayor's Wedge}_{ct} + x_{ct} + \varepsilon_{ct}$$

Where α_c and β_t are city and year fixed effects, respectively, and x_{ct} denotes the determinants of city competitiveness introduced as controls. The dependent variable measures competitiveness outcomes for a given city (denoted by the subscript c) at a given point in time (denoted by the subscript t). Similarly, the explanatory variable also varies by a given city and year. The numerical coefficients are shown in table 4.3 and depicted visually in figure 4.7. The results should be

interpreted as follows: a 1 percentage point increase in the local share of total government spending (a proxy we used for measuring the scope of a mayor's administrative remit) is associated with a commensurate 0.132 percentage point increase in job growth and a 0.179 percent decrease in household disposable income. When financial autonomy is used as a proxy for a mayor's administrative remit, the regression results show that a 1 percentage point increase in the share of a city's revenues raised locally is associated with a 0.174 percentage point decrease in GDP growth, a 0.115 percent decrease in labor productivity, and a 0.263 percent decrease in household disposable income. Explanations of these regression results are presented in the following section.

Table 4.3 Regression results from mayor's wedge model

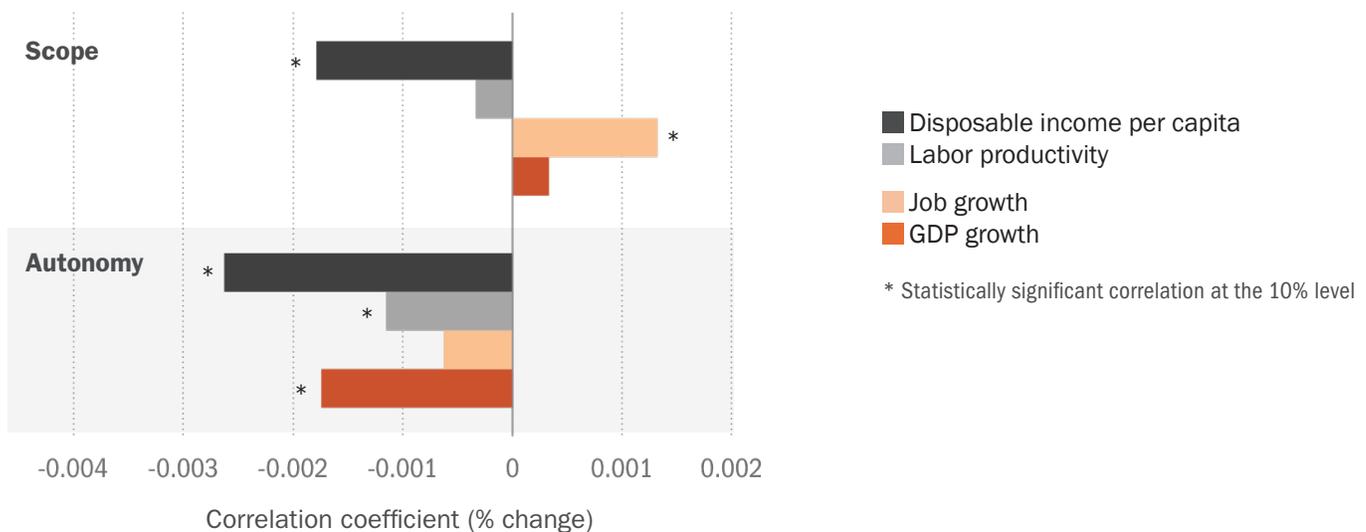
City competitiveness outcomes	GDP growth	Job growth	Labor productivity	Disposable income
Mayor's wedge: scope	0.000335 (0.000827)	0.00132*** (0.000405)	-0.000337 (0.000643)	-0.00179* (0.00101)
Mayor's wedge: financial autonomy	-0.00174** (0.000809)	-0.000629 (0.000406)	-0.00115* (0.000656)	-0.00263** (0.00113)
Constant	10.10*** (0.322)	6.425*** (0.217)	3.521*** (0.202)	3.431*** (0.397)
Observations	1,897	1,897	1,897	1,841
R-squared	0.998	0.998	0.997	0.992
Year fixed effects	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes

Source: authors' own analysis; dataset used is authors combining oxford economics dataset and various indices

Note: We also include a number of controls, such as physical infrastructure provisions: number of nurses, doctors, and teachers as well city Gini index to capture the level of inequality. However, because they were not the focus of this regression exercise, we highlight only the mayor's wedge results here.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

Figure 4.7 Size, direction, and significance of mayor's wedge coefficients from global regression analysis



Source: authors' own analysis; dataset used is authors combining oxford economics dataset and various indices

Significance level: * = 10 percent.

Findings from the mayor's wedge analysis: Scope and autonomy

The analysis found that delegating more public functions to mayors—that is, expanding the scope of a mayor's administrative remit, proxied by the local share of total government spending—is positively associated with higher levels of employment in cities but negatively associated with income. *Financial autonomy*—the share of local government revenues raised locally and not transferred by the central government—is negatively associated with all competitiveness outcomes except job growth. This finding suggests that, globally, cities perform better with stable revenue streams from the central government.

Findings from the mayor's wedge analysis: Capacity

Another important aspect of the efficacy of local governments is their ability to design and implement sound policies in the spaces that fall within their remit—in short, their capacity. Unfortunately, attempts to directly measure *local government capacity*—the ability of a government to execute and implement policy efficiently and capably—accurately and systematically across countries met methodological roadblocks. The size of the public sector, a proxy for inputs, was strongly positively correlated with outcomes but is fraught with complications ranging from issues of endogeneity to perverse conclusions, such as the implication that large public

sectors bloated with cronies may actually be associated with improved economic outcomes. Complicating matters further, proxies of public sector capacity such as public sector output per worker were negatively associated with outcomes globally.

To try to get around these global issues, we explored the performance of proxies for capacity in two institutional contexts: China and the European Union. In China, we took advantage of a recent policy change that upgraded particular counties to city status in an effort to better understand the economic effect of an enlarged administrative remit. We found that expanded scope alone was not sufficient for improving firm- and city-level economic outcomes. Instead, only *high-capacity cities*—defined here as those with (a) a larger share of public employees paid through public finance out of the total population (proxying for adequate and institutionalized human capital in the public sector) and (b) higher tax extraction capability, as defined by local tax revenues normalized by local GDP—appear to succeed in translating an expanded remit into improved competitiveness outcomes (see Zhu and Mukim 2015). The other exercise took advantage of public employee productivity data from the European Union to find that cities with larger administrative scopes and high levels of public sector productivity perform better on measures of job growth. Using the size of the public sector as a proxy for capacity, however, reveals a negative association with GDP, jobs, and income growth. This finding stands in contrast to the China finding.

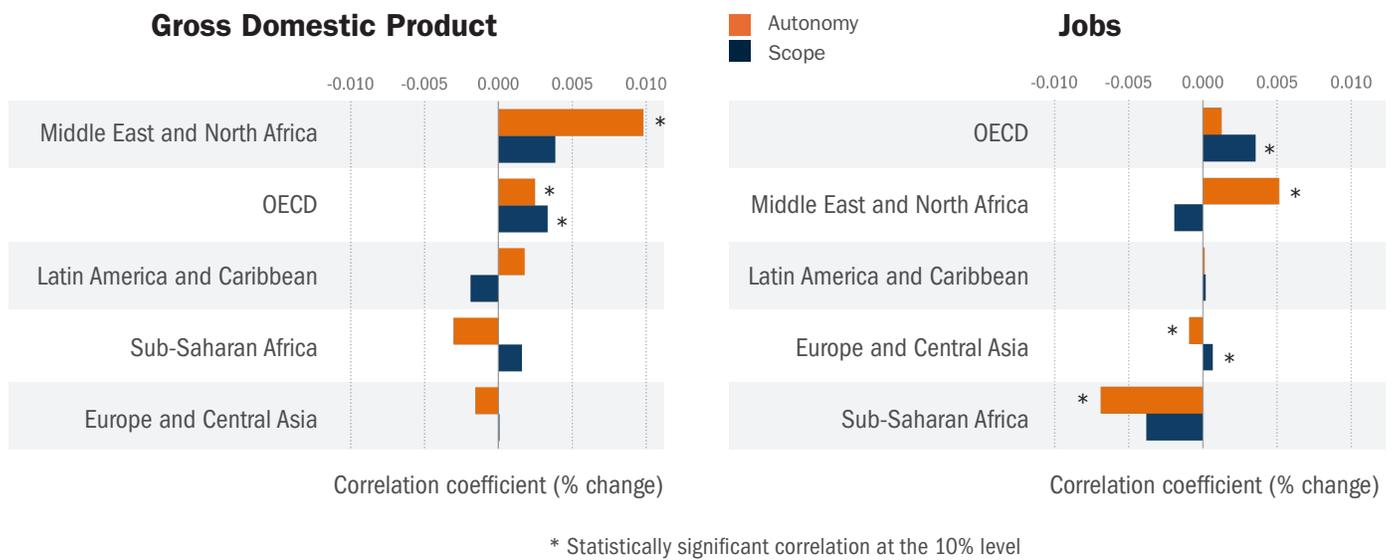
Variation in the effect of the mayor's wedge by region and city type

We then ran the regression by region and city typology and found that the nature and effect of the mayor's wedge appears to vary significantly across regions (see figure 4.8). The mayor's wedge appears to have better explanatory power in OECD and Middle Eastern and North African cities than it does in Latin American and Caribbean or Sub-Saharan African cities, where we found few statistically significant relationships.

The positive association between mayor's scope and job growth observed at the global level extends only to OECD cities (with statistical significance) at the regional level, where it is also positively and significantly correlated with GDP growth.

Sub-Saharan African and European and Central Asian cities drive the negative relationship observed between autonomy and job growth globally. GDP growth in the Middle East and North Africa and job growth in cities of the Middle East and North Africa and the OECD, in contrast, appear to benefit from local government autonomy.

Figure 4.8: Size, direction, and significance of mayor's wedge coefficients from regional regression analysis



Source: Authors' own analysis; dataset used is authors combining Oxford Economics dataset and various indices

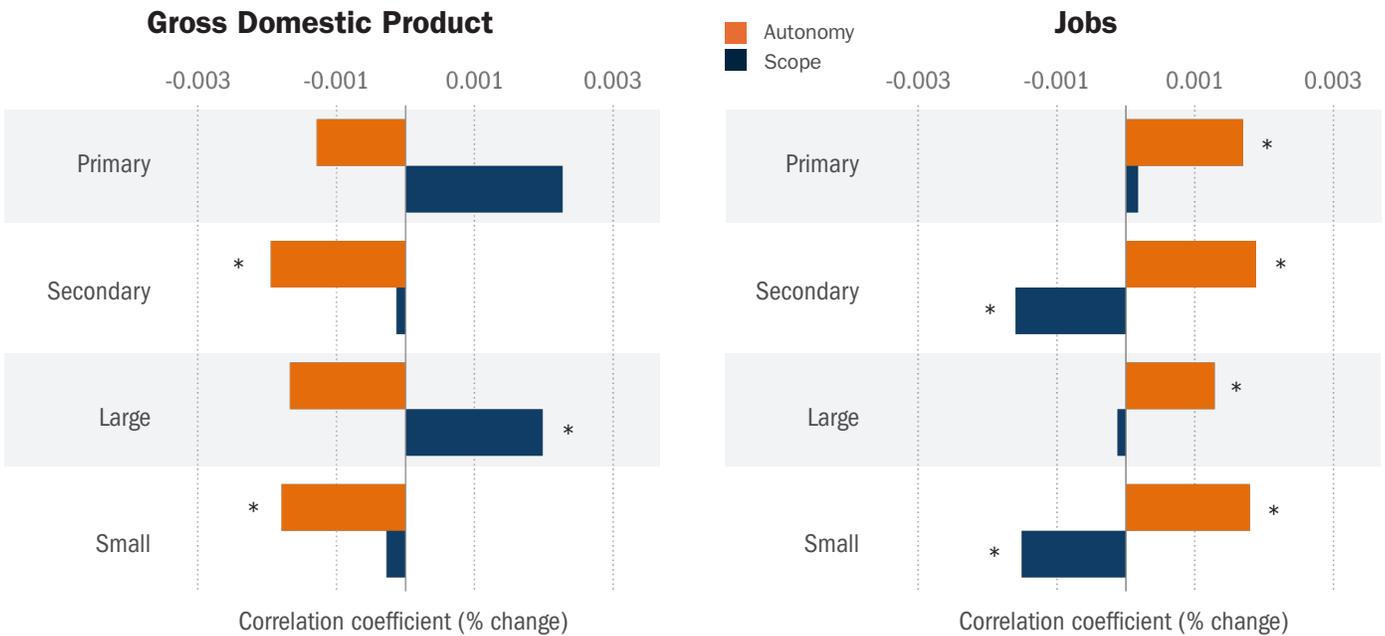
Cutting the data by city primacy and size instead of by region reveals a different set of findings (figure 4.9). The scope of a mayor's remit is positively associated with job growth at all city sizes, but the relationship is stronger in small and secondary cities than it is in large or primary ones. Fiscal autonomy is negatively associated with job growth and GDP growth in small and secondary cities but shows little relationship in large or primary ones.¹⁰

Together these findings suggest—perhaps intuitively—that small and secondary cities benefit from direction by the central government but remain competent stewards of financial inflows, better allocating resources in their administrative areas according to local needs and particularities. Potentially underscoring this point is the last cut of the mayor's wedge analysis, which although not depicted here, finds that scope is strongly and significantly positively associated with job

GDP and job growth in industrial cities. We expect industrial cities to vary more in their economic specialization than cities oriented to either consumer or high-end services sectors, given what we know about the economics of agglomeration. The logic is that local leaders may therefore be better attuned to the particular needs of their specialized regional economies.

These findings suggest that small and secondary cities benefit from direction by the central government but remain competent stewards of financial inflows, better allocating resources in their administrative areas according to local needs and particularities.

Figure 4.9 Size, direction, and significance of mayor's wedge coefficients from city size regression analysis



* Statistically significant correlation at the 10% level

Source: Authors' own analysis; dataset used is authors combining Oxford Economics dataset and various indices

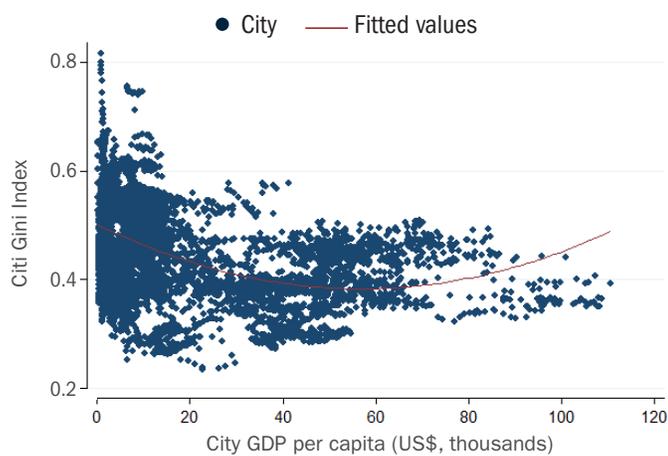
How does inequality relate to city competitiveness?

Even without significant increases in administrative powers, competitive cities are good at reducing inequality—especially cities that attract a huge influx of migrants. Descriptive results across 750 cities spanning 12 years suggest that rapid city-GDP growth at early stages of incomes is associated with larger reductions in inequality—with momentum slowing at the US\$20,000 per capita level and then reversing when cities reach income levels of US\$50,000 to US\$60,000 per capita.

We performed a nonlinear multivariate regression analysis controlling for year and city fixed effects to test the robustness of the observation that richer and more competitive cities tend to see a decrease in inequality.¹¹

$$(4.2) \quad \text{City Gini Index}_{ct} = \alpha_c + \beta_t + \delta \text{City_GDP_PC}_{ct} + \theta \text{City_GDP_PC}_{ct}^2 + I_{\text{neg_migrate}} + \varepsilon_{ct}$$

Figure 4.10 Inequality by income in 750 OE cities



Source: Oxford Economics Dataset

where α_c and β_t are city and year fixed effects, respectively, and $I_{\text{neg_migrate}}$ is an identity variable taking the value 1 if the city experiences a negative net migration. The dependent variable Gini index measures city inequality for a given city (denoted by the subscript c) at a given point in time (denoted by the subscript t).

The regression results show that cities with negative migration rates tend to be more equal (table 4.4). In other words, cities that see an influx of migrants tend to perform worse on inequality indicators. This result may be a natural by-product of the process of urbanization, as low-income migrants move to growing cities in search of job opportunities. Under such circumstances, we would expect to observe a high inequality ratio. As the income level of a city increases, however, the inequality level of a city also seems to drop, bringing shared prosperity to city residents. In the dynamic sense and over time, then, economic development reduces or “mops up” a city’s initial inequality.

Table 4.4 Regression results of city inequality versus city income level

City inequality level	City Gini index
City GDP per capita	-0.000683*** (0.000183)
City GDP per capita ²	-9.72e-07 (1.53e-06)
City with negative immigration	-0.00142** (0.000637)
Constant	0.470*** (0.00205)
Observations	8,504
R-squared	0.967
Year fixed effects	Yes
City fixed effects	Yes

Source: authors' own analysis; dataset used is oxford econ dataset
Significance level: ** = 5 percent, *** = 1 percent.

6. Conclusion

This technical overview of global quantitative analytics attempts to build a knowledge base on city economic performance and city competitiveness. Compared with similar efforts, this technical exercise stands out in terms of its geographic coverage (750 of the largest cities across 140 countries); its breadth and depth of topics (urban inequality, job creation through tradable sectors and FDIs, key factors that drive city competitiveness outcomes, and so on); and, importantly, its identification of global and regional trends pertinent to economic development in cities (city development pathways, mechanisms linking governance and outcomes, and the like).

Beginning with the basics, the very first stage of the analytics exercise involves benchmarking a global sample of 750 cities by comparing their performance with each other, with regional and national averages, and over time. Interesting global trends and findings start to emerge. First, cities generate a disproportionately large share of new private sector jobs. In fact, job creation in cities is linked to the broader urban inequality debate: cities that observe a large influx of migrants looking for jobs tend to see their inequality indicators rise sharply initially, but the evidence presented in this paper posits that as cities develop, inequality drops as migrants are assimilated into the local labor force. Second, the global data support a particular development pathway for cities: from market towns to production centers to creative and financial services hubs. At the same time, these pathways are not etched in stone: for instance, the manufacturing sector is slowing as an engine of growth and structural change, especially for low-income African cities. Third, in terms of absolute volume, after normalizing using city GDP, two-thirds of the most attractive investment destinations are in Sub-Saharan Africa, South Asia, and East Asia and Pacific excluding China. And finally, the tradable sector turns out to be important for cities not just because it creates more and better jobs, but also because it creates a multiplier for jobs created in the non-tradable sectors. In cities with lackluster tradable sectors, the non-tradable sectors also lose momentum.

The next stage of the technical exercise included an extensive literature review, followed by a survey of existing and frequently used city indexes along with an assessment

of their quality and ability to predict successful economic outcomes. Correlation analyses that explore the relationship between determinants of competitiveness, such as institutions, physical infrastructure, social infrastructure, human capital, and innovation, helped peel the onion further. Initial findings led to an intriguing hypothesis for further testing: that cities must square away a succession of building blocks of competitiveness—institutions and social and physical infrastructure at lower incomes, then innovation capacity—to build the human capital base required to compete, grow, and prosper as a high-income city. More robust techniques such as fixed-effects regressions were then used to understand associations and generate findings regarding the mechanisms that drive competitiveness. For instance, one of the important findings is that a larger mayor's wedge, in particular the scope of the mayor's administrative remit, generally has a positive relationship with city competitiveness outcomes. However, this effect is usually conditional on capacity: the local government's capacity determines whether mayors can effectively harness and use their new powers to bring growth and prosperity to their cities.

Cities must square away a succession of building blocks of competitiveness — institutions and social and physical infrastructure at lower incomes, then innovation capacity — in order to build the human capital base required to compete, grow and prosper as a high income city.

We find no holy grail of city competitiveness. This analysis has left us, and probably others, wanting. We did not set out to, nor did we expect to, uncover singular truths about city competitiveness. That being said, detailed and comprehensive data sets focusing on particular regions should produce insights specific to the cases at hand. This work points to global trends on topics such as the existence of income traps or of earlier deindustrialization, but these trends require further exploration to substantiate. Nonetheless, all of the research underlines the importance of understanding global trends and basing conclusions about them on reliable data. It also illustrates the value of city-based analyses, both broad based and customizable, depending on the client and the question at hand.

Notes

¹ The World Bank's 2009 World Development Report (World Bank 2009, 105) cites sources indicating that 50 percent of world GDP is produced on just 1.5 percent of the world's land and that 90 percent of world GDP is produced on just 16 percent of land; however, the land area estimate for all of the world's cities is unknown.

² Throughout this study, regions are classified according to the standard World Bank practice.

³ For more on city selection and other methodological questions relating to the data set generally, see OE (2014).

⁴ These descriptive statistics do not pretend to summarize the average characteristics of cities in each region; they merely summarize the 750 cities contained in this specific data set. This section is designed to contextualize the subsequent analysis of this data set.

⁵ OECD cities are representative cities located in developed countries that are OECD members.

⁶ For a thorough review of the ambiguities of the literature, see Görg and Greenaway (2003).

⁷ The model is similar to the one used in Barro (2015). The conditional convergence rate of 1.4 percent is from a model without fixed effects, whereas 9.0 percent is from a model with fixed effects (plus additional controls such as education, FDI, and provision of other public services). Positive and significant unconditional convergence rates are obtained as well, at an interval of 1.9 percent (without fixed effects) and 4.5 percent (with fixed effects). See Barro (2015) for comparison for this convergence exercise.

⁸ Marshallian externalities refer to benefits that firms derive simply by locating near other firms engaged in similar activities—knowledge spillovers, labor market pooling, and specialized suppliers—as observed by Alfred Marshall in *Principles of Economics* (1890). Jacobian externalities, in contrast, refer to the benefits that firms derive from locating near firms engaged in unrelated activities—chance encounters, differing perspectives, pollination across industries, and serendipitous innovation—as observed by Jane Jacobs in *The Economy of Cities* (1969).

⁹ For a comprehensive review of literature on the drivers of growth in cities in terms of city size, density, and per capita income, see Duranton and Puga (2014). For a detailed analysis on the drivers of growth in Colombian cities, see Duranton (2015).

¹⁰ According to the literature, fiscal decentralization (that is, local governments having more fiscal autonomy) has a mixed effect across countries. This result is probably because fiscal decentralization has to be coupled with political and administrative decentralization when being evaluated, because a systematic approach that takes into account the design of fiscal decentralization is more relevant than the fiscal dimension alone. See Martínez-Vázquez, Lago-Peñas, and Sacchi (2015).

¹¹ A robust test taking the log of city GDP per capita to account for extremely values was performed, and similar results were obtained.

¹² For some cities, data did not become available until later in the period. In such cases, city performance was assessed over the shorter time span.

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