ANNUAL INDICES FOR EXPATRIATES AND ORDINARY RESIDENTS ON COST OF LIVING, WAGE AND PURCHASING POWER FOR WORLD'S MAJOR CITIES

EDITORS

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Published by

Asia Competitiveness Institute
Lee Kuan Yew School of Public Policy
National University of Singapore
18 Evans Road
Singapore 259364

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e-ISBN 978-981-18-0398-7

Desk Editor: DW HQ Private Limited

Typeset by Lim Jing Zhi

About ACI

The Asia Competitiveness Institute (ACI) was established in August 2006 as a Research Centre at the Lee Kuan Yew School of Public Policy (LKYSPP), National University of Singapore (NUS). It aims to build the intellectual leadership and network for understanding and developing competitiveness in the Asia region. ACI seeks to contribute to the enhancement of inclusive growth, living standards, and institutional governance through competitiveness research on sub-national economies in Asia. It identifies mitigating issues and challenges for potential public policy interventions through close collaboration with regional governments, business corporations, policy think-tanks, and academics. ACI's three key research pillars include (I) Sub-national economies level competitiveness analysis; (II) The development of digital economy and its implications in 16 Asia economies; and (III) Singapore's long-term growth strategies and public policy analysis.

ACI's value propositions may be encapsulated in its acronym:
Analytical inputs to initiate policies for policy-makers and business leaders in Asia
Capacity building to enable others through improvement in productivity and efficiency
Intellectual leadership to create pragmatic models of competitiveness and inclusive growth

Vision and Mission

- ACI's over-arching vision is to build up its research credibility with policy impact, contributing as a professional, world-class think-tank.
- ACI's mission is to establish our niche as a leading policy think-tank by identifying development trends, opportunities, and challenges among Asian economies and business corporations.
- ACI endeavours to articulate sound recommendations, promote discussion, and shape research agenda in the arena of public policy amongst Asian governments.
- ACI undertakes evidence-based analysis of public policy issues and decisions, in order to provide assessment of their effectiveness as well as economic and societal impact.

Foreword

The Annual Indices for Expatriates and Ordinary Residents on Cost of Living, Wage and Purchasing Power for World's Major Cities is one of the flagship projects conducted by Asia Competitiveness Institute (ACI). First started in 2014, the institute has been constructing annual indices and rankings at the city level dating back to 2005. In this edition, we report the indices and rankings from 2005 to 2018.

As a result of urbanisation and globalisation, global competition among cities as economic growth centres has become progressively intense. The competition is likely to intensify as the world becomes increasingly interconnected. Consequently, international benchmarks of cities are vital for policy analysis. Specifically, the cost of living, wage and purchasing power are fundamental indicators of interest as they track the living conditions of urban dwellers. Amid socio-economic uncertainties, policymakers need to obtain accurate and timely estimates of ordinary residents' cost of living and purchasing power to facilitate the design and implementation of appropriate policies.

Against this background, this annual study analyses the cost of living, wage and purchasing power for expatriates and ordinary residents across 104 major cities in the world. The study makes a clear distinction between ordinary residents and expatriates as they tend to have very different consumption preferences. In this edition, we further examine the apparent discrepancy between the cost of living for ordinary residents and expatriates for cities across and within geographical regions. In addition, a pilot study on tourism price competitiveness is also included in this year's edition.

This report is a useful reference for multinational corporations, human resources managers, as well as for policymakers, researchers and analysts who are concerned with standards of living and quality of life of urban dwellers. I am confident that the insights shared in this publication will enable each city to better its urban conditions.

Professor Paul Cheung
Director, ACI
Lee Kuan Yew School of Public Policy
National University of Singapore

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1 Introduction to Cost of Living, Wage and Purchasing Power for Expatriates and Ordinary Residents

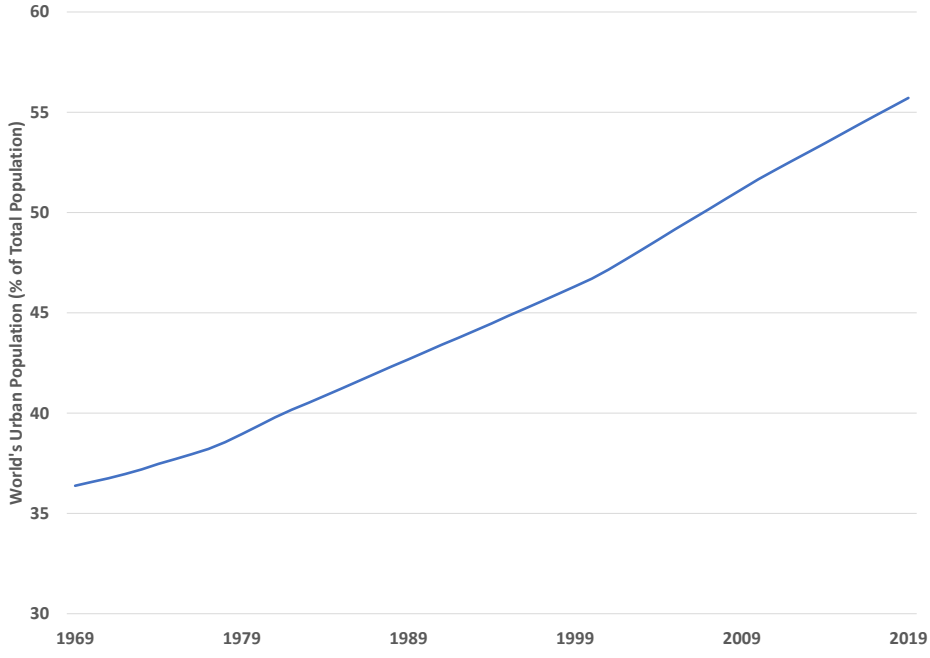
1.1 Background and Research Motivation

Urbanisation and globalisation are two major forces shaping the world economy. Data from the World Bank, as shown in Figure 1.1, exhibit an upward trend in the percentage of the world's urban population. Since 2007, more than half of the world's population has lived in urban areas. In addition, the World Bank predicts that by 2045, the number of people living in cities will be expected to increase to six billion, which is an increase of almost two billion from today. By 2050, the proportion of people living in cities will have reached a staggering 68% of the world's population (World Bank, 2018).

Such a trend implies that more and more economic activities are now drawn towards the cities. Cities have become the main drivers of economic growth; some megacities are now able to rival even whole countries in economic performance. In 2014, a study conducted by Oxford Economic, argued that the world's 750 biggest cities accounted for approximately 57% of global Gross Domestic Product (GDP). They predict that by the year 2030, this number will further increase to more than 60% of the total world GDP (Oxford Economics, 2014).

Although globalisation has existed for centuries now, the rapid advancement of technology in recent decades has amplified its effects. Technological progress, particularly in areas such as communication and transportation, have brought economies around the world closer together by facilitating greater mobility for both businesses and peoples. Economies are now increasingly interconnected and interdependent. In the past, businesses have traditionally had to manufacture entire products in one country or city but today, they can optimise their profits by decentralising and dispersing their production network to various part of the world and building Global Value Chains (GVCs), a phenomenon unprecedented in human history.

The increase in the urban population offers Multinational Corporations (MNCs) golden opportunities. In turn, countries and cities, that form part of the global value



Source: World Bank
Figure 1.1: Share of the World's Urban Population With Respect to Total Population (1969 - 2019).

chain, vie with each other to attract and retain the MNCs so as to reap the economic benefits these primary drivers of economic growth bring in their wake. This competition is likely to intensify as MNCs look to shorten their GVCs production length in response to the rising tide of protectionism (World Bank, 2018) and in the aftermath of the ongoing global COVID-19 pandemic.

Against the backdrop of urbanisation and globalisation, studies for cities, particularly the cost of living, wage and purchasing power, have garnered attention in recent years. Cost of living, which measures the level of expenses required to sustain a certain level of living, is often an important consideration for MNCs and expatriates who are looking to relocate. Beyond the cost of living, purchasing power, which is a combination of both the cost of living and wage, also provides a form of measurement for residents' well-being and standard of living. A high cost of living and low purchasing power could bring about widespread social and economic problems. Violent protests and social unrest in Hong Kong and various cities in Western Europe can be attributed partly to their consistently high cost of living and declining purchasing power (Tan et al., 2019, 2020). The study on the cost of living, wages and purchasing power is therefore essential and crucial for policy-makers, MNCs and academics around the world.

Policy-makers will gain from such studies a more accurate insight into the current

living conditions of the ordinary residents and how to improve them going forward. Ordinary residents are often concerned about whether their wages can keep pace with the rising cost of living, especially in areas such as housing, transport, education and healthcare. A study of cities, in this case, will serve as an indicator of whether such concerns are met. In addition policy-makers will be able to observe their city's competitiveness relative to other cities and tailor their policies accordingly.

MNCs, in order to optimise their profits, need to consider the potential costs required to set up an operation in a particular city. The study of the cost of living for expatriates together with the study on the cost of living, wage and purchasing power for the ordinary resident in a particular city, will provide them with the information required to decide how best to deploy their human resources around the globe.

As for academics, a separate and comprehensive study of both expatriates and ordinary residents will open up more options for their research. This study goes beyond commercial cost of living surveys such as those published by Economist Intelligence Unit (EIU), Mercer and the Union Bank of Switzerland (UBS). While useful as references to calculate compensation packages for expatriates, they are inadequate to guide policy analysis. Taking a more rigorous approach, we aim to conduct a comprehensive study for the cost of living, wage and purchasing power of ordinary residents, the first of its kind.

Consumption patterns of expatriates is likely to differ from those of ordinary residents. Therefore, policy-makers, who use findings and data solely for expatriates, will not be able to carry out accurate analysis of the general cost of living and may come out with inappropriate policies. Similarly, while the consumer price index (CPI) may serve as a measure of the cost of living at the national level, no reliable index tracking the cost of living at the city level is available at this time. This will be discussed in greater detail in our literature review in Section 1.2.

1.2 Literature Review

The theoretical basis of the cost of living index goes as far back as Konus (1939). Pollak (1989); Diewert and Nakamura (1993) and Triplett (2001) also provide useful reviews of the methodological issues surrounding cost of living indices. As defined by Triplett (2001), the cost of living index is a price index that measures the change in consumption costs required to maintain a constant standard of living. The index may include costs of all variables that affect the standard of living, or it may be conditional on some variables that are held constant for the construction of the index. Economists may substitute "standard of living" in the above definition for other terms such as "constant utility", or "indifference surface" (Blackorby and Russell (1978)).

At the national level, national statistical agencies may construct the CPI as a cost of living index though interestingly, this is not always the case. Triplett (2001) tells us that while certain countries such as the United States conceptualised the CPI as an

indicator reflecting households' cost of living, others draw a sharp distinction between the two. The second position follows from Hill (1998) who argues that the CPI, as an index for measuring inflation, was only designed to capture changes in the value of a fixed basket of goods and services with fixed weightages over time.

Hill (1998) distinguishes this from a cost of living index, which measured differences in value between baskets of goods and services necessary for the consumer to maintain constant utility across time. These baskets might be different from one another, with different weights for the items in the baskets. However, notwithstanding the conceptual debate among segments of academia, the public, the media, politicians and even academics have long used the CPI as a summary measure for the cost of living at the national level.

On the other hand, internationally comparable indices on the cost of living and purchasing power at the city level are often published by commercial research houses. These surveys garner much public attention and often generate emotional reactions, especially in the cities ranked among the most expensive. Major commercial studies include the following:

- The UBS Prices and Earnings report, which is published once every three years by the Wealth Management Department of UBS. The report offers indices on the price level for expatriates. Gross hourly wages data and purchasing power index and ranking are also available. The basket of goods and services used to calculate the price indices reflects the consumption patterns of a European family of three and the basket is assumed to be shared across all cities.

- The EIU Worldwide Cost of Living study is updated annually and only provides cost of living indices and rankings for expatriates. The study is based on a single set of international weights for goods and services typically used by the international businessman. New York is the base city in this study, with the cost of living in other cities benchmarked against it.

- The Mercer annual Cost of Living Survey, which is now in its 26^{th} edition. Mercer publishes only the ranking of cities according to the cost of living for expatriates and does not provide any index value.

These commercial reports are designed to aid human resource managers at MNCs in formulating appropriate compensation policies for expatriate employees on international assignments. Thus, they cannot be used for policy analysis concerning ordinary urban dwellers. This is because expatriates tend to have Western consumption patterns geared towards high-end and lifestyle products and it is unlikely that ordinary residents have the same consumption preferences.

Furthermore, in the case of expatriates, it is sensible to assume, as all commercial reports reviewed above tend to do, a common consumption pattern due to the social settings associated with the nature of expatriates' work as foreign white-collar

experts. However, this assumption does not hold for ordinary residents, whose consumption patterns vary according to their geographical location, social values and cultural affiliations. As a result, drawing a conclusion about a "general" cost of living level based on commercial research risks significantly overstating the actual cost of living for ordinary residents.

Commercial studies may also suffer from serious methodological weaknesses and data inaccuracies. For instance, as pointed out by Tan and Luu (2016), there were considerable discrepancies in the data used in the 2009 UBS *Prices and Earnings* report which overstated the cost of living in Singapore even for expatriates. In that report, prices for home electronics and household appliances in Singapore were above that of Mumbai, which was counterintuitive as visitors from India tend to spend twice as much on electronics as the average tourist in Singapore (Singapore Tourism Board, 2013). On restaurants, the 2009 UBS report put Singapore's price level slightly above that of many Western European cities, including Paris, which are known for their expensive restaurant meals.

More importantly, the same study made some simplistic assumptions in calculating its reported indices and rankings. These assumptions have turned out to be problematic. UBS has, for instance, used a common occupation profile, based on global averages, to derive the average wage in each city.

However, this occupation profile severely understated the percentage of Professionals, Managers, Executives and Technicians (PMETs) and overstated the share of Productions,Transportation Operators and General Labours (PTOGLs) and Clericals, Sales and Service Workers (CSRWs) in Singapore. The percentage of PMETs assumed by UBS in the 2009 report, which was made available upon request, was 9%. This was much lower than Singapore's actual percentage of PMETs in the resident workforce in 2009 at 52% (Singapore's Ministry of Manpower). Meanwhile, Singapore residents' share of PTOGLs and CSRWs in 2009 were both 24%, lower than UBS' assumed figures at 58% and 33% respectively. Due to these mismatches, the 2009 UBS report understated the average wage levels in Singapore.[1] When divided by the UBS' cost of living index which overstated the true cost of living in Singapore, the net result is that purchasing power in the city-state was severely understated.[2]

The UBS report is not the only commercial study fraught with methodological problems. We also suspect that the cost of living rankings reported in the annual EIU Worldwide Cost of Living survey is sensitive to the choice of the base city. This means that the ranking results would change if the EIU used Tokyo or London instead of New York as the benchmark city to compute their cost of living index. That such variations

[1]The UBS also appeared to have excluded contributions to the Central Provident Fund (CPF)– Singapore's defined contribution social security system – from their calculation of wages. This exacerbated the understatement of wages in Singapore because CPF contributions are also used extensively for housing, medical and educational expenses prior to retirement. Hence, they should be treated as part of wages. See Tan and Luu (2016) for a detailed discussion.

[2]Tan and Vu (2011) have revised the 2009 UBS estimates for Singapore using appropriate methodologies and data. They found significant differences with the original results.

can occur suggests that the research results are not consistent and calls into question the rigour with which the research was carried out.

The discussion above serves to highlight the care with which commercial research reports should be used for purposes other than their intended role as references to design expatriates' compensation packages. In fact, given the prevalence of methodological and data problems in these studies, one should exercise caution even when using them to make inferences about expatriates' cost of living. Meanwhile, the existing academic literature has not adequately addressed the issue of measuring the cost of living at the city level. This is a gap that Asia Competitiveness Institute (ACI) intends to fill with our research.

1.3 Factors which Affect the Cost of Living, Wage and Purchasing Power for Expatriates and Ordinary Residents

Obtaining reliable international benchmarks on the cost of living, wage and purchasing power is necessary as they facilitate meaningful analyses into issues affecting expatriates and ordinary urban dwellers. With this objective, the ACI at the Lee Kuan Yew School of Public Policy (LKYSPP), National University of Singapore has developed comprehensive indices which have systematically tracked cost of living for expatriates as well as cost of living, wage and purchasing power for ordinary residents across the world's major cities since 2005. Previous editions of the study published in 2014 and 2016 have covered 103 global cities (see Tan et al. (2016) and Tan et al. (2017)). From the 2017 edition onwards, the sample was extended to include two Vietnamese cities, namely Hanoi and Ho Chi Minh City, bringing the total of cities studied to 105 (Tan et al., 2018). We estimated the ranking results for Hanoi and Ho Chi Minh City for 2013 onwards. However, starting from this edition, we will be removing Caracas from our annual analysis due to its ongoing hyperinflation.

This section summarises some important insights which can be gained from examining our indices. These include the geographical distribution of cities according to their cost of living for ordinary residents and cost of living for expatriates, the sensitivity of the cost of living ranking to exchange rate fluctuations and the relationships among the cost of living, purchasing power and liveability of cities.

1.3.1 Geographical Distribution of Cities based on the Cost of Living for Expatriates, Cost of Living for Ordinary Residents and Purchasing Power for Ordinary Residents

From our research, we have observed that cities from developed regions tend to have a higher cost of living for ordinary residents than cities in developing regions. On

the other hand, there is no consistent pattern in the geographical distribution of the cities according to their cost of living for expatriates. This means that ordinary residents in an Asian city such as Seoul are likely to face a lower cost of living than their counterparts in a Western European city such as Paris. However, it is not possible to make any *a priori* conjecture about how the cost of living for expatriates in Asia may compare with that in Western Europe.

Figures 1.2 and 1.3 illustrate the geographical distributions of the 104 cities we have studied according to their costs of living for ordinary residents and expatriates, respectively. The figures reflect the latest index results, which are based on 2018 data. In both figures, the longer the bar, the higher the cost of living index value and hence the more expensive the city for ordinary residents or expatriates respectively.

We found that cities in Western Europe, Australasia and North America were relatively expensive for ordinary residents in 2018. In contrast, African, Asian, Eastern European and South American cities were cheaper for ordinary residents (see Figure 1.2). However, there were exceptions: Tel Aviv's cost of living is higher than Dublin's, Tokyo is more expensive than Seattle and Osaka-Kobe has a higher cost of living than Pittsburgh or Atlanta.

In contrast, Figure 1.3 shows no discernible pattern in the distribution of cities according to the cost of living for expatriates.

Cities in the developed regions are more expensive for ordinary residents than cities in the developing region due to differences in the cost structure of non-traded goods and services among these cities. In particular, locally-provided services which are non-traded either form an integral part of ordinary residents' consumption baskets or go into the local production and provision of other goods consumed by ordinary residents. These services, by nature, are labour-intensive and labour cost in Western Europe, Australasia and North America is significantly higher than in Africa, Asia, Eastern Europe and South America.

For instance, the average gross hourly wages in all Western European cities in our study in 2018 was 25.57 USD compared to 7.13 USD for Asian cities. Such wage differentials lead to higher prices for products and services, hence a higher overall cost of living for ordinary residents in developed cities. It should be noted, however, that due to higher wages, ordinary residents' purchasing power in the developed regions is also generally higher than that of their counterparts elsewhere in the world, despite the high cost of living.

Nonetheless, as can be seen from Figure 1.2, Tel Aviv, Tokyo, Osaka-Kobe, Hong Kong, and Singapore are outliers in their respective regions as their labour costs are more reflective of cities in more developed regions. The reason is that these cities are at a similar level of development as the developed cities and have similar levels of labour productivity.

On the other hand, expatriates everywhere are geared towards high-end imports and lifestyle products. As such, their cost of living is mainly affected by exchange rate fluctuations and other factors driving the costs of trade rather than local factors. This

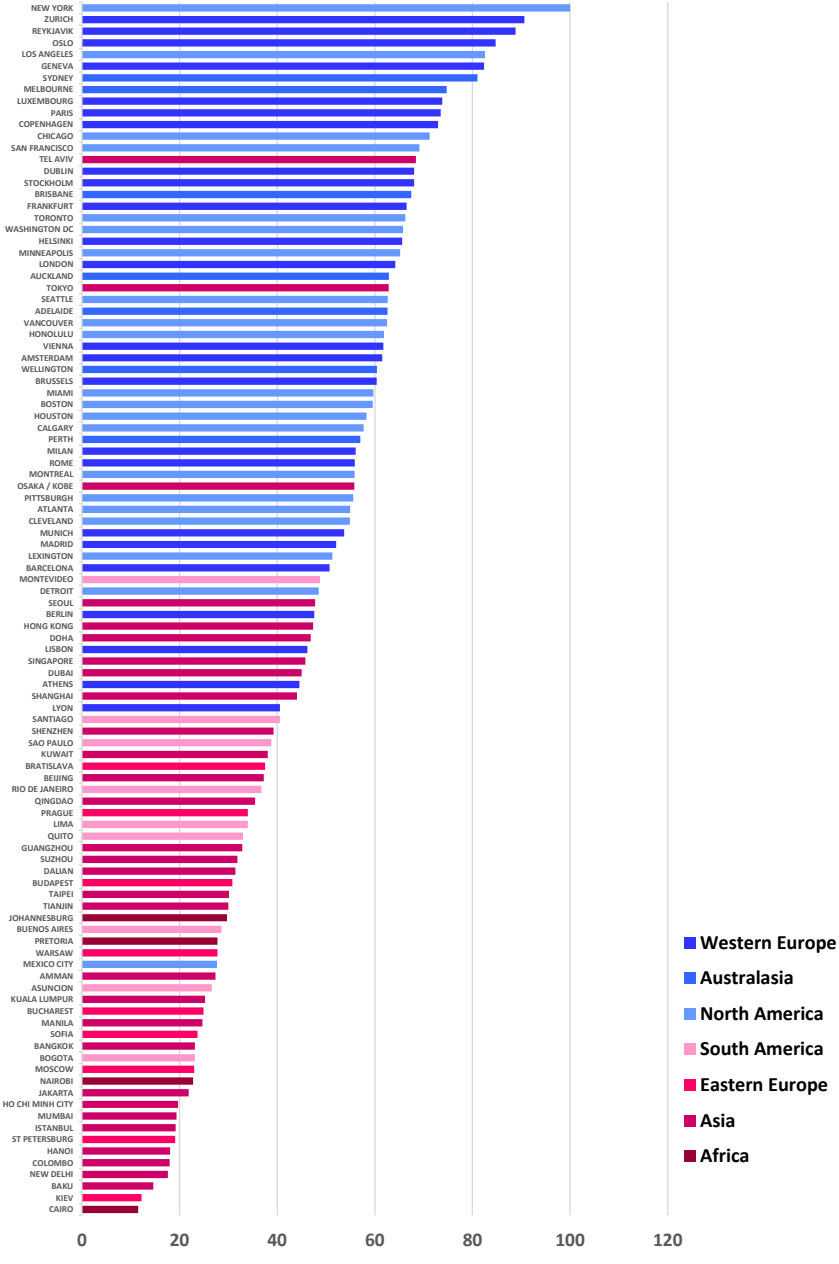
explains the lack of a pattern in the geographical distribution of cities, according to the cost of living for expatriates.

These findings again underscore the importance of distinguishing the analyses on expatriates and ordinary residents: conflating the latter with the former risks overstating ordinary residents' cost of living in developing countries, especially in Asia. Furthermore, the findings also imply that Western expatriates posted to Asia and other regions outside the Western world will benefit if they start to adopt the consumption patterns of ordinary residents in the local cities.

From our research, we have also observed that cities in developed regions tend to have higher purchasing power than cities in developing regions, despite having higher costs of living for ordinary residents. This is due to high wages in developed cities helping to compensate for the high cost of living.

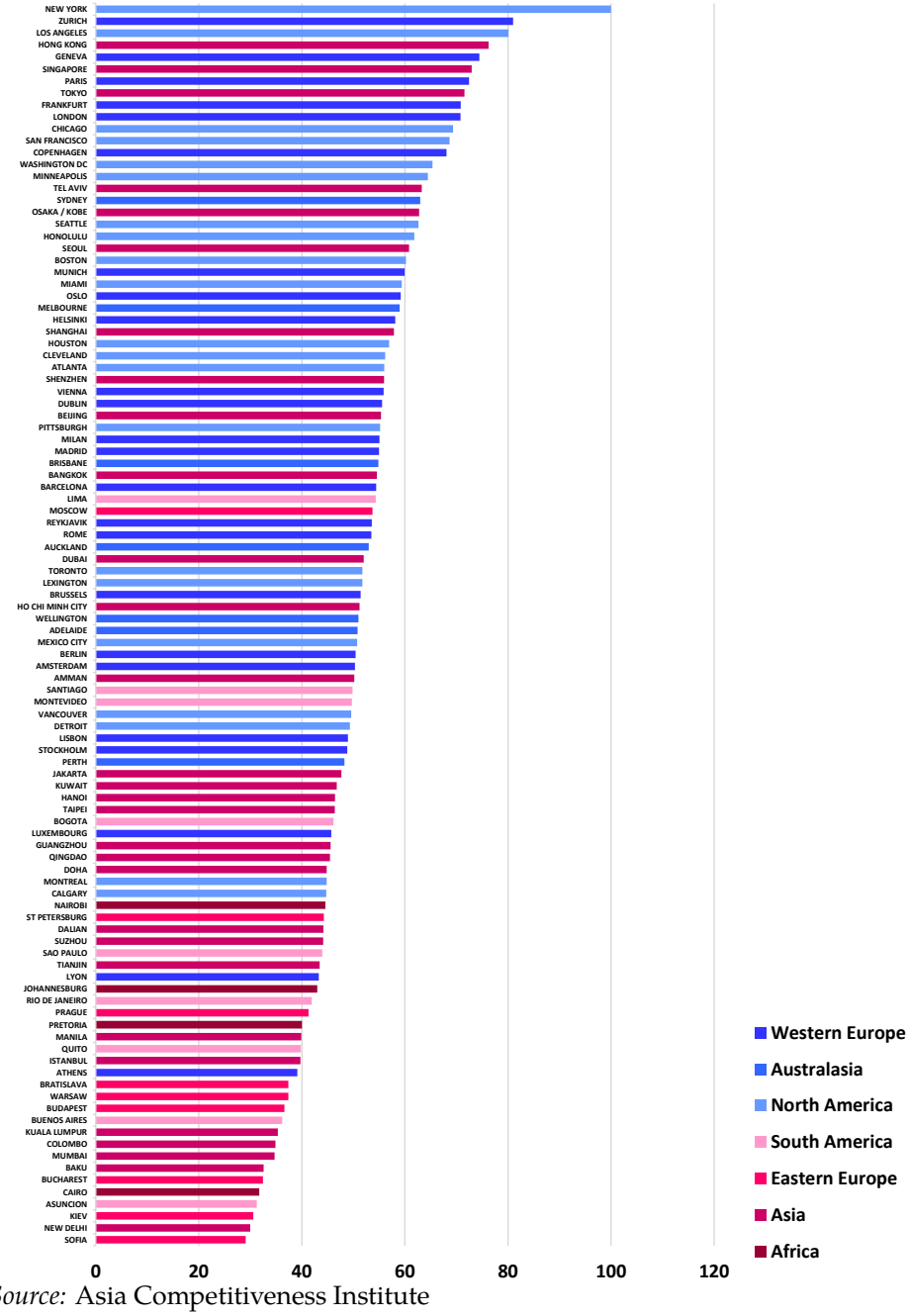
Figure 1.4 illustrates the geographical distribution of the 104 cities we have studied, according to their purchasing power for ordinary residents: the longer a city's bar, the higher its purchasing power index value and the more goods and services their ordinary residents can afford. Mexico City and Lisbon are the only two cities from the developed regions that are ranked in the bottom-25, while Singapore is the only city from the developing regions ranked in the top-25. The relatively lower wages in Mexico City and Lisbon and the relatively higher wages in Singapore help to account for these exceptions.

This study highlights the importance of monitoring the purchasing power for ordinary citizens. Cost of living by itself is not enough to measure affordability. Ordinary residents who live in a country with a high cost of living may still be able to afford more goods and services compared to ordinary residents living in a country with a low cost of living because of their higher wages. The introduction of purchasing power, therefore, facilitates a more comprehensive analysis. In a similar vein, it is also crucial to look at the relationship between expatriates' and ordinary residents' costs of living among and within each region. The discrepancy between these two groups will be explored further in Chapter 4.



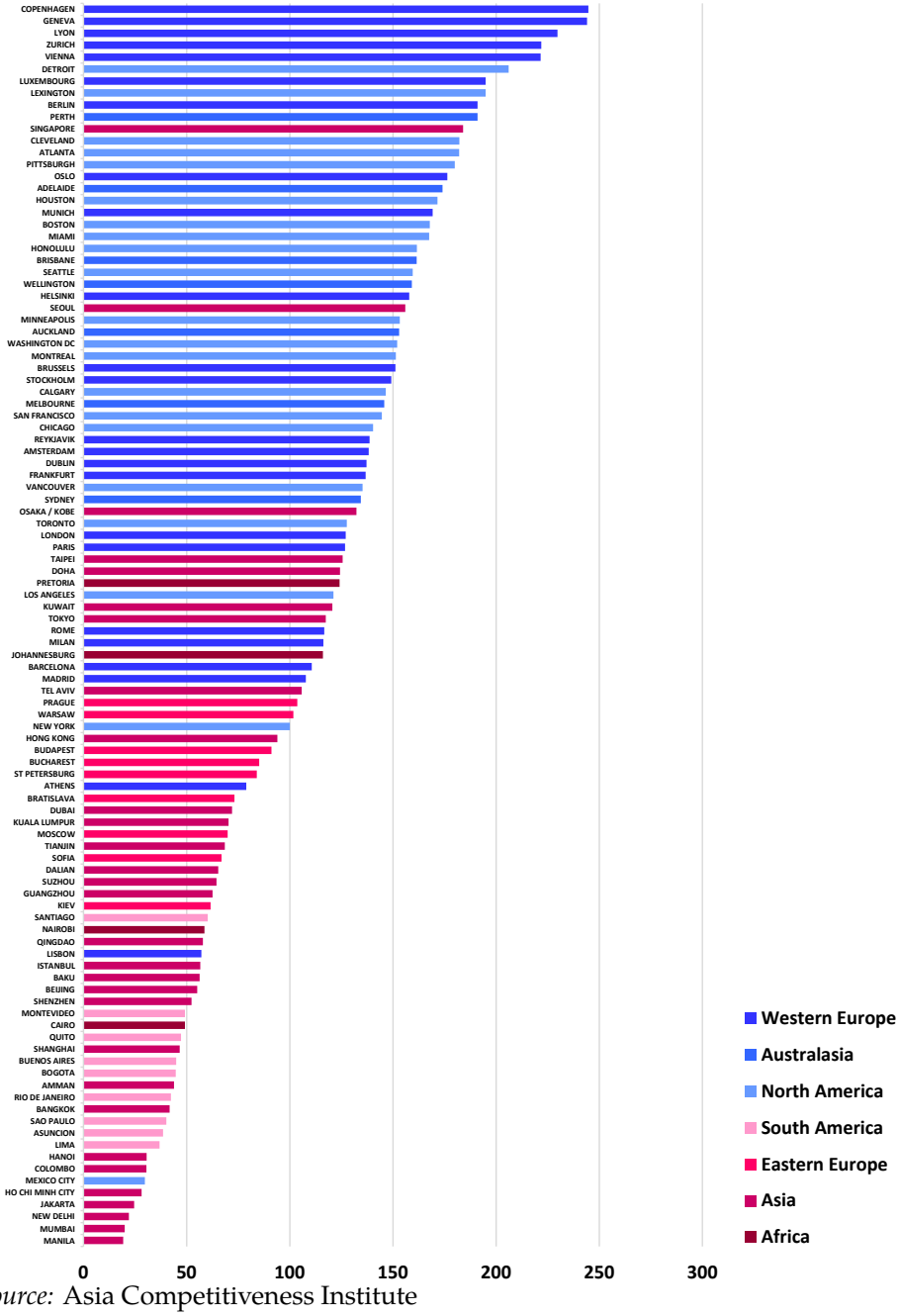
Source: Asia Competitiveness Institute

Figure 1.2: ACI's Cost of Living Index for Ordinary Residents across 104 World's Major Cities in 2018 by Geographical Regions.



Source: Asia Competitiveness Institute

Figure 1.3: ACI's Cost of Living Index for Expatriates across 104 World's Major Cities in 2018 by Geographical Regions.



Source: Asia Competitiveness Institute

Figure 1.4: ACI's Purchasing Power Index for Ordinary Residents across 104 World's Major Cities in 2018 by Geographical Regions.

1.3.2 Sensitivity of Cost of Living Rankings to Exchange Rate Fluctuations

Next, we consider a more technical issue: the sensitivity of the cost of living rankings to exchange rate fluctuations. In any study that endeavours to make an international comparison of the cost of living across different cities, the price data used must always be converted to a common unit of measurement. ACI's study, as with most other studies, uses the USD as the common currency for conversion. However, the side effect of conversion is that exchange rates of various currencies are integrated into the calculations of the cost of living indices.

As a result, the index value, and by extension the ranking of a city, reflects not only the relative expense of living in that city with respect to its peers but also the relative strength of its currency vis-à-vis the common currency. Exchange rate fluctuations, therefore, influence the cost of living rankings. For instance, currency appreciation may help to push the ranking of a city upward as an overall increase in local prices over the study period are magnified during currency conversion.

In Tan et al. (2017), we have provided a methodology and conducted a simulation for Singapore and Hong Kong to illustrate this effect. The baseline scenario from 2005-2018 used exchange rates against the USD according to their actual trajectories. In the simulation scenario, exchange rates of all other cities still followed their actual fluctuations but the exchange rate in the cities of interest - Singapore and Hong Kong - was kept at their 2005 level. The simulated cost of living rankings for expatriates and ordinary residents in these two cities were then compared with their actual rankings. Tables 1.1 and 1.2 provide an update of this simulation, incorporating the latest results based on 2018 data.

Between 2005 and 2018, the SGD appreciated by about 17% against the USD as the exchange rate went from 1.664 SGD per USD in 2005 to 1.349 SGD per USD in 2018. Concurrently, Singapore's Cost of Living Ranking for Expatriates rose from 15th to sixth while its Cost of Living Ranking for Ordinary Residents moved up from 58th in 2005 to 53rd in 2010 and then fell from 55th to 57th between 2011 and 2018.[3]

However, as Table 1.1 demonstrates, if the SGD had maintained its 2005 exchange rate against the USD throughout the study period, its Cost of Living Ranking for Expatriates would have fallen from 15th in 2005 to 20th in 2018. At the same time, as shown in Table 1.2, Singapore's Cost of Living Ranking for Ordinary Residents would have dropped from 58th in 2005 to 64th in 2010 and risen modestly from 69th in 2011 to 67th in 2018. Furthermore, Singapore's simulated cost of living rankings, for both expatriates and ordinary residents, are always lower than its actual ranking positions: the strong SGD helps to push Singapore's rankings upward.

[3]The ACI Cost of Living Index and Ranking for Ordinary Residents were constructed using data from two different rounds of World Bank's International Comparison Programme survey in 2005 and 2011. Thus, for a more precise analysis of the ranking, we need to split the study period into two sub-periods: 2005-2010 and 2011-2017. See Section 3.1.3 in Chapter 3 for a more detailed discussion.

Table 1.1: Actual and Simulated Cost of Living Rankings for Expatriates in Singapore and Hong Kong, 2005-2018.

	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*	2016*	2017*	2018*
Singapore (Actual)	15th	13th	12th	12th	12th	10th	8th	7th	4th	4th	4th	4th	5th	6th
Singapore (Simulated)	-	15th	21st	31st	25th	24th	33rd	22nd	24th	16th	8th	9th	13th	20th
Hong Kong (Actual)	5th	6th	10th	17th	13th	12th	12th	9th	11th	10th	7th	7th	6th	4th
Hong Kong (Simulated)	-	7th	10th	17th	13th	12th	12th	9th	11th	10th	7th	7th	6th	4th
SGD/USD†	1.664	1.589	1.507	1.415	1.454	1.363	1.257	1.249	1.251	1.267	1.375	1.381	1.381	1.349
HKD/USD†	7.777	7.768	7.802	7.786	7.752	7.769	7.784	7.757	7.757	7.755	7.752	7.762	7.793	7.837

Sources: Asia Competitiveness Institute and Bloomberg
* The analysis covers 103 cities for the 2005-2012 period, 105 cities for the 2013-2016 period and 104 cities for the 2017-2018 period. Both actual and simulated rankings for Singapore and Hong Kong are not affected by the inclusion of Ho Chi Minh City and Hanoi as Singapore and Hong Kong ranked above the two Vietnamese cities. However, both actual and simulated ranking for Singapore and Hong Kong are affected by the exclusion of Caracas as they both ranked lower than the Venezuela city in 2015 and 2016.
† Average exchange rate calculated from daily exchange rate with data from Bloomberg.

Table 1.2: Actual and Simulated Cost of Living Rankings for Ordinary Residents in Singapore and Hong Kong, 2005-2018.

	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*	2016*	2017*	2018*
Singapore (Actual)	58th	60th	59th	56th	59th	53rd	55th	48th	48th	49th	52nd	54th	56th	57th
Singapore (Simulated)	-	60th	62nd	65th	62nd	64th	69th	66th	67th	64th	62nd	61st	61st	67th
Hong Kong (Actual)	56th	58th	60th	62nd	60th	62nd	63rd	62nd	59th	59th	51st	50th	51st	54th
Hong Kong (Simulated)	-	58th	60th	62nd	60th	62nd	63rd	62nd	59th	59th	51st	50th	51st	53rd
SGD/USD†	1.664	1.589	1.507	1.415	1.454	1.363	1.257	1.249	1.251	1.267	1.375	1.381	1.381	1.349
HKD/USD†	7.777	7.768	7.802	7.786	7.752	7.769	7.784	7.757	7.757	7.755	7.752	7.762	7.793	7.837

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† Average exchange rate calculated from daily exchange rate with data from Bloomberg.

In contrast, Hong Kong's simulated rankings for both expatriates and ordinary residents are almost always identical to its actual rankings. There is no difference between the simulated and actual Cost of Living Rankings for Ordinary Residents in Hong Kong throughout 2005-2017, with the exception of a one place difference in 2018. For expatriates, Hong Kong's simulated and original rankings are also the same for all years except for 2006 when the two differ by only one place. This is hardly surprising since the HKD is pegged to the USD. Consequently, there were little fluctuations in Hong Kong's exchange rate with the USD to materially affect its actual ranking results.

This simple simulation exercise demonstrates the effect that exchange rate movements in a particular city may have on its cost of living rankings. However, exchange rate fluctuations in other cities may also influence the rankings of the city of interest. Consider, for example, the case of Singapore for the period 2011-2018. Over this period, Singapore's Cost of Living Ranking for Ordinary Residents fell two places from 55th in 2011 to 57th in 2018. Yet, despite a fall in ranking, Singapore overtook cities such as Buenos Aires, Rio de Janeiro, and Lyon.

The cause could have been a result of exchange rate fluctuation. Over the same period, the exchange rate of the SGD against the USD depreciated by 7.33%. In contrast, the Euro, the local currency of Lyon, depreciated at the faster rate of 17.92% against the USD while the Brazilian real, the local currency for Rio de Janeiro, depreciated

by 118.33% and the Argentinian peso, the local currency for Buenos Aires, depreciated by a staggering 580.50%. Thus, when local prices were converted to US dollars to construct the Cost of Living Index for Ordinary Residents, increases in local prices in Lyon, Berlin, Lisbon, Rio de Janeiro and Buenos Aires were dampened to a greater extent than in Singapore. This disparity contributed to the rise of Singapore's ranking over the above-mentioned cities.

A similar observation can be made for the Cost of Living Ranking for Expatriates. During the period 2011-2018, Singapore's Cost of Living Ranking for Expatriates rose from eighth to sixth. In the process, it overtook Oslo, Frankfurt, Osaka-Kobe, and Tokyo. Again, this was partly the result of exchange rate movements in these cities. From 2011 to 2017, the Norwegian krone, which is the local currency for Oslo, depreciated by 45.25% against the USD and the Japanese yen, the local currency for Osaka-Kobe and Tokyo, depreciated by 38.60%. In the case of Frankfurt, its local currency the Euro, depreciated by 17.92% between 2011 and 2018.

However, there are exceptions: Singapore rose above London and Geneva in Cost of Living Ranking for Expatriates between 2011 and 2015, even though the British pound and the Swiss franc depreciated at slower rates than the SGD against the USD, at 4.9 and 8.5% respectively. This means that the pound and Swiss franc have appreciated against the SGD. These exceptions serve to remind us that while important, exchange rate fluctuations are only one among many factors contributing to changes in the cost of living rankings. The strength of the exchange rate effect depends on the extent to which exchange rate movements affect the actual dynamics of local prices.

1.3.3 The Effects of Currency Appreciation on Expatriates and Ordinary Residents

Technicalities about the cost of living rankings aside, exchange rate fluctuations have real effects on the welfare of expatriates and ordinary residents. To make the discussion tractable, we examine a specific scenario whereby the Singapore dollar appreciates in a sustained manner against the currencies of its trading partners.

As the SGD strengthens against other currencies, it requires fewer SGD to buy one unit of foreign currency worth of imports. Consequently, there is downward pressure on local, SGD-denominated prices of imports. Consumption items which are imported may, therefore, become cheaper in Singapore. This is beneficial for both expatriates and ordinary residents, but especially so for the former because expatriates tend to consume high-end imported products. At the same time, prices of locally produced goods which have imports as close substitutes are also likely to decrease because of competitive pressure. Goods which use imports as intermediate inputs in their production may also decrease in price, further resulting in gains for expatriate and ordinary resident consumers.

However, the transmission of exchange rate shocks to retail prices of imported goods is not a one-to-one correspondence. In other words, a 1% appreciation in the

SGD may only result in a less than 1% decrease in import prices. There are at least two reasons for this. Firstly, the linkages between exchange rate fluctuations and local prices of imports as set by importers also depend on the market structure of the market for imports, government's exchange rate policy and the vagaries of the business cycle. Tan et al. (2011), for example, has shown that importers exhibited asymmetric behaviour in passing on cost-savings derived from a stronger exchange rate over the business cycle: given an appreciation of the SGD, importers are likely to reduce local import prices by a lesser degree amidst robust economic growth than during a downturn. Secondly, imported goods also contain additional value from locally provided services such as transport, logistics, wholesaling and retailing as they are delivered to the consumers. These services are non-traded and as such their costs are not sensitive to exchange rate movements. Therefore, the effect of exchange rate on the final retail prices of imports is further weakened.

On the other hand, a strong SGD makes the prices of Singapore's exports less competitive. Thus, international demand for Singapore's exports is likely to be reduced. The precise magnitude of the effect depends, of course, on the extent the appreciation is transmitted to overseas retail prices. More importantly, it also depends on the price elasticity of overseas demand for Singapore's exports. If demand is relatively inelastic, the decrease in quantities demanded will be marginal. However, if the reverse is true, exports will slump and the employment prospects of ordinary residents working in export sectors in Singapore could be adversely affected.

Notwithstanding the arguments above, a strong SGD does not have a direct bearing on ordinary residents' income and wealth. Most ordinary residents are remunerated in Singapore dollar, so fluctuations of the currency do not affect the value of their income. Moreover, since ordinary residents tend to save and invest in local assets, such as SGD-denominated time deposits or savings with the CPF, the value of their wealth also remains unaffected by exchange rate movements. Only the upper strata of the population may be affected as the value of any foreign assets they hold will decrease in terms of the SGD as the local currency appreciates.

In contrast, a strong SGD has an income effect on expatriates, although the exact nature of the effect depends on their remuneration arrangements. If an expatriate is paid in his home currency or USD, the value of his income in terms of SGD may decrease. On the other hand, if the expatriate is compensated in SGD, the value of his income is not reduced. The appreciation of the SGD may even be beneficial for expatriates who are paid in this currency. This is because expatriates often remit a portion of their income back home, either to support dependants or to meet outstanding financial commitments such as mortgages. A strong SGD lessens the burden of remittances, as the same amount of foreign currency can be sent using fewer SGD. Therefore, more income is made available for consumption.

These conclusions are important as bases to reinforce, justify or fine-tune existing exchange rate policies in economies, such as Singapore, which maintain a managed float exchange rate regime. Letting the currency appreciate may help to mitigate im-

ported inflation, but such a policy can be properly conducted only if there are accurate estimations of pass-through effects of exchange rate fluctuations to domestic prices. At the same time, the need to manage inflation must be balanced against other objectives such as mitigating the effects of a strong currency on exports. Finally, the presence of income effect of exchange rate fluctuations on expatriates means that exchange rate policies also affect a city's ability to attract global talent.

1.3.4 Relationships among Cost of Living, Purchasing Power, Liveability and Economic Competitiveness

Reliable indices also allow us to examine the relationships among the cost of living, purchasing power, liveability and economic competitiveness, which are interrelated dimensions that contribute to urban dwellers' quality of life. Following the influential contributions of Florida (2005), a strand of urbanisation literature has emerged which recognises the city's role as hubs for creativity and innovation to drive economic growth for the entire country. ACI has similarly explored the relationship between affordability and economic competitiveness in Tan et al. (2011).

In this context, the literature emphasises the need for cities to attract and retain high-quality human capital, especially those whom Florida (2005) referred to as the "creative class", by providing them with a good quality of life. While there is no consensus on a common definition for "quality of life", several studies have attempted to identify its different characteristics.[4] Beyond conventional academic researches, the idea of the quality of life has also caught on among private and consulting organisations which often produce the quality of life rankings for global cities. At the same time, improving ordinary residents' quality of life has also become the "rallying cry of many big-city mayors" around the globe (see Hasan (2008)).

In Tan et al. (2017), we have examined the nexus between the cost of living, purchasing power and liveability whereby the latter is measured by the Global Liveable City Index (GLCI) as presented in Tan et al. (2017). We found that liveability does not explain the cost of living despite a generally positive association. A city may be highly liveable, but its cost of living for ordinary residents can remain relatively low. Berlin, Singapore, Taipei and Hong Kong are examples of such cities.

1.4 Contributions and Chapter Organisation

This book provides a valuable compendium of annual indices and rankings of cost of living for expatriates and cost of living, wage and purchasing power for ordinary residents in 104 of the world's major cities between 2005 and 2018. Now in its sixth edition, the ACI's study reflects salient differences in costs of living for expatriate and ordinary urban dwellers which arise from variations in their lifestyles and consump-

[4]See Rogerson (1999) and Hasan (2008) for an overview of this literature.

tion preferences. This is of critical significance as the cost of living for the former is usually conflated as that for the latter by the general public. We believe that the ACI's pioneering attempt is the first-ever comprehensive study of ordinary residents available today. As for expatriates, the cost of living researches are widely available, but as reviewed in Section 1.2, they are conducted in a much less rigorous manner than the ACI's study.

The publication of this book is a major undertaking combining leading-edge research with rigorous methodology and datasets which are disclosed openly. Weights employed for consumption baskets are justified across different continents and stated explicitly. Moreover, all assumptions made are also laid down transparently. It is our belief that unless assumptions, methodology and data sources are disclosed publicly for open scrutiny, non-rigorous studies will mushroom, spreading spurious and misleading results.

This book is of interest to various parties. The findings in this book allow MNC employers to review and adjust compensation packages for expatriates, based on differences between expatriates' and ordinary residents' costs of living. For academics, the ACI research delivers a more accurate depiction of costs of living at the city level. The distinction made between ordinary residents and expatriates opens up more tools for social research. Finally, for policy-makers looking to make city-life better for ordinary residents, our indices provide a reliable way to track ordinary residents' cost of living. More importantly, they show whether ordinary residents' purchasing power has increased over time. Poverty statistics can also be measured differently by taking account cost of living of ordinary residents. Finally, the analyses presented through our case studies can yield important policy implications.

The world's major 104 cities covered by ACI's study are located all over the globe, including cities in Africa, Asia, Australasia, Western and Eastern Europe, North and South America. The list of cities is shown in Table 1.3.

Table 1.3: List of Cities Covered in the 2020 ACI Annual Indices on Cost of Living, Wage and Purchasing Power.

No.	City	Country/ Economy	Region
1	Adelaide	Australia	Australasia
2	Amman	Jordan	Asia
3	Amsterdam	Netherlands	Western Europe
4	Asuncion	Paraguay	South America
5	Athens	Greece	Western Europe
6	Atlanta	United States	North America
7	Auckland	New Zealand	Australasia
8	Baku	Azerbaijan	Asia
9	Bangkok	Thailand	Asia
10	Barcelona	Spain	Western Europe
11	Beijing	China	Asia
12	Berlin	Germany	Western Europe
13	Bogota	Colombia	South America
14	Boston	United States	North America
15	Bratislava	Slovakia	Eastern Europe
16	Brisbane	Australia	Australasia
17	Brussels	Belgium	Western Europe
18	Bucharest	Romania	Eastern Europe
19	Budapest	Hungary	Eastern Europe
20	Buenos Aires	Argentina	South America
21	Cairo	Egypt	Africa
22	Calgary	Canada	North America
23	Chicago	United States	North America
24	Cleveland	United States	North America
25	Colombo	Sri Lanka	Asia
26	Copenhagen	Denmark	Western Europe
27	Dalian	China	Asia
28	Detroit	United States	North America
29	Doha	Qatar	Asia
30	Dubai	United Arab Emirates	Asia
31	Dublin	Ireland	Western Europe
32	Frankfurt	Germany	Western Europe
33	Geneva	Switzerland	Western Europe
34	Guangzhou	China	Asia
35	Hanoi	Vietnam	Asia
36	Helsinki	Finland	Western Europe
37	Ho Chi Minh City	Vietnam	Asia
38	Hong Kong	Hong Kong, China	Asia
39	Honolulu	United States	North America
40	Houston	United States	North America

Table 1.3 continued from previous page.

No.	City	Country/ Economy	Region
41	Istanbul	Turkey	Asia
42	Jakarta	Indonesia	Asia
43	Johannesburg	South Africa	Africa
44	Kiev	Ukraine	Eastern Europe
45	Kuala Lumpur	Malaysia	Asia
46	Kuwait City	Kuwait	Asia
47	Lexington	United States	North America
48	Lima	Peru	South America
49	Lisbon	Portugal	Western Europe
50	London	Great Britain	Western Europe
51	Los Angeles	United States	North America
52	Luxembourg	Luxembourg	Western Europe
53	Lyon	France	Western Europe
54	Madrid	Spain	Western Europe
55	Manila	Philippines	Asia
56	Melbourne	Australia	Australasia
57	Mexico City	Mexico	North America
58	Miami	United States	North America
59	Milan	Italy	Western Europe
60	Minneapolis	United States	North America
61	Montevideo	Uruguay	South America
62	Montreal	Canada	North America
63	Moscow	Russia	Eastern Europe
64	Mumbai	India	Asia
65	Munich	Germany	Western Europe
66	Nairobi	Kenya	Africa
67	New Delhi	India	Asia
68	New York	United States	North America
69	Osaka-Kobe	Japan	Asia
70	Oslo	Norway	Western Europe
71	Paris	France	Western Europe
72	Perth	Australia	Australasia
73	Pittsburgh	United States	North America
74	Prague	Czech Republic	Eastern Europe
75	Pretoria	South Africa	Africa
76	Qingdao	China	Asia
77	Quito	Ecuador	South America
78	Reykjavik	Iceland	Western Europe
79	Rio de Janeiro	Brazil	South America
80	Rome	Italy	Western Europe
81	San Francisco	United States	North America
82	Santiago	Chile	South America

Table 1.3 continued from previous page.

No.	City	Country/ Economy	Region
83	Sao Paulo	Brazil	South America
84	Seattle	United States	North America
85	Seoul	South Korea	Asia
86	Shanghai	China	Asia
87	Shenzhen	China	Asia
88	Singapore	Singapore	Asia
89	Sofia	Bulgaria	Eastern Europe
90	St Petersburg	Russia	Eastern Europe
91	Stockholm	Sweden	Western Europe
92	Suzhou	China	Asia
93	Sydney	Australia	Australasia
94	Taipei	Taiwan, China	Asia
95	Tel Aviv	Israel	Asia
96	Tianjin	China	Asia
97	Tokyo	Japan	Asia
98	Toronto	Canada	North America
99	Vancouver	Canada	North America
100	Vienna	Austria	Western Europe
101	Warsaw	Poland	Eastern Europe
102	Washington DC	United States	North America
103	Wellington	New Zealand	Australasia
104	Zurich	Switzerland	Western Europe

Source: Asia Competitiveness Institute

The rest of the book is organised as follows. Chapter 2 discusses at length the methodology on the cost of living for expatriates, presenting data sources, including prices and weights used, where assumptions made are also explicitly stated. The method to construct the overall Cost of Living Index and Ranking for Expatriates, as well as indices and rankings specific to each ACI Consumption Category is spelt out in detail. The chapter also presents the results and findings pertaining to the Cost of Living Ranking for Expatriates in the 104 cities. It first highlights the latest ranking positions for the top- and bottom-25 cities based on data for 2018. Next, it describes some notable observations regarding the rankings for expatriates for each region covered in the study before zooming in on the major global financial centres which include New York, London, Hong Kong, Singapore, Shanghai and Tokyo. Finally, the chapter presents the results of Cost of Living Index and Ranking for Expatriates in each of the 104 cities over the period 2005-2018.

Chapter 3 describes the methodology on the cost of living, wage and purchasing power for ordinary residents where components of adjustment factors such as inflation rates, nominal expenditure and real expenditure per capita are highlighted. The construction of the overall Cost of Living Index and Ranking for Ordinary Residents,

together with category-specific cost indices and rankings, is elaborated upon in this chapter. The computation of the Wage Index and Ranking for Ordinary Residents involving gross average nominal monthly wages and mean weekly hours actually worked is also illustrated step-by-step. The chapter then describes the methodology used to construct the Purchasing Power Index and Ranking for Ordinary Residents from the cost of living and wage indices. Following which, the chapter provides the corresponding analyses for the cost of living, wage and purchasing power indices and rankings for ordinary residents. The latest results based on 2018 data for the top- and bottom-25 cities are first reported. Region-specific observations about the rankings then follow. We end with a discussion on the trends of the cost of living, wage and purchasing power for ordinary residents in each of the 104 cities between 2005 and 2018. When conducting the trend analysis, we split the study period into three sub-periods: from 2005 to 2010, from 2011 to 2016 and from 2017 to 2018. This is because the Cost of Living Index for Ordinary Residents, which is also used in the computation of the Purchasing Power Index for Ordinary Residents, is constructed using data from three different rounds of the World Bank's International Comparison Program (ICP) survey in 2005, 2011 and 2017.

Chapter 4 further examines the discrepancy between the cost of living for ordinary residents and expatriates, specifically for cities located in the Asia region. Next, we will look at a pilot case study on tourism price competitiveness. The tourism industry has often contributed significantly to the economy of the various cities. The detailed study of tourism price competitiveness is, therefore, extremely valuable for different stakeholders in each city. The pilot study serves as a base for future research extension. Finally, the chapter ends with some concluding remarks and future research agenda.