



Asian Insights SparX

Asia Mega Cities in 2030

Refer to important disclosures at the end of this report

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Rising stars lie in China

- In 2030, eight Chinese cities among the top ten on our ranking scale will see their GDP surpass the current levels in Singapore and Hong Kong; Shenzhen's wealth will match Singapore's current level while Hangzhou's wealth moves closer to the current level in Hong Kong
- Wuhan and Guangzhou are future mega cities with the highest growth potential in almost all asset classes
- Hong Kong and Singapore will keep their leads but real estate growth potential is likely to be slower compared to China's mega cities

Wealth, innovation and liveability will shape new mega cities. To identify the new mega cities in 2030 in Asia, we looked for cities that can create wealth via innovation and house top talents through offering a high-quality liveable environment. Among the 302 regional cities we analysed, China will house eight mega cities by 2030 as their GDP surpasses the current levels in Hong Kong and Singapore. Singapore and Hong Kong will remain as the wealthiest cities in Asia while Shenzhen, Shanghai, and Hangzhou will surpass or match the current level in Hong Kong.

Real estate in Wuhan and Guangzhou seem undervalued in view of their strong economic growth potential. Our in-depth analysis compares economic potential of these mega cities against current real estate prices in all asset classes. In 2030, our analysis suggests that Shanghai and Shenzhen will replace Hong Kong to become the largest Grade A office markets. Beijing, Shanghai and Guangzhou will see stronger retail rental growth than Hong Kong as their retail rents are relatively low compared to their growth potential in terms of retail sales per capita. Inter-regional connectivity will support Hong Kong and Singapore's property market, but growth rate will decelerate.

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Asia Mega Cities* 2030 Ranking



Source: DBS Bank Hong Kong Limited ("DBS HK")
 * among the cities that we analysed

The DBS Asian Insights SparX report is a deep dive look into thematic angles impacting the longer term investment thesis for a sector, country or the region. We view this as an ongoing conversation rather than a one off treatise on the topic, and invite feedback from our readers, and in particular welcome follow on questions worthy of closer examination.

Table of Contents

Investment summary	3
New mega cities on the rise	5
Cities to shine	7
Which cities to see best growth potential in property prices?	9
Which cities to see best investment value in office sector?	11
Which cities to see good growth in retail rents?	17
Which cities to see brightest outlook in hotel assets?	20

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Investment summary

Three mega trends to shape future mega cities. In the last few decades, investment in infrastructure, foreign direct investment and job creation have been among key factors driving the growth of mega cities in Asia. In our view, however, growth will need to be supplemented by high quality factors to shape future mega cities. The mega cities in 2030 will provide a high quality liveable environment to house an affluent population and innovative strategy to recruit top talents. More cities will shift their focus from growth to quality, from building infrastructure to innovation/efficiency and from job creation to foster a liveable environment. Against this backdrop, we collected data from 302 cities, including 291 cities in China, Singapore, Hong Kong, Taipei, and eight cities in India. We selected 55 cities with a population over 5m and annual GDP per capita of over US\$8,000 for an in-depth analysis. We ranked the competitiveness of these cities based on three categories: (1) wealth; (2) innovation; and (3) liveability. Our key conclusions are discussed below.

Chinese cities occupied eight of the top 10 cities with Shenzhen ranked number 1; Guangzhou and Shanghai stood out as third and fourth. Our ranking shows Chinese cities have strong potential to stand out in terms of innovation and quality of growth. Hong Kong and Singapore ranked No. 2 and 5 respectively on the list. Both cities continue to offer a liveable environment and higher government spending in R&D/education, but their growth in both population and GDP is projected to moderate over the next decade. Taipei, despite lower population growth, also ranks high on the list, supported by its liveable environment. The key cities in India - Mumbai, Bengaluru, and Delhi – came in towards the bottom mainly due to lower scores in the parameters on a per capita basis.

In 2030, eight Chinese cities among the top 12 cities will see their GDP size surpass the current levels in Singapore and Hong Kong assuming their GDP will slow by 0.1% to 0.2% p.a. in the next decade. In terms of GDP scale, the GDP for Shenzhen, Guangzhou and Tianjin will exceed that of Hong Kong and Singapore and narrow the gap with Beijing. Shanghai will maintain its top position in terms of GDP scale.

Shenzhen's GDP per capita will surpass that of the present level in Hong Kong and move closer to Singapore's current level. Hangzhou will get closer to today's Hong Kong level as well. Singapore will remain its status of having the highest GDP per capita in 2030.

Wuhan and Guangzhou are two cities with the best real estate investment potential in almost all asset classes. We assess the real estate potential of these mega cities against their economic potential. Our key findings are discussed below.

Property prices in Changsha, Wuhan and Guangzhou have the highest growth potential while Hong Kong, Singapore,

Shanghai and Beijing will witness lower growth. GDP per capita has been and will continue to be the key long-term driver for residential property prices. Using property price-to-GDP per capita ratio as a key indicator, we have attempted to predict cities' residential price upside potential, assuming zero inflation. The current price to GDP per capita ratio of Singapore is 24%, which we consider as a comfortable level. Applying this level to GDP per capita in 2030, we find that Changsha, Wuhan, and Guangzhou will have more upside potential in their property prices. **Residential property price growth in Hong Kong, Singapore, Shanghai, and Beijing have lower upside.**

Shenzhen and Hong Kong face supply shortage in the near term but this advantage may not prevail in 2030. We analysed the built-up area as percentage of total land area for the top 12 cities. Shenzhen has built up 45% of its land area which is the highest among all cities. Hong Kong's and Wuhan's ratio are relatively higher than other cities at around 25%, while Beijing has the lowest mainly due to larger total land area. In our view, supply factors would affect property prices over a shorter time horizon. Transportation connections, increase in density or plot ratio, and even expansion in administration area of cities are potential ways to break supply constraints in the longer term.

Driven by higher growth in tertiary sector's GDP, Shanghai and Shenzhen will replace Hong Kong to become the largest Grade-A office market. Our analysis shows strong correlation between historical nominal GDP in the service industry and occupied Grade A office space in the past 12-17 years. We believe this trend will continue. Based on the projected 2030 tertiary GDP for these mega cities, our regression model shows that Shanghai's and Shenzhen's occupied office space by 2030 will be 22.7m square metres (sm) and 18.4m sm, respectively (up 135% and 251% respectively from 2017's level), exceeding Hong Kong and Singapore.

Guangzhou to register the highest CAGR of 5.0% for Grade-A office rental rate in 2017-2030, followed by Shanghai's 4.2%. Tertiary GDP per square meter office space are the key ratio to drive future rental. We used office space occupancy cost ratio (Grade-A office rents over tertiary GDP per sm) to project rental growth potential. Among four Chinese tier 1 cities, Guangzhou has the highest office rental growth potential by 2030, while Hong Kong and Singapore will still see 2% and 4% CAGR during 2018-2030.

Hangzhou and Wuhan may see more rental upside, if supply is well controlled. We also compare the rental costs per sm Grade-A office space vs. tertiary GDP per occupied Grade-A office space and draw a conclusion that Hangzhou and Wuhan may offer more rental upside as occupancy costs are relatively low as compared to tertiary GDP generated at present.

Wuhan, Shenzhen, Changsha, and Nanjing are likely to see stronger growth in retail sales, driven by local GDP growth and rising population. We expect local retail sales per capita to grow in tandem with GDP growth. This, coupled with rising population, should continue to drive retail sales growth until 2030. Therefore, we forecast 2030 retail sales per capita, based on 2017 retail sales per capita multiplied by our 2017-2030 GDP projection. The 2030 retail sales per capita multiplied by our 2030 forecast population gives us our projection for total retail sales for each city in 2030. Based on the above calculation, Wuhan tops the list in terms of retail sales growth, followed by Shenzhen, Changsha, and Nanjing.

Beijing, Shanghai, and Guangzhou offer greater rental upside in retail rental, whereas Hong Kong is likely to see a slowdown. We compare the ground-floor rents vs. retail sales per capita and believe that **Beijing, Shanghai, and Guangzhou** may have more rental upside as their ground-floor rents are relatively low compared to retail sales per capita. In Hong Kong, we expect upcoming bridges and high-speed trains to bring in additional shopper traffic to retail malls. However, given its already higher-than-peer rental rate, we expect rental growth in Hong Kong to lag behind Beijing, Shanghai and Guangzhou going forward. Singapore's retail sales resumed growth in 2017, after declining for three years in 2014-2016. Retail sales are expected to grow at a low single digit, in tandem with local income growth. Singapore remains a gateway to Southeast Asia and will benefit from the rising affluent population in this region.

High RevPAR growth potential expected for Asia-Pacific hotels, especially China to catch up with levels in the US, Europe and Middle East. Data shows that average daily rate (ADR) in Asia

Pacific cities is significantly lower than those in other regions despite fast growing demand. Given that the oversupply is gradually being digested by fast growing number of tourists, the conversion of hotel into other uses, well-controlled pipeline of new room supply, and refined hotel management incentive structure, we believe hotel revenue per available room (RevPAR) in Asia-Pacific cities have good potential to catch up with the other regions.

Shenzhen, Shanghai, and Beijing's RevPAR moving to level in global cities; Wuhan is likely to have more upside among Chinese cities based on available room night per international traveller ratio. Historical trends of Shanghai, Hong Kong and New York hotels all indicate a strong negative relationship between available room night per international traveller and hotel RevPAR. Current cross-city comparison also indicates a similar relationship. Shenzhen and Wuhan's hotel room rates are likely to have more upside, while Nanjing's hotel rooms may need more time to recover or to rely more on domestic tourists to take up the available rooms.

Shanghai, Hangzhou and Shenzhen to enjoy higher growth in RevPAR, using another forecast method. We also found strong correlation between hotel RevPAR and local wages and expect such to continue. We project local wages to grow in tandem with GDP per capita growth and forecast 2030 RevPAR, based on 2017 RevPAR multiplied by our 2017-2030 GDP per capita growth projection. Based on the above calculation, Shanghai, Hangzhou and Shenzhen will likely to enjoy higher growth in RevPAR. However, Hong Kong and Singapore will continue to top on 2030 RevPAR, despite a slower CAGR growth.

New mega cities on the rise

Wealth, innovation and liveability are new trends to shape mega cities in 2030. Traditionally, economic growth, FDI, investment and job creation are among key factors to drive a city's competitiveness and ability to attract population inflow. Yet, this has started to change as quality of growth, innovation, education and air quality started to come to play. To identify future mega cities in 2030, we have factored in new trends to shape future mega cities in our 2030 mega city ranking. We believe future mega cities will house a great amount of affluent population, provide foundation for innovation and creativity, and foster a liveable environment.

From scale to quality. Urbanisation has been the key driver of growth for city economies in the past decades. Massive infrastructure development has facilitated the urbanisation process in most Asian cities. Yet, this has created deteriorating quality life from overloaded facilities, overcrowded city centres and pollution. Different from the past, future mega cities are likely to centre on quality for growth, ie growing a green economy without pollution; new generations will be raised with strong educational support, among others.

From investment in infrastructure to investment in innovation. During the past decade, cities in Asia had gone through a period of swift development and upgrade in infrastructures including transportation, technology, and other facilities. Lifestyles have been changing at the fastest pace in history, especially in communication and consumption. With smartphone's penetration shooting up since 2011, technology is reshaping communication, transportation, accommodation, shopping, working, etc. We believe cities with high awareness on innovation, or more specifically, investment in R&D, high output of patents, and higher spending in education will outperform others in the next decade.

From job availability to liveable conditions. In the past decade, we have seen increasingly high attention paid to air pollution. Marked by 2015 media reports on the hazardous consequences caused by air pollution, we saw expatriates return to their home countries from highly polluted cities, and city governments' efforts to control pollution. On the other aspects of liveability, mobile talents value education, healthcare, and travel convenience.

Methodology of our Asian mega city ranking. Against the above backdrop, we collected data for 302 cities in Asia, including 291 cities in China, Singapore, Hong Kong, Taipei, and eight cities in India. 55 of them are selected for final ranking based on a population of above 5m and annual GDP per capita of over US\$8,000. We ranked these cities by three categories (1) wealth creation; (2) innovation and (3) liveability. See table below for indicators we used under each category.

Chinese cities occupied eight seats in the top 10 cities. The rank shows Chinese cities have strong potential to stand out in innovation and quality growth. Hong Kong and Singapore ranked No. 2 and 5 on the list which are not surprising due to liveable environment and higher government spending in R&D/education in the history, but slower in growth in both population and GDP. Taipei, despite of smaller in population, also ranked high on the list due to more liveable environment. Key Indian cities of Mumbai, Bengaluru, and Delhi ranked towards the bottom mainly due to lower ranking in the parameters on a per capita basis.

Indicator categories and measurements

Category	Indicator	Measurement
Wealth & Growth	Population	Population living in the city over 6 months
	GDP	GDP per capita GDP growth
	Income	Average wage of employed staff
	Deposit	Deposit per capita
Innovation	High value added sector	% of employees in Tertiary sector
	Intellectual Property	No. of patents applied per 1000 people Government spending on R&D as % of GDP
	School	Government spending on education per capita
	No. of entrepreneurship	No. of top 200 universities in Asia % of employees in private sector
Liveability	International connection	No. of airline travelers
	Air quality	Monthly average PM2.5

Source: DBS

Ranking

City	Wealth & Growth	Innovation	Liveability	Overall
Shenzhen	1	3	4	1
Hong Kong	9	1	1	2
Guangzhou	2	8	3	3
Shanghai	5	5	4	4
Singapore	16	2	2	5
Nanjing	8	4	10	6
Beijing	4	6	13	7
Hangzhou	2	10	16	8
Qingdao	18	12	9	9
Wuhan	10	9	21	10
Taipei	20	13	8	11
Changsha	7	13	22	12
Tianjin	12	7	24	13
Mumbai	23	19	20	20
Bengaluru	29	25	29	27
Bangkok	46	23	22	31
Delhi	35	32	33	35
Jakarta	47	32	39	42

Source: DBS

Cities to shine

2030 Mega City No. 1 - Shenzhen

Shenzhen government's spending in R&D accounts for the highest percentage of local GDP amount of all cities. It also stands out in government spending on education per capita, GDP per capita, air quality, and international connection indicators. Housing Tencent's headquarters in the city, Shenzhen targets to build the city into a global sustainable, innovative city by 2030. With total GDP exceeding Hong Kong in 2017, it plans to grow its population by 2.4% per annum up to 2030, which is the highest growth rate among the tier 1 cities in China and faster than most of the cities in the region. Shenzhen's GDP per capita is expected to reach Singapore and Hong Kong's 2017 level by 2030, allowing it to become a strong mega city.

2030 Mega City No. 2 - Hong Kong

As a developed economy, despite slower GDP growth than most cities and a smaller population, its higher spending in R&D and education and a well-developed services sector, better air quality compared to most Asia cities, and international connection support its high ranking among Asia mega cities. Rolling out its plan to attract talents in science and technology in 2018 to embrace the innovation-driven era, Hong Kong is likely to maintain its leading status in the region.

2030 Mega City No. 3 - Guangzhou

Balanced high score in all three categories we studied. It enjoys high ranking in GDP per capita and deposit per capita. With moderate growth in GDP, Guangzhou ranks No. 2 in the wealth and growth category. Good air quality, transportation connections and having a larger number of universities enable it to be ranked among the top 8 and top 3 in Innovation and Liveability categories, respectively. We believe the integrated development in the Greater Bay area and reasonable local property price will make Guangzhou stand out as a mega city in the next decade.

2030 Mega City No. 4 - Shanghai

Housing two airports with the highest number of airline travellers and the second largest population (Chongqing has the highest), Shanghai's efforts and investment in R&D and education along with its high ranking in GDP and deposit on per capita basis enables it to rank high in innovation. Shanghai, as the faucet city in the Yangtze River Delta region, leads wealthy cities in Zhejiang and Jiangsu province, and aims to be an international economy, finance, trade, and shipping centre. Shanghai intends to control its population in the coming decade, with its planned annual population growth being the lowest among key cities at 0.23% CAGR up to 2030.

2030 Mega City No. 5 Singapore

As a developed economy, despite of slower GDP growth than most cities and smaller sized population, its higher spending in R&D and education, developed services sector, good air quality, and international connection supported its high ranking among Asia Mega cities. Singapore aims to remain a leader in all aspects of sustainability from technological advancement, to green investments, policies and lifestyle. These initiatives will be co-created between the public and private sectors. Driving these targets will be the Smart Nation initiative, where people are empowered by technology to lead more meaningful and fulfilled lifestyles. As a compact city with high population density, the government will continue to invest in public transit infrastructure so that people can travel seamlessly around a "car-lite" urban environment. The city state aims to actively reduce carbon footprint and strive to be a zero waste nation by 2030.

2030 Mega City No. 6 - Nanjing

Nanjing, the first tier 2 city appears on our Mega city 2030 ranking, is driven by its wealthy population on GDP per capita basis, large number of universities, top 10 number of patent retaining ratio, and strong inter-city connection in the Yangtze River Delta region. Aiming to be a famous innovation city, Nanjing rolled out talent attraction plan to allow young graduates to obtain local residency and housing purchase/rental subsidies. It also provides subsidies and other assistance to start-ups to set up offices in Nanjing.

2030 Mega City No. 7 - Beijing

Located in the northern area, despite suffering natural disadvantage in living environment, especially air quality, Beijing ranks among the top 10 in our Asia Mega Cities 2030 list due to its sizeable population and the high average wage of its workforce, its position as China's gateway city connecting the world, and high government spending in R&D and education. Although Beijing is keeping its annual population growth below 0.7%, it aims to attract worldwide talents in the areas of start-ups, technology, and culture and creative industries by granting local residency status and start-up subsidies. Beijing aims to be a world class harmony and liveable metropolitan by 2030.

2030 Mega City No. 8 - Hangzhou

Housing the world most successful e-commerce company Alibaba, Hangzhou maintains its high GDP growth among Asian cities and enjoys high deposit per capita. Its high ranking in patents per capita also enables it be ranked top 8 among our Asia Mega Cities 2030. Hangzhou aims to control its population in the next decade. However, it is open to young educated graduates in the areas of computer science, environmental science, telecommunication, biotech,

new materials, architecture, marketing, logistics, etc. to support its local economic growth.

2030 Mega City No. 9 - Qingdao

Located in Shandong province which is one of the wealthy provinces in China in northern part of China, Qingdao ranked the highest among northern cities (other than Beijing). It stands out in air quality and transportation connection and in turn liveable factors. Qingdao's government also spent more on education than other tier 2 cities.

2030 Mega City No. 10 - Wuhan

Housing the most reputable universities in China with higher spending on R&D as percentage of GDP, Wuhan is the ninth largest city by population in China. Targeting to be China's Silicon Valley, Wuhan's years of efforts in building its R&D centre and business park are enabling it to benefit this digital age. Wuhan plans to grow its population by 3.4% per annum in the coming decade which is the fastest among the cities we compared.

2030 Mega City No. 11 - Taipei

Taipei missed its top 10 places due to slower growth in GDP and population despite its high ranking in deposit per capita and its higher rankings in offering a liveable environment.

While government spending on education per capita and number of top 200 universities ranked high, government spending on R&D as % of GDP and number of patents received appear to be lower than other top ranked Chinese cities.

2030 Mega City No. 12 - Changsha

Changsha appears in our list of top cities due to its top 10 GDP per capita, fast GDP growth, top 10 number of patents and universities. As one of the core cities in the central area of China, Changsha aims to be one of China's intelligent manufacturing centres, innovative and creative centres, and transportation and logistics centres. Changsha is also aggressive in attracting talents by providing housing purchase subsidies to young graduates and fast approval for local Hukou application. Changsha's population growth plan for the next decade is also one of the highest.

2030 Mega City No. 13 – Tianjin

Located in northern China next to Beijing, Tianjin houses a sizeable population and makes decent efforts in R&D and education. To support environmental improvement, Tianjin's GDP growth has slowed down significantly from 2016 to 3.6% in 2017, as traditional industrial plants closed. To revitalise the economy and realise a speedy upgrade, Tianjin has been aggressive in accepting people inflow and fostering new industries.

Asia Mega Cities* 2030 Ranking



Source: DBS
 * among the cities that we analysed

Which cities to see best growth potential in property prices?

GDP per capita, the key long-term fundamental factor to support residential property prices. Although in the short term, residential property prices are affected by multiple factors including policies, supply, credit environment, price expectations, etc, we believe in the long term, they are driven by people's wealth level in the city. Using property price-to-GDP per capita ratio as a key indicator, we predict cities' residential price upside potential, assuming zero inflation. We use Singapore's property price to GDP per capita ratio, which is 24%, as a reasonable benchmark for our forecast.

GDP of Top 8 Chinese cities on our list will exceed Singapore and Hong Kong's current levels. GDP growth in Chinese cities ranged between 3.6% and 9% in 2017 but mostly in a slowing down trend. Singapore and Hong Kong recovered from 2.4% and 2.3% in 2016 and to 3.6% and 3.8% in 2017 respectively. Assuming a 0.2-ppt per annum slowdown in GDP growth in Chinese cities and 0.1ppt in Singapore and Hong Kong, we expect that all Chinese cities ranking high on our list will be able to grow their GDP to a higher level than Hong Kong and Singapore. Shenzhen's GDP has already surpassed Hong Kong and Singapore and will catch up with Beijing's, while Shanghai will still top all cities in GDP by 2030.

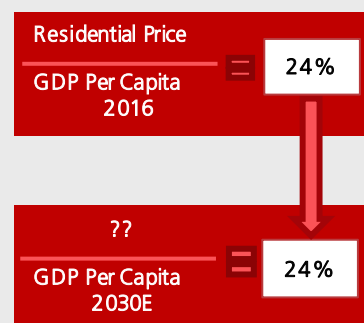
Wuhan and Shenzhen plan to grow their population at the highest pace. Following the fast urbanisation process in recent years, many cities are now facing challenges in providing facilities including transportation, healthcare, and education to the locals. Looking into 2030, based on local development plan and industrial positioning, the cities have laid out a comprehensive population growth plan. Wuhan and Shenzhen top the planned population growth by forecasting 3.4% and 2.4% CAGR up to 2030, while Shanghai and Hangzhou will focus on population control and hence expect a low 0.23-0.24% CAGR. We forecast that Shanghai will continue to house the largest population.

Singapore will maintain its wealthiest city status within the region. Shenzhen's GDP per capita by 2030 will exceed Singapore and Hong Kong's current levels, while Hangzhou's GDP per capita is approaching the current level in Hong Kong.

Changsha, Wuhan and Guangzhou's property prices have the highest potential for upside based on a 24% price-to-GDP per capita ratio. As mentioned earlier, the current price-to-GDP per capita ratio for Singapore is at 24%. Applying this ratio to all cities' GDP per capita by 2030, without considering inflation, we find that Changsha, Wuhan, and Guangzhou will have more upside in their property prices. Hong Kong, Singapore, Shanghai, and Beijing have lower upside in residential property prices based on local economic fundamentals.

Shenzhen to maintain highest ASP in China. Although Shenzhen's ASP is still the highest among mainland cities, it will be lower than Singapore and Hong Kong. Singapore's residential property price to GDP per capita ratio is about the city average in our study. Property price is likely to be driven by GDP per capita growth in the next decade. Its property price growth CAGR is likely to be at around 2%, compared with relatively flat trend in Hong Kong due to gradual normalize in the price to GDP per capita ratio.

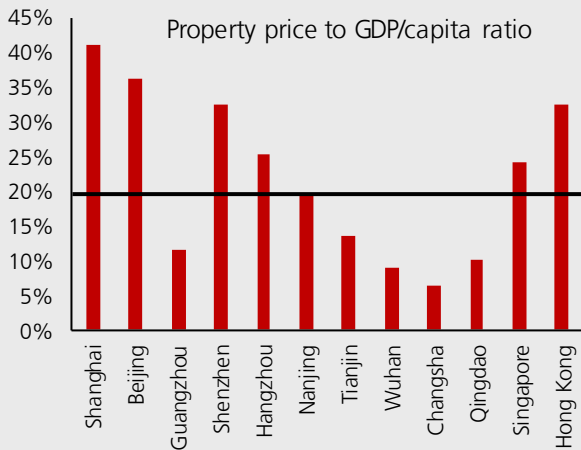
Method to forecast property price upside



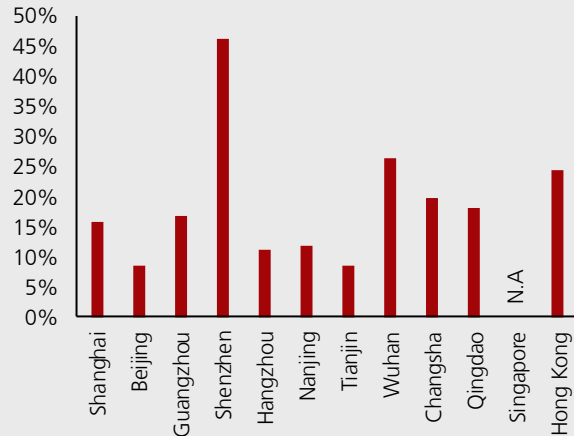
Source: DBS

Shenzhen and Hong Kong faces supply shortage in the near term but this advantage may not prevail to 2030. We analysed the built-up area as percentage of total land area for those top 12 cities. Shenzhen has built up 45% of its land area which is the highest among all cities. Hong Kong and Wuhan's ratio are relatively higher than other cities at around 25%, while this ratio of Beijing is the lowest mainly due to larger total land area. In our view, supply may affect property price in a shorter time horizon. Transportation connection, increase in density or plot ratio, and even expansion in administration area of cities are potential ways to break supply constraints in the longer term.

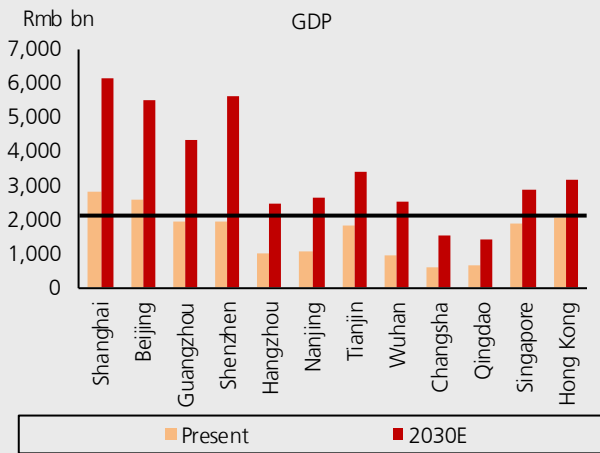
Price-to-GDP per capita by 2016



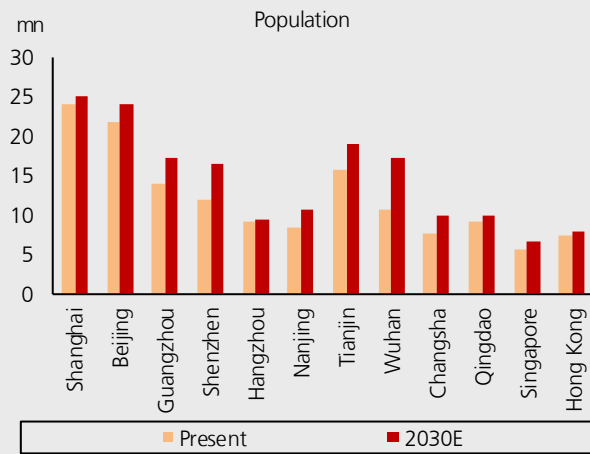
Built-up area as % of total land area



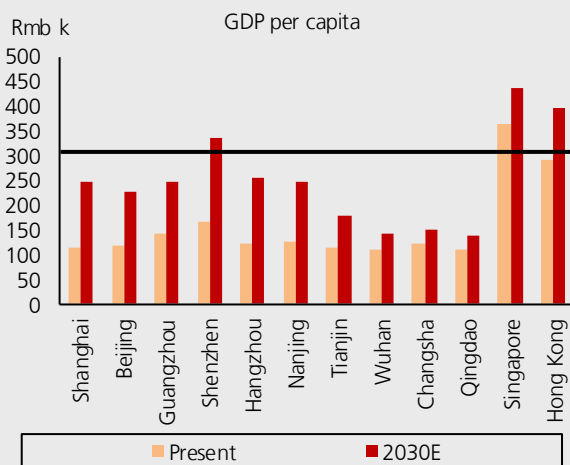
GDP projection by 2030



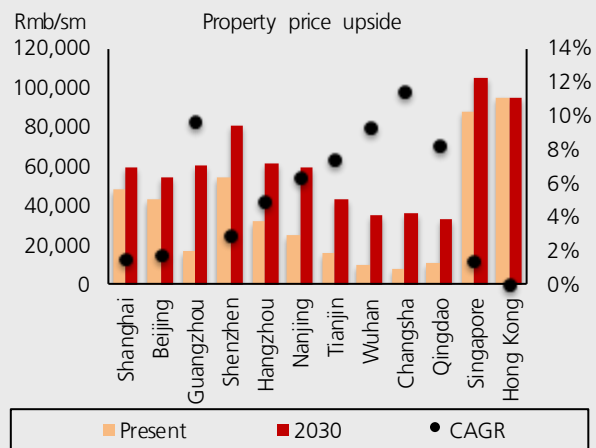
Population by 2030



GDP per capita by 2030



Price upside



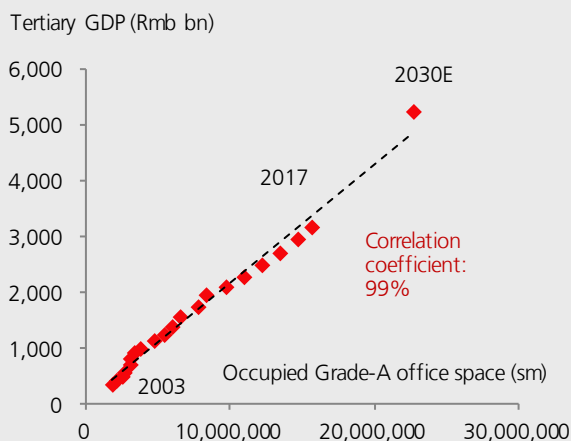
Source: DBS

Which cities to see best investment value in office sector?

Strong correlation between tertiary industry GDP and occupied office space. We have run linear regressions for historical nominal GDP from the service industry and occupied Grade A office space for Shanghai and Beijing for

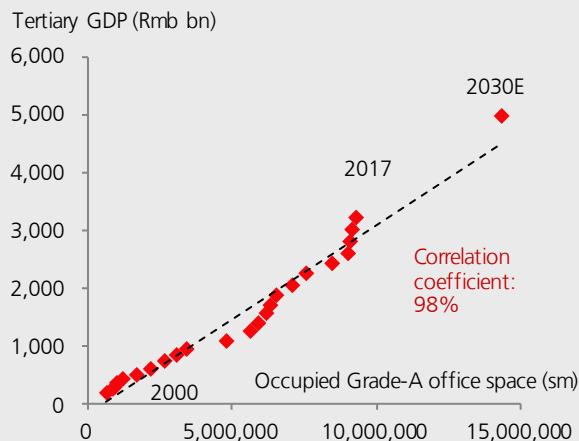
the past 12-17 years, and observed strong correlation coefficients of between 98% and 99%. We believe this trend will continue.

Linear regression between tertiary GDP and occupied Grade A office space: Shanghai



Source: JLL, DBS

Linear regression between tertiary GDP and occupied Grade A office space: Beijing



Source: JLL, DBS

Urbanisation, higher tertiary and education penetration will continue to drive up Asian GDP and industry upgrade.

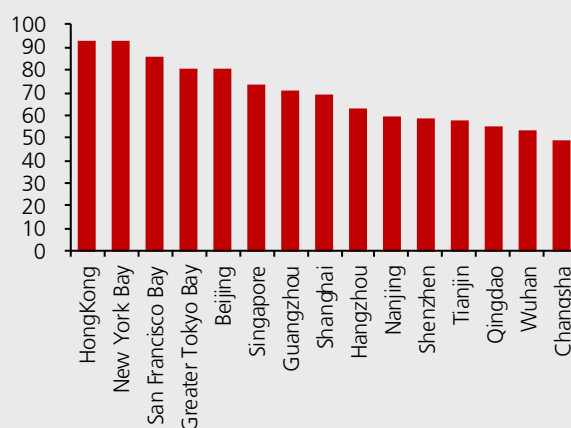
Service industry's contribution to local GDP in key cities of China is still low as compared to key economic areas/cities globally. We expect those cities to continue to experience industry upgrade after fast urbanisation over the past decades. Tertiary industry as a percentage of local GDP rose 0.8-2.5ppts in those key China cities each year over several years and we use this trend as a key assumption to forecast service industry's local GDP contribution in 2030.

Hong Kong's economy has been closely tied to China's growth. Yet, in terms of tertiary industry's contribution to local GDP, Hong Kong already topped among key cities in Asia at 93.0% in 2017. In addition, such ratio ranged from 92.2% to 93.1% over the past decade and we expect it to stay at a similar level for the next decade.

Singapore's growth has been correlated to the ASEAN economy given the geographic proximity and its role as a gateway to the region. Southeast Asia has a young population with an average age of 30, where the demographic dividend will continue to drive economic growth in the region. In addition, China's 'Belt and Road' initiatives have enhanced intra-Asia cooperation and capital flows. The economic growth in Southeast Asia will keep underpinning demand for office space, especially in Singapore, as the city houses regional headquarters of

multinational corporations. Tertiary industry's contribution to local GDP was 73.8% in Singapore in 2016, ranking fourth in Asia. Such ratio ranged from 70.6-75.2% over the past decade and we expect it to edge up to 75.0% in 2030.

Tertiary industry as % of total GDP comparison, 2017

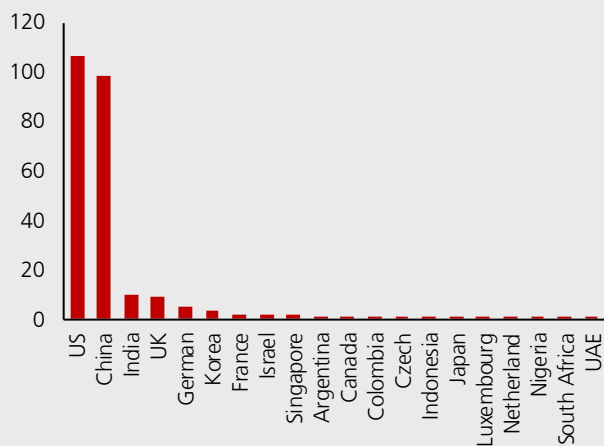


Source: CBRE, CEIC, DBS

High-tech and financial industry will also raise tertiary industry's contribution to GDP. According to Deloitte's report, there are 115 unicorns (privately held start-up companies that are valued at over US\$1bn) in Asia,

accounting for 46% of the global total. China was ranked second in terms of the number of unicorn companies (98), followed by India (10), Korea (3), Singapore (2), and Indonesia (1). In China, those unicorn companies are also concentrated in the three mega regions and tier 1 cities. We expect them to be the next-generation corporations, which will be big GDP contributors and Grade-A office occupiers.

Global unicorn distribution: 46% in Asia

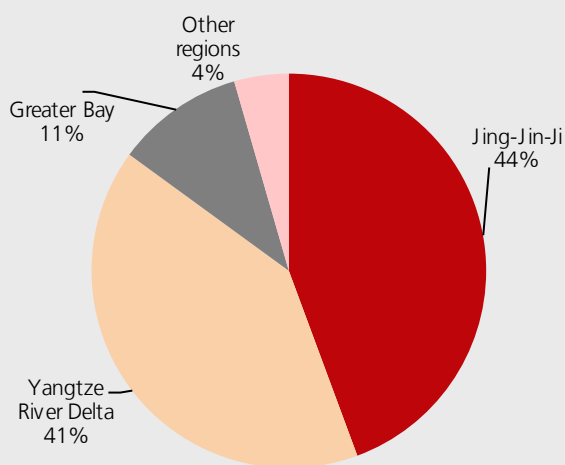


Source: CVSource&CBInsights, Deloitte, DBS

In China, regional collaboration (Jing-Jin-Ji, Yangtze River Delta, Greater-Bay-Area) will continue to drive industry upgrade for top cities in China. We also expect the high-tech and financial sectors to become the key drivers for Grade-A office space. According to the Ministry of Science and Technology of China, Beijing, Hangzhou, and Shanghai top the list of unicorn companies in terms of valuation. Apart from the high-tech sector, we also expect the gradual financial liberalisation, the rise of Fintech, the market connect (SH/SZ-HK stock connect, bond connect and potential SH-London stock connect, etc.) and more financial products (upcoming C-REITs) to continue to foster Shanghai and Shenzhen to become global financial centres.

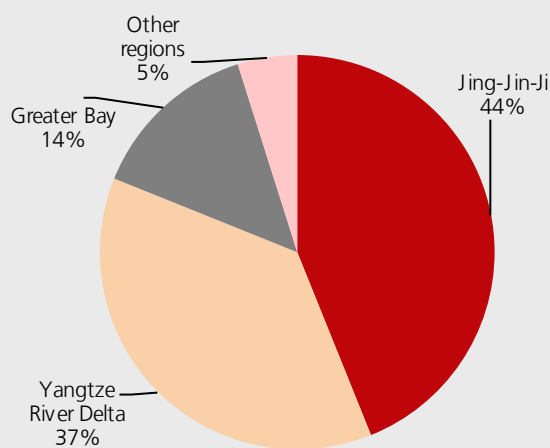
Intra-region capital flow and more financial initiatives (such as REITs) will also keep expanding across ASEAN countries. India will likely kick off its first REIT in 2018, having already established its REIT code in 2014. Indonesia and Philippines are also working on potential tax reform to foster/accelerate local REIT development. Singapore, being the largest REITs market in Asia (ex-Japan), will continue to attract global assets to launch listed REIT products in the local market.

China's unicorn distribution, in terms of valuation



Source: Ministry of Science and Technology of PRC, DBS

China's unicorn distribution, in terms of no. of companies

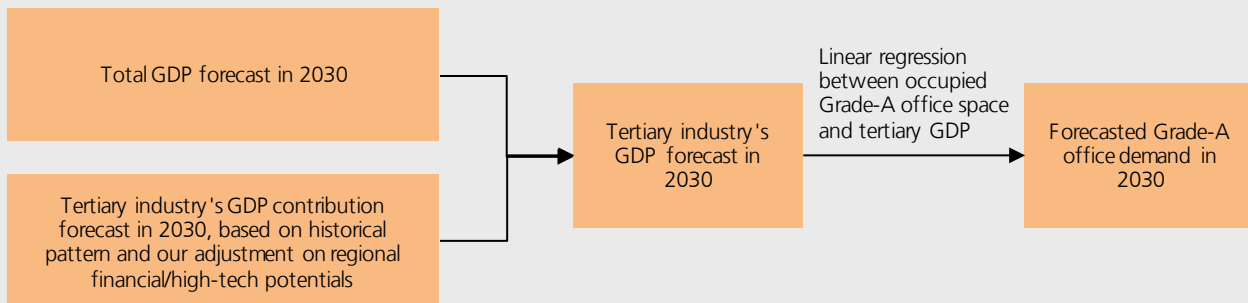


Source: Ministry of Science and Technology of PRC, DBS

Tier 1 cities in mainland China to outpace Hong Kong in terms of tertiary GDP. In 2017, Beijing/Shanghai outpaced Hong Kong in terms of tertiary GDP, while Guangzhou's tertiary GDP also surpassed Singapore's. As mentioned above, tertiary industry as a percentage of local GDP rose 0.8-2.5ppts in those key China cities each year over several years and we use this trend as a key assumption for our 2030 forecast, subject to some adjustments based on regional financial and high-tech potential. As such, we expect Beijing to keep its lead among China cities in 2030,

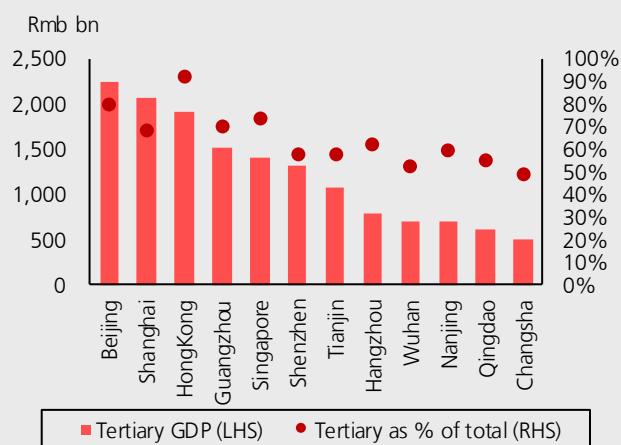
in terms of service industry's contribution, followed by Shanghai, Tianjin, Guangzhou, Hangzhou, and Shenzhen. Yet, for matured markets like Hong Kong and Singapore, we expect the tertiary industry's contribution to local GDP to stay relatively steady by 2030. As a result, we expect the four tier 1 cities in China to outpace Hong Kong in terms of tertiary GDP and the key tier 2 cities to surpass Singapore.

Forecast for grade-A office demand



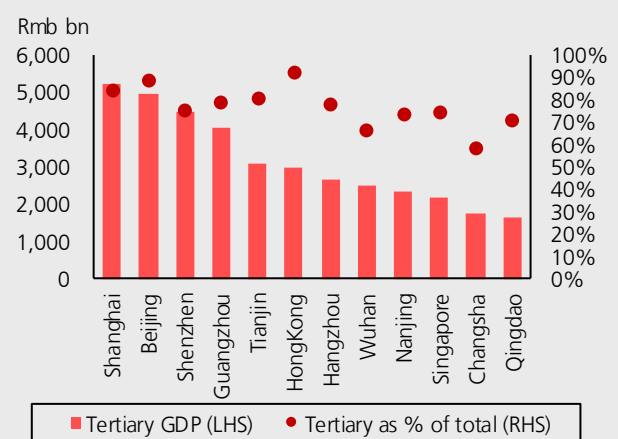
Source: DBS

Tertiary GDP and % of total GDP, 2017



Source: CEIC, DBS

Tertiary GDP and % of total GDP, 2030F

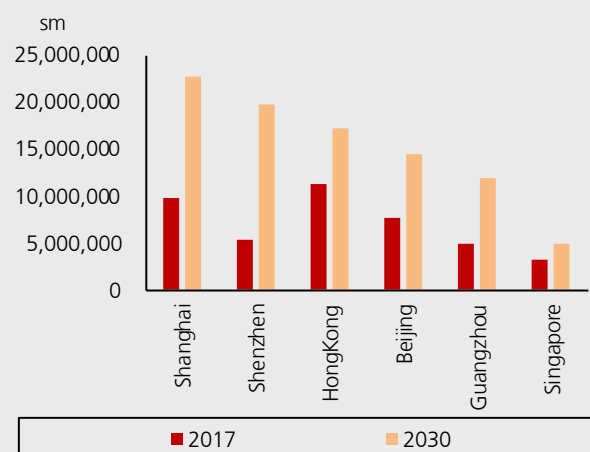


Source: CEIC, DBS

Using abovementioned linear regression to forecast occupied office space in 2030 for key gateway cities in Asia.

We have estimated 2030 Grade-A office space in the four tier 1 cities in China, based on the regression relationship between historical occupied Grade-A office space and local tertiary GDP, as well as our forecasted 2030 tertiary GDP. For matured markets like Hong Kong and Singapore, we used their occupied Grade-A office space per tertiary GDP in 2017 multiplied by our estimated 2030 tertiary GDP to forecast the demand for their 2030 office space.

Occupied office stock space, 2030

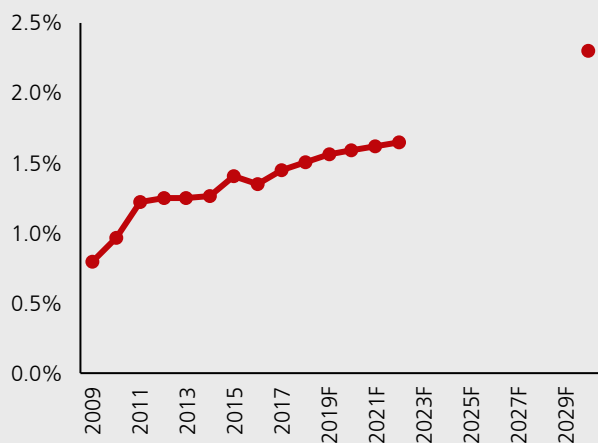


Source: JLL, DBS

Shanghai and Shenzhen to replace Hong Kong as the largest Grade-A office providers. Based on our abovementioned regression model, we expect tertiary industries to occupy 22.7m sm and 18.4m sm in Shanghai and Shenzhen respectively in 2030 (up 135% and 251% respectively from 2017 level). Due to limited land supply in those tier 1 cities, we expect supply to be well controlled in the four tier 1 cities and occupancy rates in those cities to range from 85-98% in 2030.

Forecasting tertiary industry’s occupancy costs and rental rate for major gateway cities in China. As Grade-A offices are mainly occupied by tertiary industry players, we use total office rental costs (occupied Grade-A office space multiplied by annual rents) divided by tertiary GDP as a proxy to gauge the tertiary industry’s occupancy cost for each city. This ratio ranged from 0.6-1.5% for the four tier 1 cities in China, and was 1.0% for Singapore and 5.6% in Hong Kong. Also, this ratio edged up at an average of 0.07-0.08ppt per annum for tier 1 cities in China over the past decade and we have assumed that this trend will continue. Based on this, we expect tertiary industry’s occupancy cost to go up to 1.7-2.3% for the four tier 1 cities in China in 2030.

Tertiary industry’s occupancy cost forecast for Shanghai



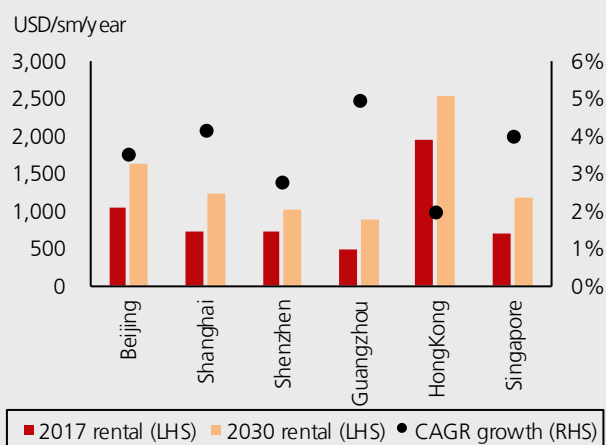
Source: JLL, CEIC, DBS

Then, we derived the total Grade-A office rental costs in 2030 for each city based on our forecasted 2030 tertiary

industry’s occupancy cost multiplied by forecasted 2030 tertiary GDP. After that, we use total rental costs divided by 2030 forecasted occupied Grade-A office to calculate our forecasted rental rate for 2030. For tier 1 cities, we expect Guangzhou to register the highest CAGR of 5% for Grade-A office rental rate in 2017-2030, followed by Shanghai’s 4.2%.

Office rental rates in CBD maintained its growth momentum driven by continued strong demand from China companies and limited new supply. We therefore expect CAGR of 2-3% for Hong Kong CBD’s office rents in 2017-2030. Given escalating office rents in CBD, a growing number of cost conscious multinational firms continues to expedite their office relocation to decentralised areas where office rents are 67% cheaper than in CBD.

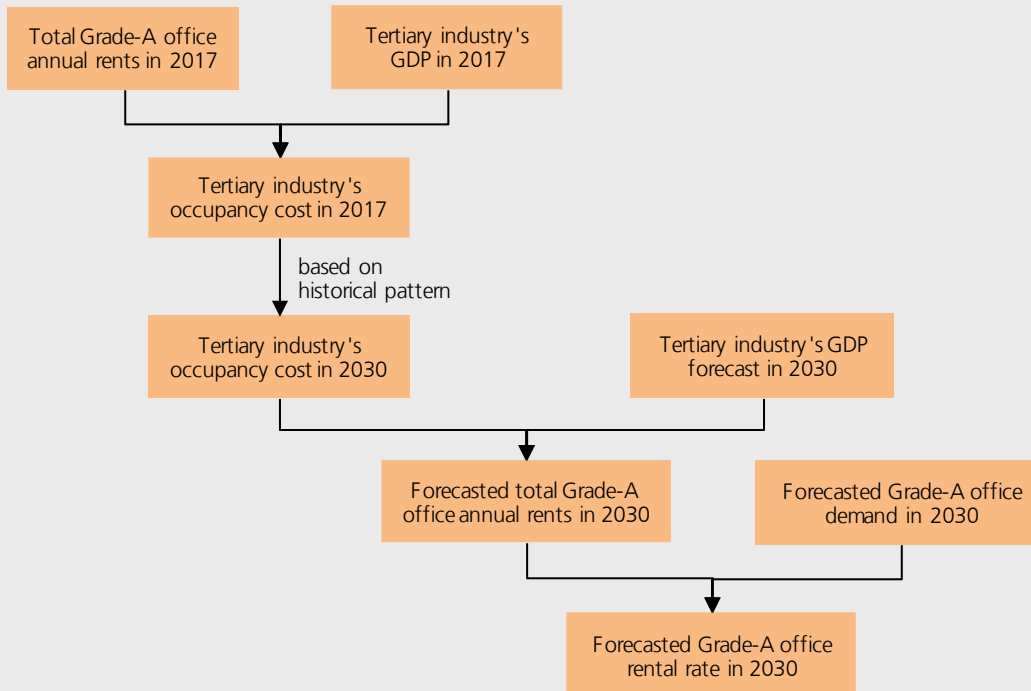
2030 rental forecast and CAGR growth (2017-2030)



Source: JLL, CEIC, DBS

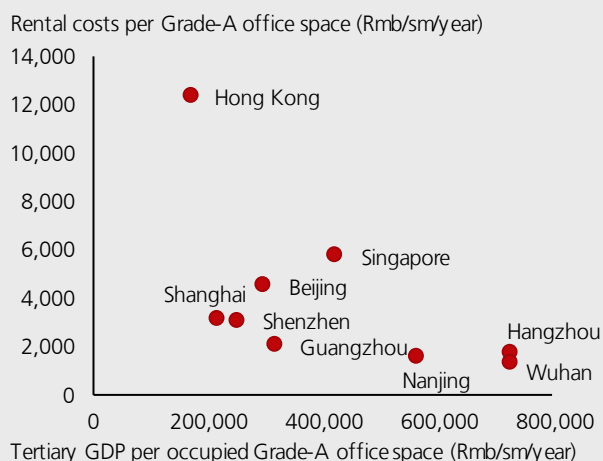
Singapore office rents have recovered from 2H17, and we expect further rental growth, given limited supply ahead (0.63 sf per annum scheduled in 2018-2023 vs. 1.38 sf per annum in 2010-2017). Additional supply is likely to be carefully calibrated to support business needs and at the same time, keep business cost affordable. We therefore expect a 3%-5% CAGR for Singapore office rents in 2018-2030.

Forecast for grade-A office rental rate in 2030



Source: DBS

Tertiary industry's occupancy cost comparison, 2017



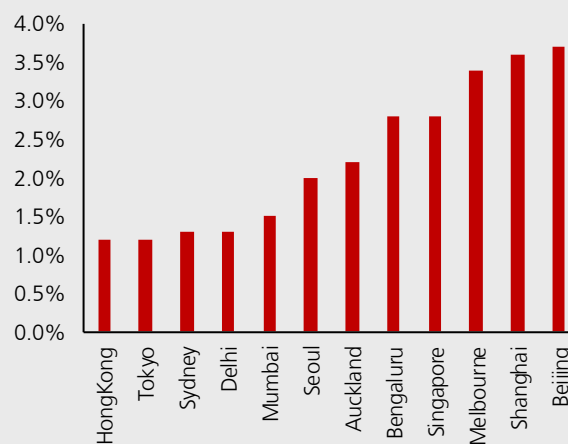
Source: JLL, CEIC, DBS

Hangzhou and Wuhan may see more rental upside, if supply is well controlled. We also compare the rental costs per Grade-A office space vs. tertiary GDP per occupied Grade-A office space and observed that Hangzhou and Wuhan may have more rental upside as the occupancy costs are relatively low as compared to tertiary GDP generated.

Rising popularity of co-working space may have limited impact on office. According to JLL, co-working space recorded a 35.7% CAGR growth in Asia-Pacific in 2014-

2017, as compared to 25.7% in the US and 21.6% in Europe. So far, co-working space penetration (as a percentage of total office space) ranged from 1.2-3.7% in regional gateway cities in Asia-Pacific. Yet, around 80% of those co-working space were from the conversion of Grade-B offices, upper floors in retail malls and hotels. Therefore, we do not expect co-working space to have a significant impact on Grade-A offices' supply-demand dynamics.

Co-working space penetration rate comparison



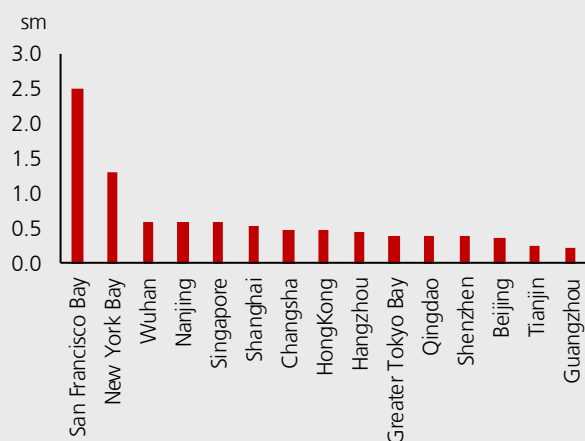
Source: JLL, DBS

Which cities to see good growth in retail rents?

Retail space (prime) per capita is generally low in Asian cities. Retail space per capita of the key Asian cities averaged at 0.45 sm vs. 1.3 sm and 2.5 sm in New York Bay area and San Francisco Bay area respectively. China remains the key area with a pipeline of retail mall projects. Emerging markets, especially in Asia, also remains highly active in terms of delivery of retail mall space. This has raised oversupply concerns. However, we believe the supply risk is overestimated as (i) a large percentage of pipeline malls has been delayed or cancelled, and we expect this to continue; (ii) the supply risk in well-managed malls could be even overstated as those non-performing malls might not be direct competitors to well-managed malls; (iii) the latest trend to convert mall space into co-working space and China's new policy to allow conversion of commercial lands into long-term rental housing usage will further reduce future supply risks. **On top of that, the low retail space per capita in China also implies mall penetration is low in most cities.**

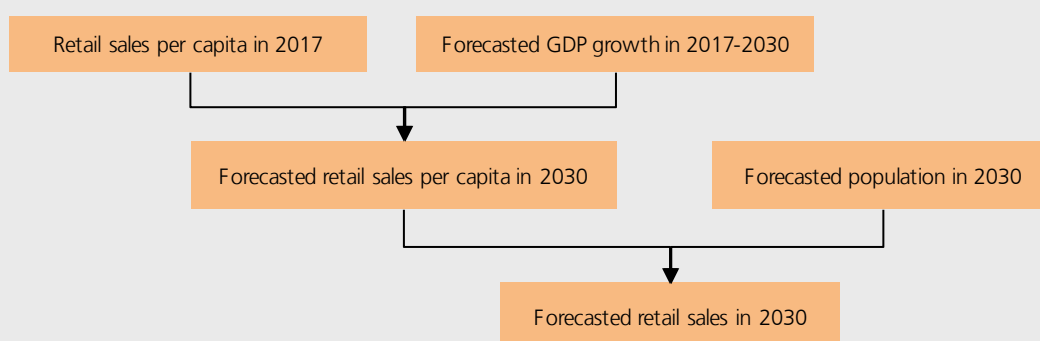
Wuhan, Shenzhen, Changsha, and Nanjing are likely to see stronger growth in retail sales, driven by local GDP growth and rising population. We expect local retail sales per capita to grow in tandem with GDP growth. This, coupled with rising population, should continue to drive retail sales growth until 2030. Therefore, we forecast 2030 retail sales per capita, based on 2017 retail sales per capita multiplied by our 2017-2030 GDP growth projection. The 2030 retail sales per capita multiplied by our 2030 forecasted population results in our projection for total retail sales for each city in 2030. Based on the above calculation, Wuhan tops the list in terms of retail sales growth, followed by Shenzhen, Changsha and Nanjing.

Retail space per capita comparison, (2017)



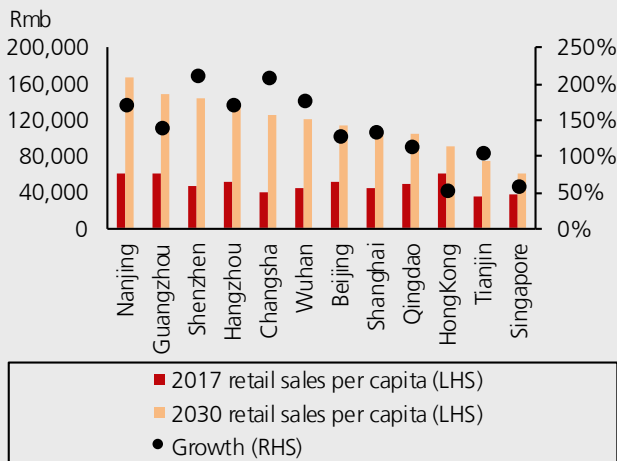
Source: CBRE, JLL, CEIC, DBS

Methodology used to forecast retail sales



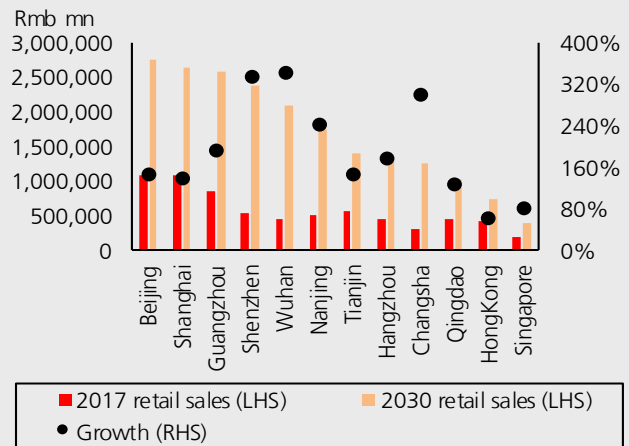
Source: DBS

Retail sales per capita projections



Source: CEIC, DBS

Retail sales projections

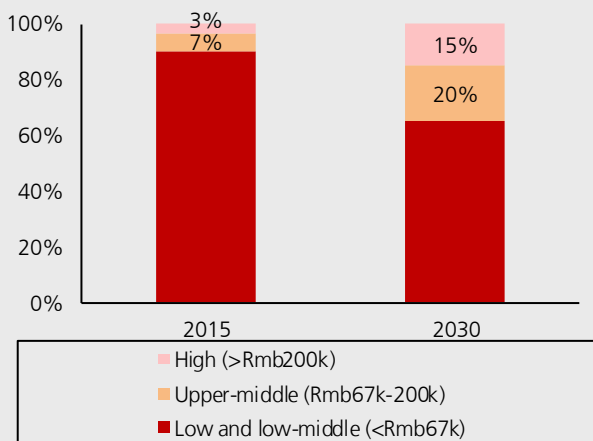


Source: CEIC, DBS

Change in shopping behaviour led by millennials and rising middle-class will continue to drive up demand for physical stores. According to the Economist Intelligence Unit, the high income and upper-middle income groups are projected to account for 35% of China's total population in 2030, up from 10% in 2015. In addition, millennials are increasingly looking for (1) convenience, (2) product quality and authenticity, and (3) individualisation. The increasing complexity of consumers helps safeguard the demand for physical stores. In addition, we have seen an increasing number of e-retailers opening brick-and-mortar stores, especially in China.

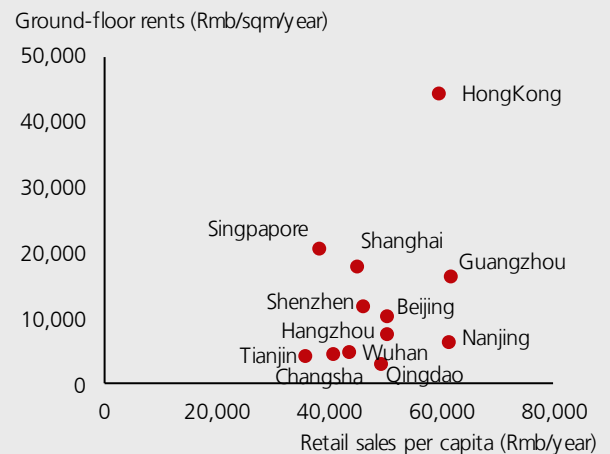
Beijing and Guangzhou are seeing more rental upside, whereas Hong Kong is likely to see slowdown in rental growth. We compare the ground-floor rents vs. retail sales per capita and concluded that Beijing and Guangzhou may have more rental upside as their ground-floor rents are relatively low as compared to retail sales per capita. Beijing and Shanghai are still attracting both shoppers and brand tenants nationally and internationally. Demand in both cities remains strong and we expect existing luxury malls in core areas and suburban malls with strong population influx to keep outperforming. **Nanjing and Hangzhou** may also see more rental upside, if supply is well controlled.

Rising affluent population in China



Source: The Economist Intelligence Unit, CBRE, DBS

Ground-floor rents vs. retail sales per capita (by end-2017)



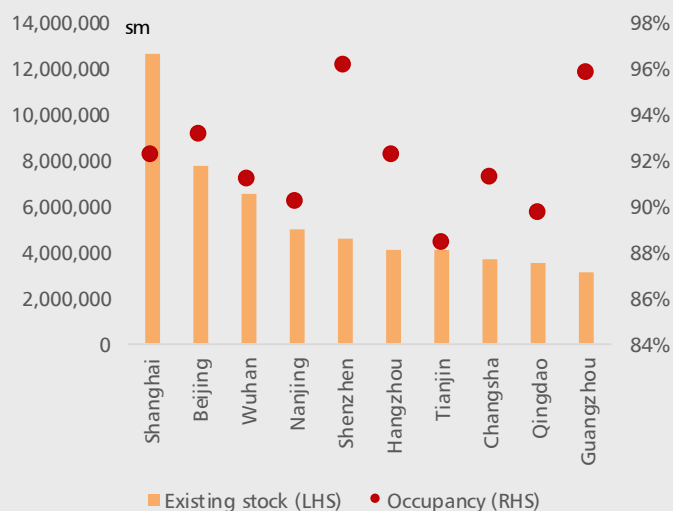
Source: JLL, DBS

For Hong Kong, we expect upcoming bridges and high-speed trains to bring in additional shopper traffic to retail malls. However, given its already higher-than-peer rental rate, we expect rental growth in Hong Kong to lag behind major Chinese cities.

Singapore's retail sales regained growth in 2017, after three years of decline in 2014-2016. Retail sales are expected to grow at a low single digit, in tandem with local income growth. On the other hand, supply of new retail malls for the next five years is low and the location of these malls are in the suburban towns supporting the needs of the local population catchment. As Singapore remains as a gateway to Southeast Asia and will benefit from rising affluent population in this region, we expect the retail scene to remain healthy and landlords will continue to enjoy strong portfolio occupancy rates across market cycles.

Beijing and Guangzhou are also expecting a limited pipeline of supply. In addition, given the limited land supply in Beijing and Shanghai, we also see a rising trend in the conversion of retail space into office or co-working space, which could cap future supply.

Existing retail space and occupancy (by end-2017)



Source: JLL, DBS

New supply in the next 4 years (5 years for Beijing and Shanghai)



Source: JLL, DBS

Which cities to see brightest outlook in hotel assets?

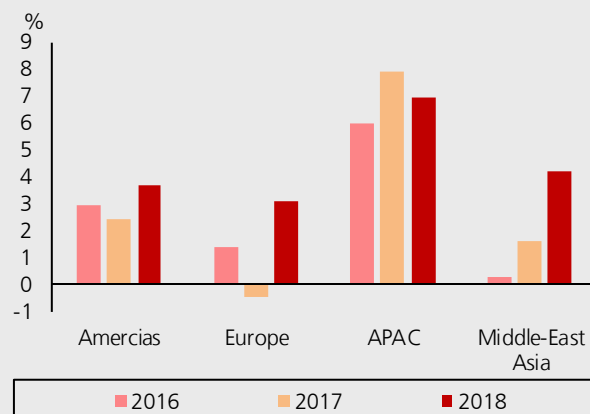
Asia-Pacific hotels seeing fastest growth in demand, but their average daily room rate (ADR) is far below global peers. According to STR Global, luxury hotels have seen faster growth in demand (a CAGR of 6.9%) over the past three years, compared to other regions (CAGR of 1.3-3.0%). In our view, luxury hotels' ADR in APAC is lower than those in other regions as: (i) temporary oversupply has led to lower occupancy rate, especially in China, (ii) developers/landlords in APAC usually do not have the capability to manage luxury hotels and have to outsource this function to international hotel operators. The hotel managers will be responsible for daily operations and marketing with a term of 15-30 years. Also, the hotel managers will provide global market and advertising, centralised reservations, sales services and other hotel-specific services. In return, the hotel managers charge basic fees (normally a certain percentage of hotel revenue) and incentive fees (a certain percentage of hotel gross operating profit) depending on hotel operating results (criteria varies with some purely based on occupancy rate while others are based on gross operating profit). In the earlier years, landlords had less experience in negotiating terms with hotel managers and some contracts were only based on incentive fees on hotel occupancy rates. Therefore, hotel managers are more willing to secure occupancy rates to be eligible for their incentive fees, rather than raising ADR while risking occupancy rate as well as incentive fees.

As a result, we observed an interesting finding: current hotel ADRs have been highly correlated to local labour cost. Payroll usually accounts for around half of operating costs for luxury hotels. Our analysis reveals that the correlation between star-rated hotel room rates and local wages is as high as 0.93. In our view, ADR increase has been mainly pushed up by rising labour costs in the past and this trend is likely to continue.

Yet, we are more bullish on hotels' outlook in Asia ahead due to the following reasons.

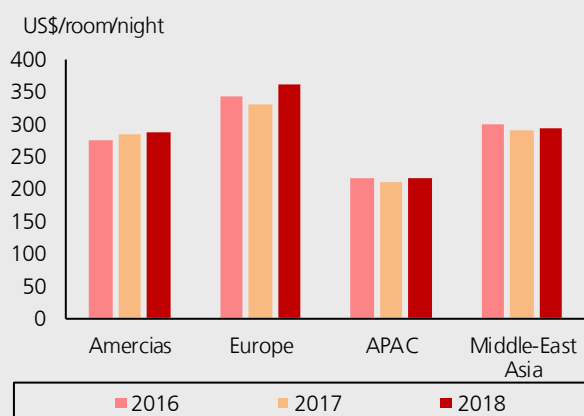
(i) **Demand in APAC to remain robust.** As previously mentioned, demand for luxury hotels in APAC registered a CAGR of 6.9% over the past three years and we expect such trend to continue ahead. China's belt-and-road initiatives will continue to drive up intra-regional cooperation and connections, driving up demand for hotels. In the key gateway cities of China, the demand is mainly driven by domestic travellers and consumption upgrade. Meanwhile, Chinese outbound travellers have been one of the key factors to drive the regional hotel recovery. The number of Chinese outbound travellers posted a 23% CAGR during the past five years. We expect the current consumption upgrade trend to continue.

Luxury hotel demand comparison, y-o-y growth



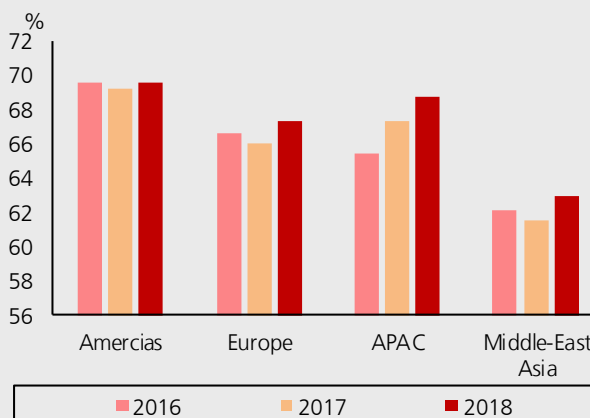
Source: STR Global, Hotel News Now, DBS

Luxury hotel ADR comparison (US\$/room/night)



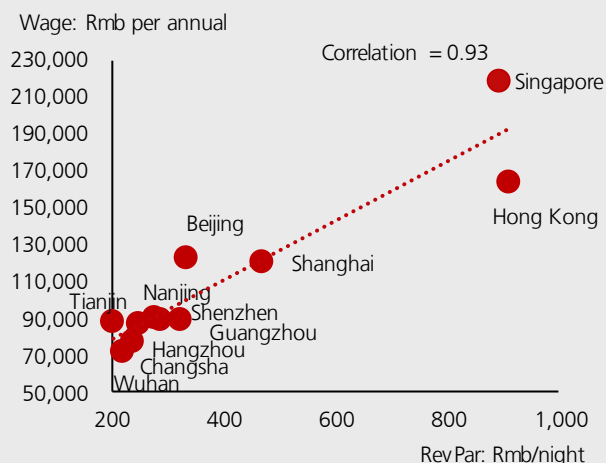
Source: STR Global, Hotel News Now, DBS

Luxury hotel occupancy comparison



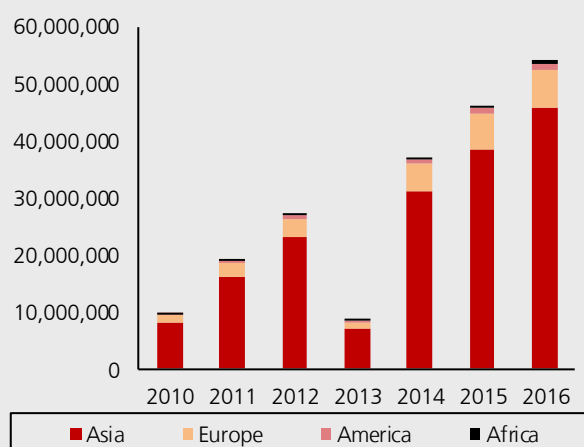
Source: STR Global, Hotel News Now, DBS

RevPAR vs. wages



Source: DBS

China's outbound tourists



Source: DBS

(ii) Divergent returns of commercial properties have sped up the conversion of hotels into offices in the key gateway cities.

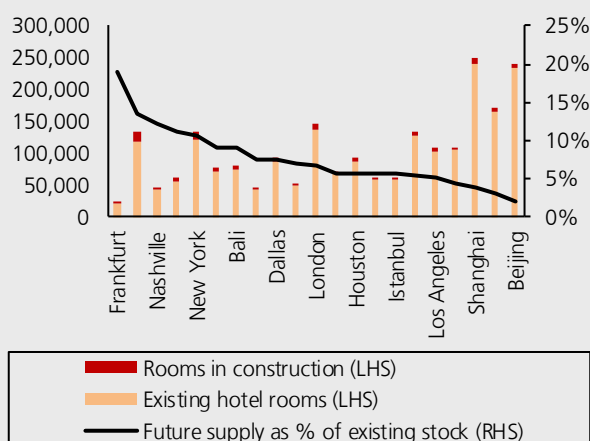
Based on our calculation, luxury hotels' EBITDA in Beijing or Shanghai is only one-third of Grade-A offices' EBITDA. Driven by this, we have seen rising property conversions in those gateway cities which are seeing limited land supply ahead. According to CBRE, there were five hotel/mall transactions (total consideration of Rmb13bn) in Shanghai and Beijing during 2014-2015, for conversion into office space. The number of such transactions increased to 16 during 2016-2017, with total consideration of Rmb23bn. We expect such trend to continue and will see more hotels being converted into office space, or co-working space and long-term rental apartments in China, given the government's policy inclination towards the rental housing business. Aged hotels with convenient transportation but

weak financial performance are the major targets to be converted into long-term rental housing.

In Hong Kong, given buoyant commercial property valuations, we believe an increasing number of well-located three -to four-star hotels will be redeveloped into office or commercial buildings. If the Excelsior, J Plus, and Crowne Plaza Hong Kong Causeway Bay are redeveloped into commercial properties, hotel inventory would be cut by c.1,200 rooms. This could moderate the net growth in hotel-room supply, which should in turn push up the hotel occupancy as well as RevPAR growth.

(iii) Limited future supply, as both government and developers rationalise on hotel investments. After value-added tax reform in China, we expect low incentive for local government to issue hotel land for sale, given much lower taxes generated from hotel assets. Previously, business tax was 5.6% on hotel revenue, but is now 6% of gross profit. In addition, limited income tax could be generated from hotel sector, given hotels' inferior financial performance. As shown below, Shanghai, Beijing and Guangzhou are expected to see the lowest supply ahead (as a percentage of existing supply).

Existing hotel rooms and future supply



Source: STR Global, Hotel News Now, CEIC, DBS

Major events likely to cause oversupply in the city for several years but there are not many events over the next years.

Beijing's 2008 Olympics and Shanghai's 2010 World Expo caused a significant increase in star-rated hotels to support large tourist inflows during the events. Despite strong hotel performance in the event year, the local hotel market experienced several years of downturn as the number of tourists dwindled. Looking into the next decade, we are not aware of any similar events that would trigger a significantly high hotel supply so far.

World class events in the next decade

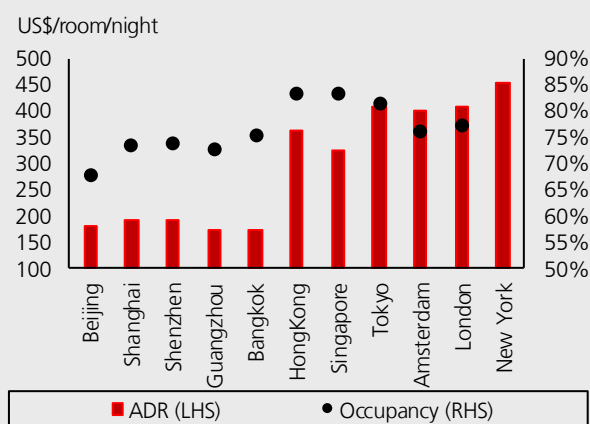
Football World Cup (in various cities)	Rugby World Cup (in various cities)
2022 Qatar	2019 Japan
2026 Canada/Mexico/United States	2023 France
2030 TBD	
Summer Olympics	Winter Olympics
2020 Tokyo	2022 Beijing
2024 Paris	2026 TBD
2028 Los Angeles	2030 TBD
World Expo	
2020 Dubai	
2023 Buenos Aires	
202 TBD	
2028 TBD	

Source: DBS

(iv) **Hotel owners to have stronger bargaining power vs. hotel managers ahead.** As earlier mentioned, landlords had less experience in negotiating contract terms with hotel managers in the early years. However, given the gradual conclusion of contract periods for the first batch of luxury hotels, we believe hotel owners will regain their bargaining

power over hotel managers, as there is limited future supply and hotel managers will have to accept less favourable terms to maintain their presence in key cities. For example, with the contract expiration for Shanghai Westin hotel in Jingan district, the landlord took back and rebranded the hotel as Kunlun Hotel, leaving Westin with no presence in the core districts of Shanghai. Going forward, we believe the interests of hotel managers will be closely aligned with hotel owners, and both parties will work together to push up ADR or hotel operations ahead. So far, luxury hotels' room rates in major Asian cities (except for Hong Kong, Singapore and Tokyo) are still far below those in global gateway cities. However, we see more potential for Asian city's room rates to catch up with their global peers' in the next decade.

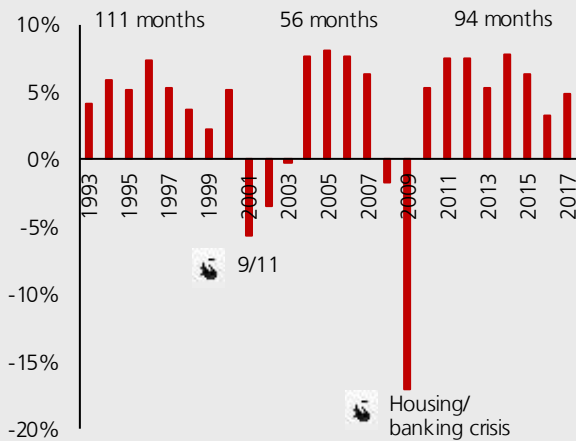
Luxury hotel's ADR and occupancy comparison



Source: STR Global, Hotel News Now, CEIC, DBS

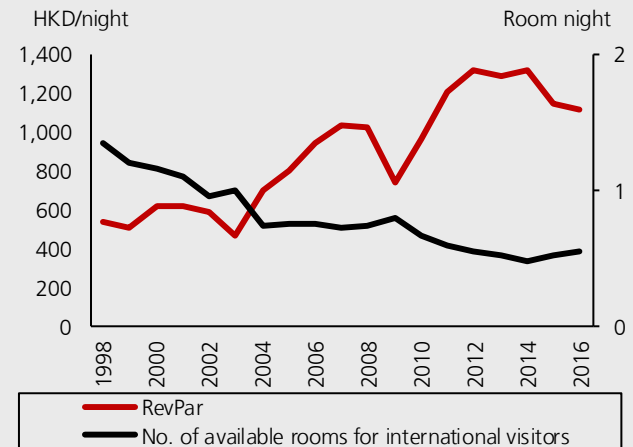
Stronger intra-regional connection, consumers' trading up and well-controlled supply will drive up long-term growth for the hotel sector. In addition, the rising popularity of REIT products in the region will also speed up the hotel industry consolidation, as evidenced by the experience of hotels in the US. In the early 1990s, hotel industry in the US also suffered from oversupply. After the supply of new assets slowed down, there was a gradual recovery in hotel ADR and RevPAR. Coupled with the emergence of modern equity REITs, this has resulted in mounting acquisition activity by REITs and a larger number of hotel rooms being controlled by fewer players. This has also led to a continuous increase in RevPAR, except during the two 'Black Swan' periods (9/11 and housing/banking crisis).

Hotel RevPAR in the US has kept rising during the past decades, except for two periods



Source: STR Global, Hotel News Now, CEIC, DBS

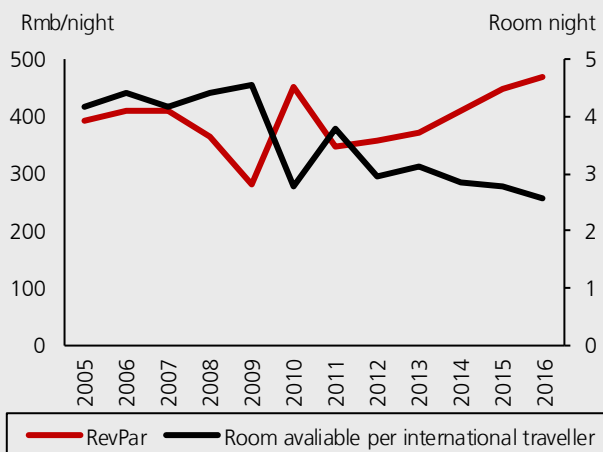
Hong Kong's star-rated hotel RevPAR vs. available room night per international traveler



Source: DBS

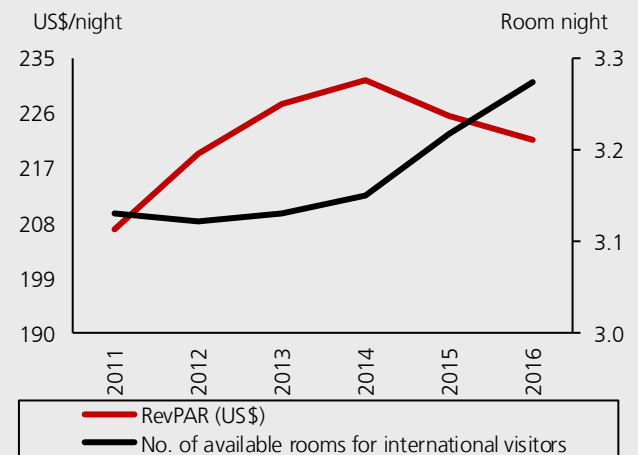
Available room night per international traveller has been a major driver of hotel room RevPAR. Historical trends of Shanghai, Hong Kong and New York hotels all indicate a strong negative relationship between available room night per international traveller and hotel RevPAR. Current cross-city comparison also indicates a similar relationship. Shenzhen and Wuhan's hotel room rates are likely to have more upside, while Beijing and Nanjing's hotel rooms might need more time to recover or rely more on domestic tourists to take up the available rooms.

Shanghai's star-rated hotel RevPAR vs. available room night per international traveler



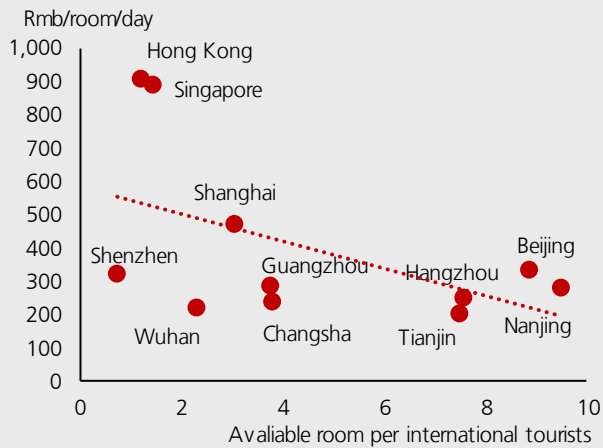
Source: DBS

New York's star-rated hotel RevPAR vs. available room night per international traveler



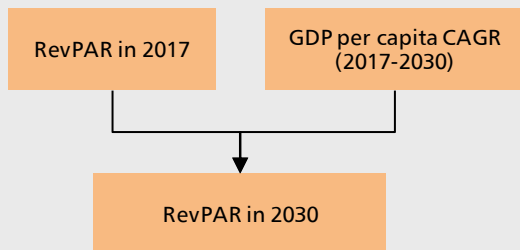
Source: DBS

RevPAR vs. available room per international tourist



Source: DBS

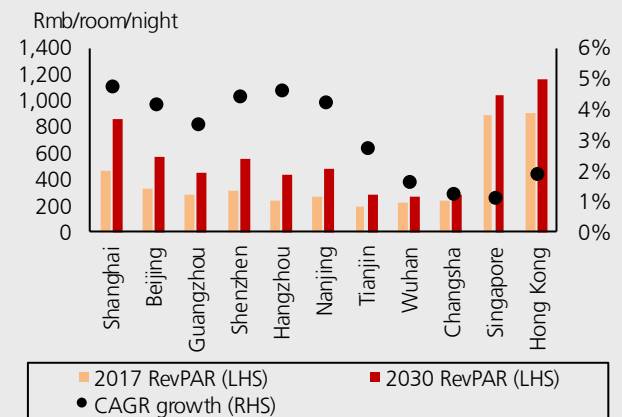
RevPAR forecast



Source: DBS

Shanghai, Hangzhou and Shenzhen to enjoy higher growth in RevPAR. As abovementioned, we found strong correlation between hotel RevPAR and local wages and expect such to continue. We project local wages to grow in tandem with GDP per capita growth and forecast 2030 RevPAR, based on 2017 RevPAR multiplied by our 2017-2030 GDP per capita growth projection. Based on the above calculation, Shanghai, Hangzhou and Shenzhen will likely to enjoy higher growth in RevPAR. However, Hong Kong and Singapore will continue to top on 2030 RevPAR, despite a slower CAGR growth.

RevPAR 2017 comparison and 2030 forecast



Source: DBS

DBS Bank, DBS HK, DBSVTH, DBSVI, AllianceDBS, recommendations are based on an Absolute Total Return* Rating system, defined as follows:

STRONG BUY (>20% total return over the next 3 months, with identifiable share price catalysts within this time frame)

BUY (>15% total return over the next 12 months for small caps, >10% for large caps)

HOLD (-10% to +15% total return over the next 12 months for small caps, -10% to +10% for large caps)

FULLY VALUED (negative total return i.e. > -10% over the next 12 months)

SELL (negative total return of > -20% over the next 3 months, with identifiable catalysts within this time frame)

Share price appreciation + dividends

Completed Date: 10 Jul 2018 17:10:15 (SGT)

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Sources for all charts and tables are DBS Bank, DBS HK, DBSVTH, DBSVI, AllianceDBS, unless otherwise specified.

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