

## 2. Benchmarking Chongqing's Potential against Global Cities

**With the right development strategy, there is little doubt that Chongqing can achieve its ambition of becoming a metropolis with international appeal in the next 20 years. To develop such a strategy and understand its main priorities, this report begins by benchmarking Chongqing against a set of global cities.**

### What Makes a Global City?

To begin, a basic question must be answered: which cities are global cities, and what are their common features?

**Although there is no internationally agreed definition of what constitutes a global city, there are some common characteristics that many such cities share.** The so-called Big Six leading global cities—London, New York, Paris, Tokyo, Hong Kong SAR, and Singapore—are global economic hubs.<sup>9</sup> They all have high levels of business and investment activity and attract talent and businesses from around the world.<sup>10</sup> In particular, global cities have developed comprehensive competencies in four mutually reinforcing dimensions:

1. **Economic competitiveness** that is defined by robust economic performance, a large and skilled labor force, high innovation capacity, and excellent connectivity
2. **Environmental sustainability** driven by resource efficiency and the effort to maintain a low carbon footprint
3. **High quality of life** with a unique urban fabric, vibrant neighborhoods, and cultural interaction
4. **Compact spatial structure** to support agglomeration and maximize efficiency—a cross-cutting and enabling dimension that is vital for the other three areas

### Key Findings of Benchmarking Chongqing with Global Cities

**Compared to the Big Six and other leading global cities, Chongqing has its own strengths, as well as a number of weaknesses that any long-term plan must aim to address and improve.** Due to its sheer size, Chongqing Municipality can be benchmarked against entire countries, while central Chongqing, comprising nine districts, can be compared to leading global cities. Chongqing Municipality's area, for example, is approximately 80 percent that of the Republic of Korea, and its population about 60 percent. The population of central Chongqing's nine districts is about 7.4 million (2015, registered population) and is thus comparable to Tokyo's 23 wards, Seoul Special City, Singapore, Hong Kong SAR, London, or New York City.<sup>11</sup> For the purpose of this report, benchmarking is done at the scale of both the municipality and central Chongqing, as relevant (see Annex 1).

**Benchmarking reveals a number of strengths that make Chongqing well placed to become a global city in the future.** Chongqing Municipality's economy has recently been the fastest growing in China, expanding 9.3 percent year-on-year in 2017. This **rate of growth** is about three times higher than that of Singapore or Hong Kong SAR. The municipality's **land transport infrastructure**, especially roads and railroads, is strong; and its **location**, as a gateway

*Facing page photo:* The municipal government highlighted the city's distinct urban form when advertising Chongqing at New York's Times Square on New Year's Eve, 2017. Photo: Chongqing Municipal Government. © Chongqing Municipal Government. Reproduced with permission from Chongqing Municipal Government; further permission required for reuse.

to China's west, to Europe, and to Southeast Asia, is an asset. At 2,818 km, the length of Chongqing Municipality's network of expressways is 57 percent that of Korea. When the extension of Chongqing Municipality's high-speed rail network is completed, the network's length will be double that of Korea's network and three-quarters that of Japan's (Table 2). Chongqing also has an unusually **strong manufacturing base**, both in automobiles and IT. Lastly, **Chongqing's housing market**, underpinned by strong public housing provision (Box 1), is affordable compared to China's other province-level municipalities and to global cities, ensuring its attractiveness for young talent.

**However, benchmarking also reveals weaknesses that threaten the city's potential to develop the economic competitiveness, environmental sustainability, and social inclusiveness required of global cities.**

**Chongqing lags behind global cities in three areas in particular: density, innovation, and environmental sustainability.**

Concerning the first, Chongqing's built-up area has increased twice as fast as its urban population in the past two decades. The city has used more land to accommodate each new urban resident (136 m<sup>2</sup>) than the average for China, other Chinese cities, and Hong Kong SAR (94 m<sup>2</sup>). **As a result, the municipality's urban population density has almost halved**, dropping from 22,820/km<sup>2</sup> in 1997 to 12,013/km<sup>2</sup> in 2015, and is now much lower than that of other provincial-level municipalities in China (Table 3).

The share of people and jobs within walking distance of public transport is also low compared to London, New York, and Hong Kong SAR (Table 4).

**TABLE 2** Connectivity in Chongqing and Global Cities

Indicator	Chongqing	International benchmarks
High-speed rail network length	2,032 km at municipality scale (when the mi [米] railway network is complete)	Japan: 2,765 km Korea: 1,048 km
Annual international passenger air traffic (2017)	5 million (target 2020)	Greater London: 110 million New York JFK: 32 million Seoul Capital Area: 57 million Tokyo Narita: 32 million Hong Kong SAR: 70 million Singapore: 58 million

Source: Based on data from Chongqing Planning Bureau; Chongqing Municipal Government 2017; Migiros 2018; ACI 2018.

Note: Figures for London include Heathrow and Gatwick.

**TABLE 3** Land Expansion and Density in Chongqing and Global Cities

Indicator	Chongqing	International benchmarks
<b>Land expansion 2000–2009</b>		
Additional land per new urban resident (m <sup>2</sup> )	136 (central Chongqing)	Hong Kong SAR: 40 Singapore: 38
<b>Density</b>		
Population density (people/km <sup>2</sup> in built-up area)	12,129 (municipality)	Seoul Capital Area: 11,880 Greater Tokyo Area: 8,062
	13,248 (central Chongqing)	Hong Kong SAR: 37,100 Seoul Special City: 29,100 Singapore: 18,248 Tokyo 23 wards: 15,346

Source: Calculated based on data from Seoul Metropolitan Government; Tokyo Metropolitan Government; Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016; Angel et al. 2016; and Government of Hong Kong Planning Department 2018.

**Furthermore, economic agglomeration is significantly lower in central Chongqing than in other Chinese and global cities** (Table 5).

**Chongqing lags global cities in terms of research and development (R&D).** This is visible both at the country level and city level, and both internationally and within China. The total R&D spending in Korea, Japan, Finland, and Sweden is more than 3 percent of GDP, and the same is true for Beijing (5.9 percent), Shanghai (3.8 percent), and Tianjin (3.1 percent). In comparison, R&D spending in Chongqing amounts to only 1.6 percent. In addition, R&D expenditure by industry enterprises in Chongqing is relatively low as well. This is an important factor, given that innovation is largely driven by private sector participation in research.

**Chongqing's energy intensity and CO<sub>2</sub> emissions are very high compared to global cities.** As Table 6 shows, Chongqing emits approximately twice as much CO<sub>2</sub> per capita as Tokyo and Seoul, rising to eight times as much when measured per unit of GDP, and uses 8–10 times the amount of energy per unit of GDP as Hong Kong SAR and Tokyo. Chongqing also uses about three times more water per capita than New York, and Chongqing's air quality is well below World Health Organization (WHO) critical thresholds. PM<sub>2.5</sub> concentration is, for example, more than three times higher than in Singapore and Paris, four times higher than in Tokyo and London, and 6.6 times higher than in New York.

**TABLE 4** Accessibility of Housing and Jobs by Public Transport in Chongqing and Global Cities

Indicator	Chongqing	International benchmarks
Share of people living within walking distance to transit (less than 1 km in global cities)	20 percent (central Chongqing)	London: 53 percent New York: 48 percent Hong Kong SAR: 75 percent
Share of jobs within walking distance to transit (less than 1 km in global cities)	35 percent (central Chongqing)	London: 67 percent New York: 58 percent Hong Kong SAR: 84 percent

Source: Based on an assessment made by Calthorpe Associates for this report and Rode et al. 2013.

**TABLE 5** Economic Density in Chongqing and Global Cities

Indicator	Chongqing	International benchmarks
GDP density (GDP/km <sup>2</sup> of built-up area in billion US\$/km <sup>2</sup> at current prices)	0.166 (municipality)	Greater Tokyo Area: 0.31 Seoul Capital Area: 0.34 New York Metropolitan Area: 0.23
	0.180 (central Chongqing)	Hong Kong SAR: 1.18 Singapore: 1.07 Seoul Special City: 0.78 Greater London: 0.60 New York City: 0.94

Source: Calculated based on data from Seoul Metropolitan Government; Angel et al. 2016; Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016; Government of Hong Kong Planning Department 2018.

**TABLE 6** Carbon Emissions and Energy Consumption in Chongqing and Global Cities

Indicator	Chongqing Municipality	International benchmarks
CO <sub>2</sub> emissions per capita (tons)	8.22	Greater Tokyo Area: 4.8 Seoul Capital Area: 3.7
CO <sub>2</sub> emissions per unit of GDP (US\$10,000 at PPP)	7.8	Greater Tokyo Area: 1.1 Seoul Capital Area: 1
Energy consumption per unit of GDP (MJ/US\$1,000 at current prices)	12	Greater Tokyo Area: 1.2 Singapore: 3 Hong Kong SAR: 1.5

Source: Calculated based on Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016 and Economist Intelligence Unit 2011.  
Note: PPP = purchasing power parity.

**The development pathway of many global cities suggests that when wealth reaches a certain level, resource consumption decouples from increasing GDP per capita.** For example, the Asian Green Cities Index shows that when incomes exceed around US\$20,000 per person, average resource consumption decreases (Economist Intelligence Unit 2011).

**However, decoupling does not happen automatically.** The experiences of global cities such

as Copenhagen (Box 2), London, New York, and Hong Kong SAR show that increasing wealth creates the preconditions for decoupling, but active and well-integrated policies are crucial for it to actually happen. Policies that should be put in place include planning for a compact urban form with densities aligned with transit, mixed-use developments, and a good job and housing balance; policies favoring nonmotorized transport; and replacement of coal with renewable energies.

**BOX 2** Copenhagen's Goal of Becoming the First Large Carbon-Neutral City by 2025

Copenhagen commuters. Photo: LeoPatrizi.



Copenhagen's GDP per capita increased by 30 percent between 1993 and 2010, while carbon emissions have halved since 1993 to reach 3.5 tons of CO<sub>2</sub> per capita. Thus an absolute decoupling of economic growth and carbon emissions has been achieved. Copenhagen is well known for its "Finger Plan" of development from 1947, which has channeled urban growth along rail corridors radiating from the city center while protecting "green wedges" from development. Through effective spatial planning, the city has

achieved a high level of integration between land use and transit, with 57 percent of the population and 61 percent of the jobs within walking distance from urban rail stations. Moreover, the city is aiming for 50 percent of commuting trips to be made by bike. Replacing coal and biomass for heating and power generation and the increased use of wind energy have also made a substantial contribution to reducing the city's overall emissions.

Source: Rode et al. 2013.

## Four Risks That Must Be Managed for Chongqing to Achieve Its Vision

Based on the strengths and weaknesses identified in the benchmark analysis, four main risks can be identified as potential barriers to Chongqing's Vision 2035:

### Risk 1

**The gradual depletion and misuse of Chongqing's most important asset for development—its land reserve**

### Risk 2

**Risks arising from its current drivers of growth: fixed-asset investment and the twin engines of Chongqing's core industry base—automobiles and IT**

### Risk 3

**Demographic change, including an aging population and a looming shortage of skilled labor**

### Risk 4

**Increased competition from other regional urban centers, such as Chengdu.**

Among these four risks, the first two are a result of the current growth modality—that is, the trend that would endanger Chongqing's transition to the next stage of transformation. These risks can be mitigated if Chongqing fundamentally rethinks its development strategy. The last two risks arise from external forces, which are inevitable; they require Chongqing to prepare early to mitigate the risks and to develop a strategy for adaptation to the new circumstances. Each is discussed in more detail below.

## Risk 1

### Fast depletion and suboptimal use of Chongqing's strategic land reserve

**Chongqing has a limited developable land supply due to its mountainous topography.** Despite its vast territory of 82,400 km<sup>2</sup>, only approximately 2,300 km<sup>2</sup> are available and planned for development.

**As the benchmarking reveals, Chongqing's recent development has been excessively land-intensive, with a land consumption rate much higher than in other Chinese cities.** By 2015, only about 800 km<sup>2</sup> remained available for further development, including for industrial land use (Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016). This pattern is common across China (Box 3), but particularly pronounced in Chongqing.

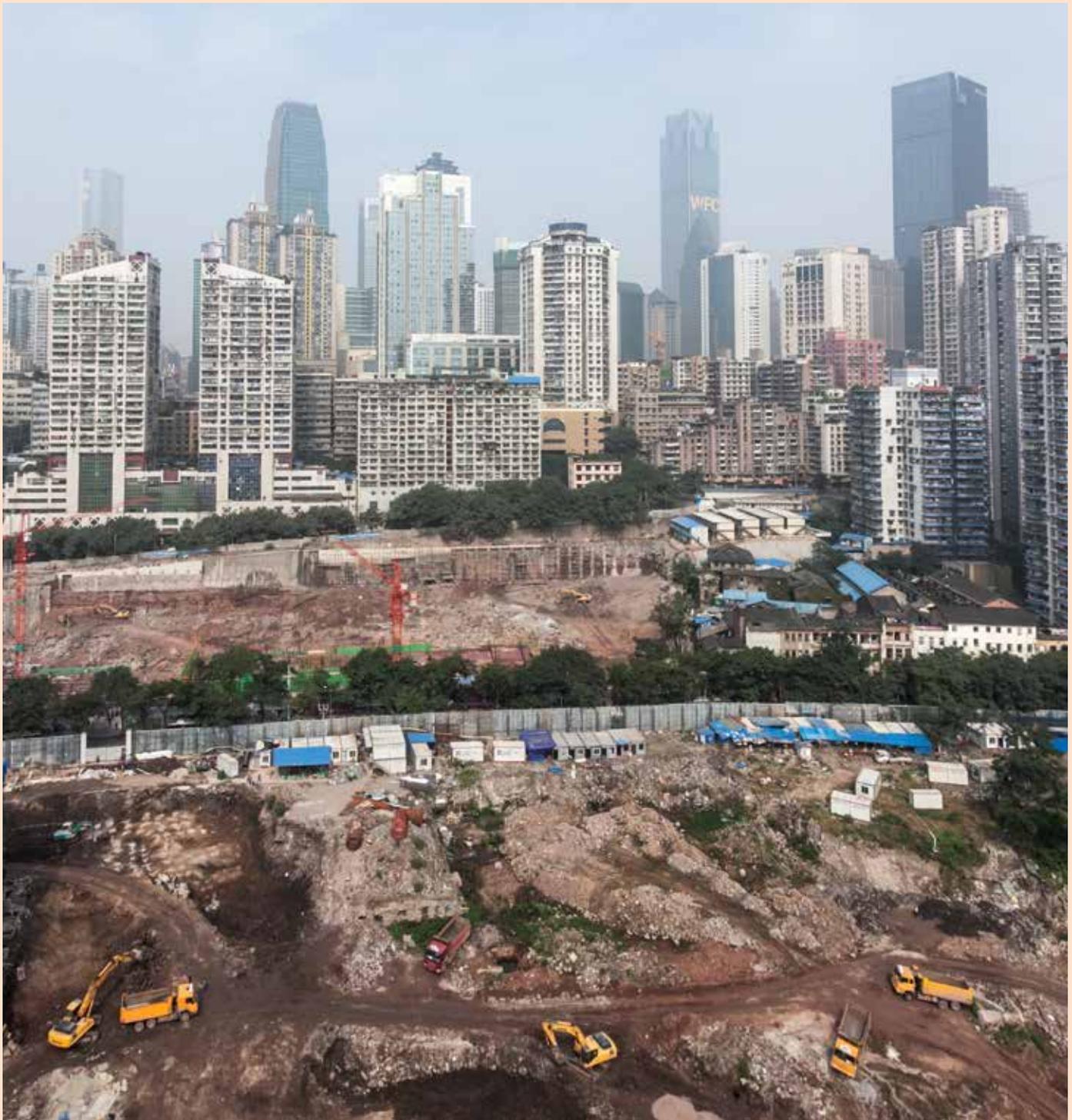
**Chongqing's high land consumption poses four major risks:** emerging land shortfall, declining population density and economic density, reduced walkability and quality of life, and increased infrastructure costs.

**Chongqing's available land could be depleted within the next 10 to 15 years.** If the excessive conversion rate of 136 m<sup>2</sup> of land per new urban inhabitant continues, Chongqing will use all its developable land by 2030 to accommodate the 5.8 million new urban dwellers in central Chongqing, leaving no room for industrial uses and for further urbanization.

**The current model of urban growth, which focuses on superblocks,<sup>12</sup> is leading to low population density, reduced economic density, and increased traffic congestion.** Residential superblocks currently cover three-quarters of central Chongqing, but house only 36 percent of its population and thus represent a clear waste of land assets. Economic density is also 16 times lower in residential superblocks than in Chongqing's mixed-use walkable areas. Lastly, this urban form and its fragmentation in outlying areas of central Chongqing has resulted in 80 percent of residents and 65 percent of jobs being located in car-dependent areas with low or no pedestrian access to public transit—a figure well below global city benchmarks, and one that leads to a high level of traffic and, hence, congestion and pollution.<sup>13</sup>

**Superblocks are also less connected and less walkable than other Chongqing urban forms, affecting the quality of life** (Figure 4 and Figure 5). More street intersections reduce connection distances, increase urban interaction, and boost the quality of life. Conversely, a coarse urban fabric is pedestrian-unfriendly and car-oriented. In Chongqing's superblock areas, the density of street intersections drops below 10 per km<sup>2</sup>, the length of streets falls to 5 km per km<sup>2</sup>, and the average distance between intersections reaches 400 m.<sup>14</sup> Compared to other global cities, these are very low numbers.

**BOX 3** Land Overconsumption Trends across China



Chongqing construction. Photo: Wonri.

Chongqing's land overconsumption is not isolated; it is a general trend across China that is driven by local governments' desire for more land income. According to a report by the National Development and Reform Commission, the central planning agency of China, small and medium-size cities are planning more than 3,500 new areas that, taken together, could

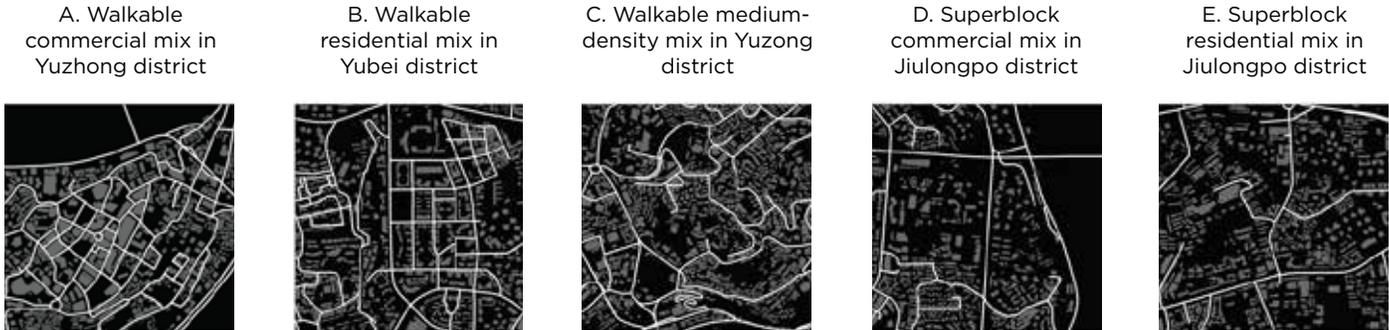
accommodate more than twice the current Chinese population of 1.4 billion people—or almost half of the world's population. The results were detailed in an analysis by Xinhua News Agency, which criticized the new development areas planned as impractical and leading to “ghost towns.”

Source: Wu, Dong, and Xu 2016.

**Lastly, superblocks result in increased infrastructure costs.** The cost of street infrastructure per unit of GDP for superblocks increases up to 11

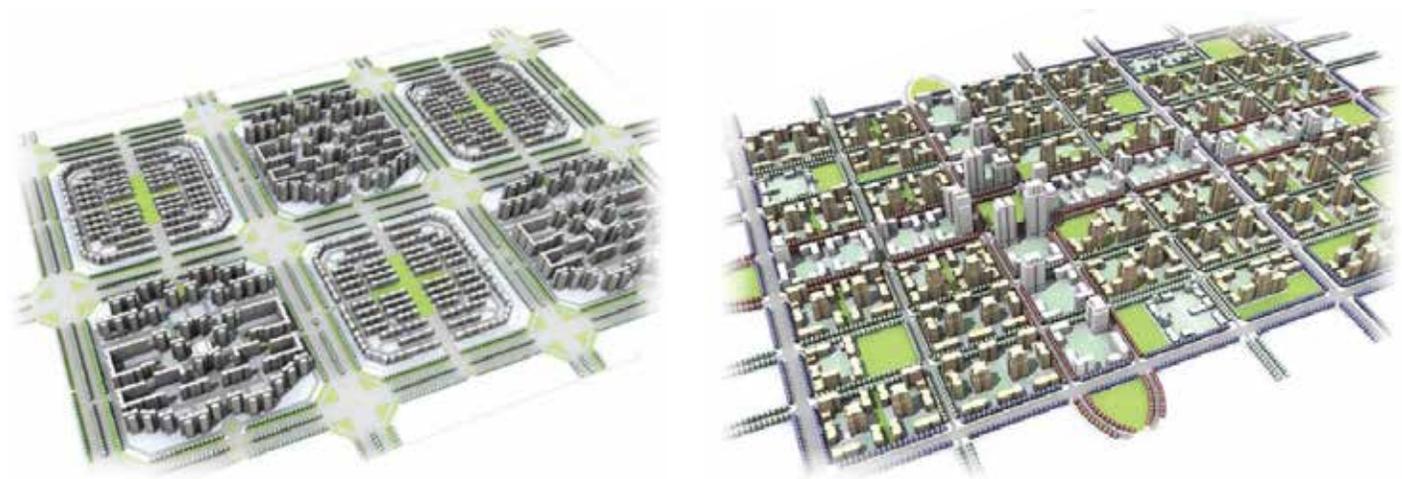
times compared with the Trend scenario. This implies that, relative to each unit of infrastructure, a smaller tax base is available to fund it.

**FIGURE 4** Chongqing's Urban Forms



Source: Produced by China Sustainable Transportation Center (CSTC) for this report.

**FIGURE 5** The Urban Form of Superblocks (Left) and Walkable Development (Right)



Source: Produced by Calthorpe Associates for *Chongqing 2035: Urban Growth Scenarios*.  
 Note: The diagrams are at the same scale.



**Superblock development**

Image credit: Calthorpe Associates. © Calthorpe Associates. Reproduced with permission from Calthorpe Associates; further permission required for reuse.



**Transit service in a walkable development pattern**

Image credit: Institute for Transportation & Development Policy (ITDP). © ITDP. Reproduced with permission from ITDP; further permission required for reuse.

## Risk 2

### Difficulty of managing drivers of Chongqing's development to ensure future success

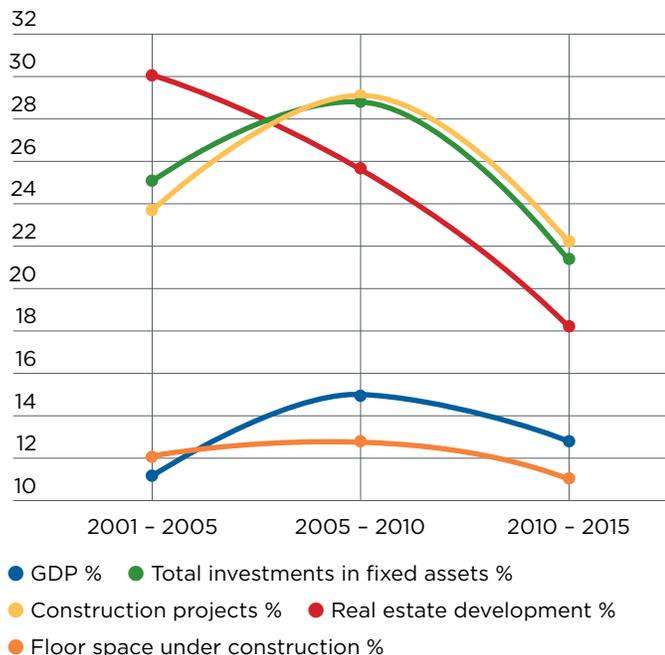
**The drivers of Chongqing's past achievements do not necessarily ensure future development and may even endanger the transition to a new growth model.** Over the past two decades, Chongqing's transformation was driven by fixed-asset investment, automobile production, and IT manufacturing. While successful in the past, these drivers of growth cannot be relied on for continued success.

**The fixed asset-driven growth modality is unsustainable.** Chongqing's investment in fixed assets grew by 48 times in 20 years, and rapid infrastructure development increased the city's connectivity, improved urban services, and fueled GDP growth. However, investments in fixed assets may have peaked and are likely to decline going forward (Chongqing Municipal People's Government 2016), (Figure 6). As a result, the projection for GDP growth by 2020 is expected to fall to 9 percent.

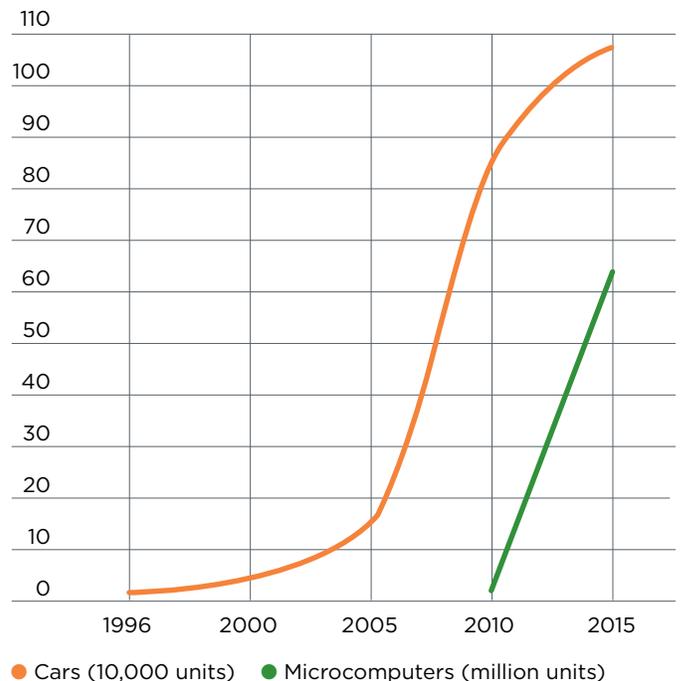
Additionally, labor productivity growth has slowed down significantly in the past five years, a possible sign that Chongqing's economy has exhausted gains from first-generation policy reforms and the absorption of imported technologies (World Bank 2015a). Identifying new drivers for growth will be crucial for maintaining robust and sustainable economic growth.

**Chongqing's two engines of growth—IT and automobiles—are beginning to plateau.** Chongqing has successfully adopted an ecosystem approach for industrial transformation and cluster development. However, while its two core industries have been important drivers of growth, their rate of growth slowed significantly between 2010 and 2015, reflecting a shift in the market. Automobile production, in particular, seems to be reaching the end of a pronounced S-curve. While the annual growth rate of car production peaked at an average of 40 percent between 2006 and 2010, it fell sharply to an average of 5 percent between 2011 and 2015 (Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016). The expected slowdown in both production and sales could have

**FIGURE 6** GDP Growth and Investments in Fixed Assets (Five-Year Average)



**FIGURE 7** Production of Automobiles and Microcomputers Since 1996



Source: Produced by the Urban Morphology and Complex Systems Institute for this report, based on Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016.

associated effects on downstream and upstream raw materials and spare parts production enterprises.

**This situation raises an important issue: the trade-off between specialization and diversification in the upgrading of Chongqing's real economy.**<sup>15</sup> Going forward, Chongqing needs to review and continue to optimize its industrial structure to achieve the right balance between specialization and diversification (Box 4). Today, its two main industrial clusters,

electronics and automobile manufacturing, account for a large share of the city's industrial output. They should be closely monitored to avoid the risk of a sudden collapse. Automobile manufacturing may suffer from lower growth rates going forward, as shown in Figure 7. Diversifying into electric mobility may be an excellent way to leverage Chongqing's industrial base, while at the same time securing future growth and employment.

#### **BOX 4** Benefits and Risks of Specialization and Diversification

Chongqing main square crowd. Photo: URF.



Specialization brings a number of important benefits: well-oiled supply chains and deep local labor markets, for example, make it likely that new firms entering the relevant industries will choose Chongqing over other locations. The co-location of many firms facilitates learning by doing, promotes local innovation, and attracts industry talent to Chongqing in search of jobs. It also makes it likely that logistical links, both upstream to suppliers and downstream to distributors, will be strengthened and reliable, and that financing with the relevant industry expertise will be available. In sum, specialization supports the formation, retention, and growth of industrial clusters and product chains, making it more likely that a city becomes a central economic hub with a strong “center of gravity” effect.

However, from the perspective of diversification, if economic or employment growth is heavily concentrated in one or a small number of industries,

hidden dangers may ensue. Chongqing has already learned this lesson once: the district of Dadukou, heavily reliant on iron and steel production, saw remarkable economic development for many years and was one of the main drivers of Chongqing's economy in the 1990s and early 2000s. However, a severe recession affected its core industry of iron and steel, and its economic growth fell off a cliff. To date, Dadukou's GDP is the lowest of central Chongqing's nine core districts, and the area continues to struggle with industrial development. In other words, overspecialization means tying the fate of the overall economy to the fate of a single sector or a small number of industries and carries the risk of sudden collapse. A certain degree of diversification is therefore beneficial for Chongqing's economic sustainability and economic development.

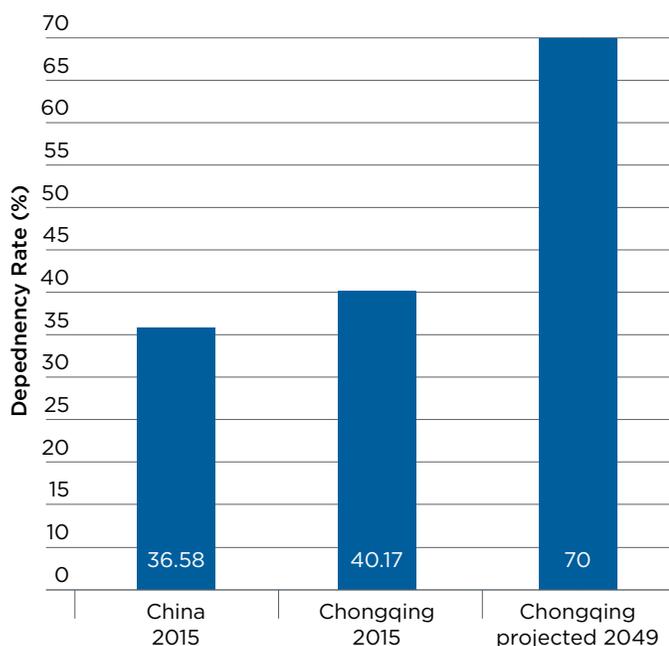
*Source:* Dadukou District Bureau of Statistics 2010.

### Risk 3

#### Disappearing demographic dividends with an aging population

**If China as a whole risks growing old before growing rich, the challenge facing Chongqing is potentially even more severe.** In the past 15 years, Chongqing has become an aging municipality.<sup>16</sup> In 2015, Chongqing had a higher dependency ratio than the national level—that is, 40 percent compared to 37 percent for China overall. Chongqing’s Municipal Statistics Bureau has projected the dependency rate in 2049 to be as high as 70 percent (Figure 8).

**FIGURE 8** Projected Evolution of Chongqing’s Dependency Ratio Compared to China Overall, 2015–2049



Source: Produced by the Urban Morphology and Complex Systems Institute for this report, based on information provided by Chongqing Planning Bureau.

**In addition to an aging population and a high dependency rate, Chongqing remains a municipality with a net population outflow.** Until 2016, about 5 million people left the municipality, while only 1.6 million people moved in, for a net loss of more than 3.4 million people to other regions (Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016).

**To address this outflow, Chongqing needs to remain economically attractive.** The majority of the outflow consists of young migrants or skilled workers who leave for better economic opportunities in other cities.

### Risk 4

#### Reduced geographical advantages due to the increased connectivity of other cities in the region

Like Chongqing, **neighboring regions such as Chengdu in Sichuan Province have in past decades poured massive investment into transport to reduce geographical barriers** (Box 5). Chengdu’s Shuangliu Airport handled 42.2 million passengers in 2015. In 2013, it was the fourth-busiest airport in China, the fifth-busiest airport in terms of cargo traffic in China, and the busiest airport in western and central China. A transcontinental rail link has also transformed Chengdu from a regional hub to an international port and investment center. Its rail link covers more than 10,000 km and reaches Germany in 14 days (HKTDC 2016).

As Chongqing strives to become a logistics hub for western China, a coordinated development strategy that creates win-win opportunities for development of the Chongqing-Chengdu corridor is becoming ever more important.

#### **BOX 5** How Increased Connectivity Has Reshaped the Strategic Significance of Cities

In 1850, the population of Chicago was 30,000, one-quarter that of St. Louis, then the second-largest port in the United States after New York. However, the completion of the Illinois and Michigan Canal in 1848, which connected Chicago to the Mississippi River, diverted trade that previously went to St. Louis. Its strategic location at the heart of the Great Plains, in

turn, meant that Chicago would grow exponentially during the railroad era. Chicago now has the largest number of American highways and highest volume of rail freight, while O’Hare International Airport is the second-busiest airport in the world.

Source: Dreyfus 1995.



As Chongqing strives to become a logistics hub for western China, a coordinated development strategy that creates win-win opportunities for development of the Chongqing-Chengdu corridor is becoming ever more important.



Multi-level overpass. Photo: pengpeng.

# 重 庆

## CHONGQINGBEI RAILWAY

# 候 车

## WAITING HALL

重庆北站列车候车信息					温馨提示
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K775	广州	16:00	第3候车室	进站候车	
8762	重庆西四场	16:15	第3候车室	进站候车	
D8528	涪陵北	16:38	第2候车室	进站候车	
D2261	成都东	17:08	第1候车室	进站候车	
K542	乌鲁木齐	17:26	第3候车室	进站候车	
K587	成 都	17:47	第2候车室	未到进站时间	

