Hong Kong Economic Policy Green Paper 2024

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香港經濟政策綠皮書2024

Table of Contents

Online Version

Preamble

It is with immense pleasure and delight that I present the third annual Hong Kong Economic Policy Green Paper, produced by the distinguished scholars of the HKU Business School. This annual volume serves as a testament to the exceptional dedication and rigorous analysis undertaken by our esteemed academic community in addressing the myriad economic opportunities and challenges that Hong Kong faces today.

In the wake of the global pandemic and amidst rising geopolitical tensions, it is more critical than ever for our city to forge a clear and strategic path forward. This year's Green Paper provides invaluable insights and guidance to help us navigate these uncertain times. The sustained efforts and unparalleled expertise of the scholars at the University of Hong Kong are both timely and welcome, as they contribute to shaping a prosperous and resilient future for our beloved city.

The Hong Kong Economic Policy Green Paper is a commendable initiative, and I wholeheartedly recommend this year's installment to everyone who is passionate about and invested in the future of Hong Kong. May it inspire thoughtful deliberation, informed decision-making, and collective action as we work together to overcome the challenges ahead and seize the opportunities that lie before us.

With my warmest regards and congratulations to the authors and contributors of this exemplary publication, I invite you to delve into the pages of the third annual Hong Kong Economic Policy Green Paper and join us in our pursuit of a brighter tomorrow for Hong Kong.

Y C Richard Wong

Deputy Vice-Chancellor and Provost
The University of Hong Kong

1 January 2024

Introduction

Amid the changing nature of globalization, which has become more regionalized, digitalized, and service-oriented, and a challenging geopolitical landscape, there is an urgent need to explore new paths and positions for the Hong Kong economy. Similar to the past two years, the HKU Business School is once again publishing the Hong Kong Economic Policy Green Paper 2024, which is an edited volume of eight chapters on various aspects of the city's economic future. These chapters are contributed by different experts from the University of Hong Kong. This year's Green Paper is a joint effort of academics from the HKU Business School and other faculties. The topics covered in the Green Paper range from the future of Hong Kong as an international financial center to public health reforms. I hope you will enjoy reading these chapters and gain new insights on how the city's economy can be restructured to be more inclusive and resilient.

The first chapter, written by Arner, examines Hong Kong's evolution into a major international financial center, the scope of its role, and recent structural changes. History serves as a guide: Hong Kong weathered the 1987 global market crash and the 2008 Global Financial Crisis and continued to grow as an international financial center. However, the period from 2019 to 2023 was challenging due to domestic instability, COVID-19, and geopolitical tensions. Rather than declining, Hong Kong's role may be undergoing structural change as the global economy becomes increasingly multipolar. Hong Kong and Singapore are evolving into financial centers for different regions – Hong Kong for China and Singapore for Asia excluding China. To enhance its role, Hong Kong must maintain its strengths, reinforce its access to mainland China, and improve its transactional infrastructure. Its success will depend on openness, infrastructure, institutions, and interconnections.

A fundamental infrastructure underlying Hong Kong's function as an international financial center is its fixed exchange rate with the U.S. dollar (USD), which was chosen by the city's monetary authority. What is the future of the currency peg given the possibility, although unlikely, of the U.S. authorities increasing their use of financial sanctions on other governments, companies, and individuals? Fang and Liu explore the current status and development of Hong Kong's linked exchange rate system with the USD amid an evolving international economic situation. The authors argue that the benefits brought by the linked exchange rate system will be longer-lasting than what is implied by the temporary challenges posed by the changing

global geoeconomic environment. The article discusses the benefits of the linked exchange rate system for Hong Kong's financial and trade sectors, explains why the benefits of a floating exchange rate for the Hong Kong dollar (HKD) are not as significant as expected, highlights the challenges of maintaining the linked exchange rate system and offers possible solutions, and analyzes the possibility of linking the HKD to the Chinese renminbi.

As is well-known, social and income inequalities have been long-running problems for Hong Kong. Fong, Hong, Zhang, and Zhu analyze economic inequality in Hong Kong based on Census data from 1981 to 2016. The study reveals growing wage inequality driven by high-income earners, contributing to higher overall household inequality. Despite the rising median household income, the income of the poorest households is regressing. The authors also observe greater gender wage equalization and find that government transfers have played a more significant role since Hong Kong's handover. Wage inequality between high-skilled and low-skilled workers has declined due to government investment in higher education, resulting in large expansions of college enrollment. The findings suggest that without government intervention, inequality in Hong Kong may be even higher, and the idea of minimal government interference may no longer hold true in the area of income distribution.

Another long-term socioeconomic challenge in Hong Kong is its aging population and the resulting burden on the city's public health sector. Bishai, Chen, Grépin, and Quan have examined the future impact of population aging on healthcare costs in Hong Kong until 2040. The authors have used autoregressive, integrated, moving average (ARIMA) models to predict total and sub-components of health spending in the coming decades. The results indicate that health spending started growing faster than Hong Kong's GDP in 2010 and is currently growing twice as fast. Although immigration may slow population aging and health spending growth, health spending's share is still projected to rise from the current 7% to as much as 9% of GDP. The authors recommend that the government improve efficiency in curative services, enhance public health programs, increase fiscal space through new sources of public revenue, and enable Hong Kong's health insurance markets to serve as more effective pressure valves for the public system.

Another significant obstacle that has hindered Hong Kong's economic development is its high housing costs, which have discouraged many local talents from pursuing their dreams and deterred foreign talents from settling in the city. Wang, Wong, and Wong have studied the reasons for and solutions to the long waiting times for public housing in Hong Kong. The government has introduced the Transitional Housing (TH) and Light Public Housing (LPH) programs to provide short-term housing relief. However, concerns have been raised about the underutilization of these programs, especially in the New Territories. The authors propose using data analytics and computer algorithms to increase the utilization of TH and reduce public housing wait times. They identify reasons for low utilization, such as spatial mismatch between residents and TH projects, and inefficient application processes. To address these issues, the authors recommend

practical and cost-effective policy changes, including leveraging data analysis and market design theory to improve housing matches and increase TH utilization. Implementing a centralized computer algorithm can significantly improve the allocation, utilization, and satisfaction of units when households have diverse preferences for housing options.

Due to the aforementioned socioeconomic issues faced by the city, among other reasons, hundreds of thousands of Hong Kong's working-age population and their families have emigrated abroad. Simultaneously, hundreds of thousands of people, some attracted by the Hong Kong government's ambitious talent programs, have arrived in Hong Kong in the past year. What are the implications of these population flows on the city's labor force and talent pool? Kwan, Tang, and Wong have analyzed LinkedIn profile data and government statistics to evaluate Hong Kong's labor market and economic prospects. The results show that while Hong Kong has experienced a brain drain in recent years, there has also been a significant influx of talent, particularly from Mainland China and the United States. The incoming population is older, better-educated, but less globally connected and ethnically diverse compared to those leaving. Meanwhile, the city's talent pool remains strong and internationally competitive. The authors suggest that Hong Kong can continue to thrive by implementing policies to retain and attract talent. Additionally, Hong Kong should monitor the health of its labor force using a range of administrative and company datasets to improve policy design and counter factually questionable narratives.

The last two chapters explore two important areas that Hong Kong should focus on developing as new international hubs. Under the Chinese Central Government's 14th Five-Year Plan, Hong Kong is expected to strengthen its existing roles and explore new ones as regional or international hubs across eight business areas. Among these areas, intellectual property (IP) trading is perhaps the least understood, despite the gradual shift of global IP activities towards the Asia-Pacific region. Tang and Cheung explain how Hong Kong can become a regional IP trading hub and why such development is crucial for Hong Kong's growth as an innovative and resilient economy. To achieve this, the city should focus on accelerating progress in IP commercialization and financing. Hong Kong can learn from the development experiences of China, the United States, and Singapore. The authors recommend eight strategies for enhancing Hong Kong's ecosystem for IP commercialization, including developing standards for IP-related investments, establishing valuation criteria, strengthening cooperation with the Mainland, and deepening international collaborations.

In the final chapter, Chen examines a crucial determinant of a city's greatness - its role as an aviation hub. He posits that strong international home carriers play a crucial role in promoting their base as a center for travel, tourism, services, and business, as well as making significant contributions to the local economy. Chen highlights the historical importance of cities like Venice, Changan, and Rome as major trade and transportation hubs and draws parallels to modern-day great cities such as London, Singapore, Hong Kong, Tokyo, Dubai, and New York.

The paper emphasizes the importance of maintaining and enhancing Hong Kong's status as an aviation hub, offering suggestions for improving air transport facilities and infrastructure, enhancing the role of home carriers, and developing related industries to ensure the city's continued growth and influence on the world stage.

We aim to utilize this green paper to stimulate policy debates and initiate discussions on how to enhance Hong Kong's competitive positioning, tackle long-standing socioeconomic challenges, and navigate shifts in the global economy. As the subsequent eight chapters will demonstrate, there are abundant opportunities and risks to consider. The crucial aspect lies in capitalizing on the former while mitigating the latter. By collaborating with policymakers and the business community, the thorough and accessible analysis presented by our colleagues in addressing diverse policy issues will hopefully shed light on potential paths forward and uncover new areas for research.
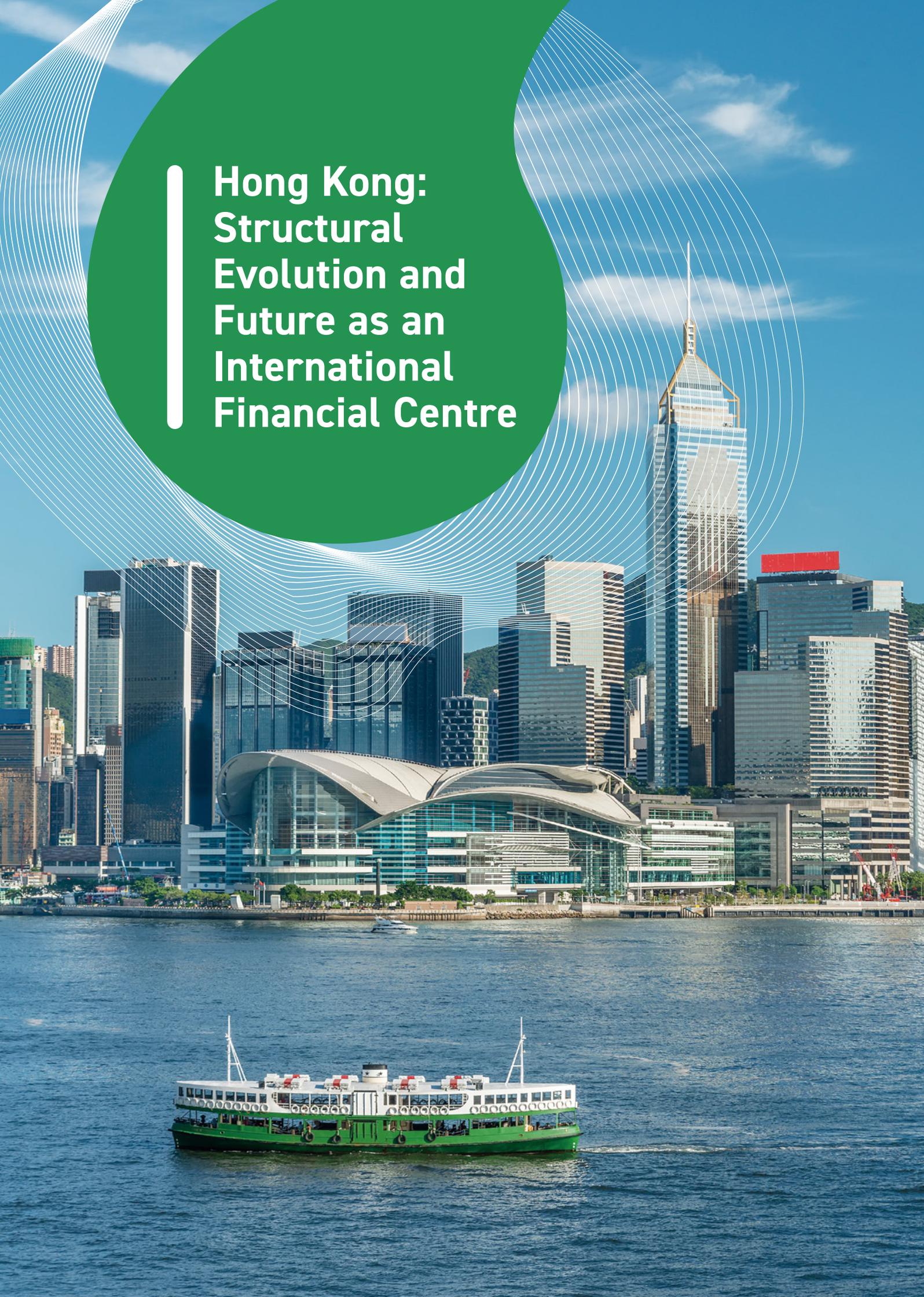
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1 January 2024

Hong Kong: Structural Evolution and Future as an International Financial Centre

Hong Kong: Structural Evolution and Future as an International Financial Centre

Douglas Arner

2023 was a challenging year for Hong Kong's role as an international financial centre. The rapid reopening of both Mainland China and Hong Kong from the beginning of the year fueled high expectations of rapid economic and financial rebounds in both locales. However, recovery has proven slower than expected. This resulted from various structural challenges in the Mainland economy, in particular ongoing problems in the property sector, weak consumer spending, and continuing geopolitical issues. The combination led to slower growth in the Mainland throughout the year. On top of all this, Hong Kong faced rapid increases in US interest rates, which feed directly into the city via the Hong Kong dollar-US dollar linked exchange rate system.

These and other factors have resulted in one of the lowest figures for funds raised through stock exchange initial public offerings (IPOs), which fell to a 20-year low at the end of 2023.[1]

What does the future hold for Hong Kong as an international financial centre?

Looking ahead to 2024, three key elements are central going forward: the factors underlying Hong Kong's evolution into one of the world's major financial centres, the breadth of its role, and structural changes particularly over the period 2019-2023.

Emergence as a major international financial centre

Hong Kong's emergence as a major international financial centre arguably began in October 1987, in the wake of the global market crash triggered by the record 'Black Monday' market drop in the US. The turmoil led to the closure of the Hong Kong Stock Exchange and the Hong Kong Futures Exchange, and the failure and subsequent bailout of the futures clearing house, the Hong Kong Futures Guarantee Corporation.[2]

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1   Hong Kong IPO market revival on the cards amid favourable interest-rate outlook, China policy easing | South China Morning Post (https://www.scmp.com/business/markets/article/3246630/hong-kong-ipo-market-revival-cards-amid-favourable-interest-rate-outlook-china-policy-easing)

2   See D. Arner et al., Financial Markets in Hong Kong: Law and Practice (Oxford University Press 2016 2d ed.)

Following the crash, Hong Kong undertook a comprehensive review of its financial system to address regulatory and infrastructural weaknesses. This led to the creation of the Hong Kong Securities and Futures Commission in 1989 and the creation of Hong Kong Exchanges and Clearing (HKEx), merging the stock, futures and clearing companies into a single company listed on the Hong Kong Stock Exchange. Related to an earlier crisis which led to the establishment of the linked exchange rate system in 1983, the Hong Kong Monetary Authority was established in 1993, combining the functions of monetary system maintenance with banking supervision to form the territory's central bank. This established the fundamental infrastructure for Hong Kong's financial system. This infrastructure was then put to use as China began its process of economic reform and liberalisation, particularly in channelling foreign investment through a familiar legal framework in Hong Kong combined with fundraising by Chinese enterprises from the early 1990s.

By the time of Hong Kong's handover to China and the Asian Financial Crisis, both in 1997, Hong Kong had emerged as a significant regional centre. The Asian Financial Crisis in particular proved a major test of Hong Kong's financial system. It also proved a major opportunity for Hong Kong to enhance its financial regulatory framework and financial infrastructure following the 1997 crisis. This process was supported by a clear foundation elaborated in Hong Kong's Basic Law, which established the One Country, Two Systems arrangement in the context of money and finance. This supported Hong Kong's emergence as one of the world's major financial centres in parallel to the re-emergence of China as one of the world's major economies, particularly from its 2001 accession to the World Trade Organization.

During this period, despite the challenges of the 2008 Global Financial Crisis, Hong Kong experienced significant growth in its role as an international financial centre. After the 2008 crisis, not only did Hong Kong avoid the significant failures of many other jurisdictions, it arguably benefited both from China's post-crisis stimulus and continuing growth, liberalization and reform, as well as international regulatory responses which over time saw major international financial institutions reorganizing around regional structures, including holding companies in Hong Kong and/or Singapore.

From 2008 to 2019, Hong Kong emerged as the major centre for flows in and out of China, as well as for fundraising by Chinese companies and investment into Chinese companies, albeit alongside New York and Shanghai/Shenzhen. Hong Kong also became central to RMB internationalisation efforts. Following significant financial volatility in Mainland China in 2015, Hong Kong's position as the major international nexus for finance in and out of China was strongly reinforced, as efforts to liberalise finance and capital flows in and out of Mainland China slowed.

Up to the first half of 2019, Hong Kong could be seen as one of the world's three leading financial centres, alongside London and New York, with a central role for the entire Asia timezone, a

process which had been reinforced by the re-centering of many regional functions following the 2011 earthquake in Japan.

2019: Highpoint, turning point, or something else?

As an international financial centre, Hong Kong in 2019 was not only a clear leader in equity fundraising (as shown by HKEx IPO volumes) but also in Chinese and foreign company international and regional headquarters, by survey rankings such as those of Z/Yen, and by foreign exchange and derivatives volumes (as documented by the 2019 triennial survey of the Bank for International Settlements[3]).

In summary:

IPOs (2019 full year): 2nd globally, with 183 listings raising USD 40.1 billion[4]

AUM (2019): 20% annual increase to HKD 28.769 trillion (USD 3.694 trillion)[5]

Forex (daily, end April 2019): USD 632 billion (4th)

OTC interest rate derivatives (daily, end April 2019): USD 436 billion (3rd)

The period from 2019-2023 however has proven a major challenge for Hong Kong's role as an international financial centre. It also is a period marked by structural change in the global, regional and Chinese economies, along with the role of Hong Kong.

One could argue that the first half of 2019 will historically be the high point for Hong Kong's role as an international financial centre, after which – as with so many other financial centres throughout history around the world and in Asia – its role declines, to be taken by another. However, for a variety of reasons, I would suggest that this is not currently likely — in spite of the major challenges Hong Kong faced from mid-2019 to end-2022, including domestic instability, COVID and geopolitical tensions.

Rather I would suggest that 2019-2022 may mark a period of structural change for Hong Kong and its role as an international financial centre. This is significant because Hong Kong – and

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3   Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets in 2019 (bis.org) (https://www.bis.org/statistics/rpfx19.htm)

4   Hong Kong's IPO Market: Resilience and Innovation (ft.com) (https://www.ft.com/partnercontent/brandhongkong/hong-kong-ipo-market-resilience-and-innovation.html#:~:text=The%20Hong%20Kong%20stock%20exchange,and%20raised%20US%2440.1bn.)

5   AWMAS_2019_EN.pdf (sfc.hk) (https://www.sfc.hk/web/files/ER/Reports/AWMAS_2019_EN.pdf)

Southern China more generally – have gone through numerous periods of structural change. In Hong Kong these include its establishment (marking a major turning point in the roles of Macau and Canton), the Second World War (marking a major inflection point in the role of the UK), 1987 (as mentioned above) and 1997-2003 (covering the period of the handover, Asian financial crisis, dot-com crisis and SARS).

From the standpoint of 2019-2022, the central structural change stemmed from geopolitical tensions, particularly between the US and China. These however are partially reflective of a longer term evolutionary process, involving the relative reduction in the size of the US economy and the development of an increasingly multipolar global economy, with multiple drivers and multiple centers. In this framing, China – as one of the world's largest economies, major trading nations and leading global investors and investment destination – has re-emerged as one of the driving poles, along with the US and Europe. Other potential drivers – including particularly India and ASEAN/Asia ex China – are also growing and developing rapidly. In this framing, particularly with questions around the reliability of the US-led monetary and financial infrastructure in the wake of the Russia-Ukraine war's outbreak in 2022, each pole is both a financial area and the hinterland for a major financial center to serve its economy and interactions with other poles.

In this framing, Hong Kong and Singapore are competing less directly. Instead, they are more structurally and functionally different, with Hong Kong the centre for China and Singapore for Asia ex China. While China is growing more slowly, it nonetheless will remain one of the major economic and financial poles going forward. At the same time, as Asia ex China grows more rapidly, its need for its own center becomes clearer.

This can be seen from the continuing increase in foreign exchange, derivatives and assets under management in both jurisdictions. Hong Kong is the better center for China related finance while Singapore is much better for ASEAN and much of Asia ex China.

This does however mean structural evolution in both places. For Hong Kong, 2019 was not thus the highwater mark but rather the inflection point.

Looking forward

From this standpoint, what should Hong Kong do to enhance its role as an international financial center?

Clearly, the first must be to focus on maintaining and reinforcing its existing strengths vis-à-vis the Mainland: free movement of capital, information and people, supported by a predictable legal, monetary, financial and regulatory infrastructure. These are the areas where – without continued attention – Hong Kong is potentially at greatest risk of weakening its differentiation and comparative advantage against other competitors. At the same time, it must continue to

reinforce its access with its hinterland – on which all financial centers ultimately depend – in this case, the Mainland. But Hong Kong's role is fundamentally as an intermediary. This in turn requires increasing connections with corridors of continuing financial and economic linkages between the Mainland and the rest of the world (including Europe, North America and ASEAN/ East Asia, particularly the RCEP region) but also seeking to identify emerging areas of potential opportunity (such as the Middle East, Africa and Latin America). It also means continually improving transactional infrastructure, particularly in relation to payments, where increasing multipolarity is an important trend and a major opportunity.

Looking forward, it is clear that Hong Kong's role is – as it has over a number of occasions in the past – evolving in a new direction. Success is by no means certain but central will be the factors of openness, infrastructure, institutions and interconnections which have been central to its success in previous periods.

From the standpoint of the central areas:

Equity markets. It is important to not only maintain transparency, openness and regulatory quality but also to focus on new clients for fundraising and investment. For fundraising, perhaps the best opportunity comes from financing of innovation, technology and sustainable development. Each of these however requires both efforts from HKEx and regulators, and the development of a wider innovation ecosystem centered on Hong Kong,[6] not dissimilar to Silicon Valley. This has long been an objective: linking the technological strength of Shenzhen with the financial markets and infrastructure of Hong Kong. It has however not proven simple. With that said, attention to research and development funding and support as well as physical and data linkages offers the basis of the emerging center.

Assets under management. While AUM has increased (to HKD 30.541 trillion / US$3.912 trillion at end 2022), this is an area where there are both opportunities and risks. Central will be success in attracting Chinese institutional investors as and when they are able to invest more widely. In addition, efforts to attract private wealth are key in this respect. Key to this will be building the human capital necessary to provide necessary levels of expertise and service, an area where progress has been made but more needs to be done.

Structured finance. Central to foreign exchange and OTC derivatives are the attractiveness of Hong Kong's legal and regulatory system, as well as its continued openness vis-à-via the Mainland. Going forward, further development will be heavily impacted by China's growth and flows of funds in and out. Building multipolar payment and treasury management frameworks will also play an important role.

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6   R. Buckley, D. Arner & D. Zetzsche, FinTech: Finance, Technology and Regulation (Cambridge University Press 2024).

Payments and RMB internationalization. The decade-plus long RMB internationalization project was accelerating prior to recent increases in geopolitical tensions, particularly US and European responses to the Russia–Ukraine conflict. In addition to these structural changes, payments and liquidity infrastructure will be key to increasing external use via Hong Kong.[7] Beyond RMB internationalization, there are also wider opportunities to enhance Hong Kong's role as a hub in the emerging multipolar financial system.

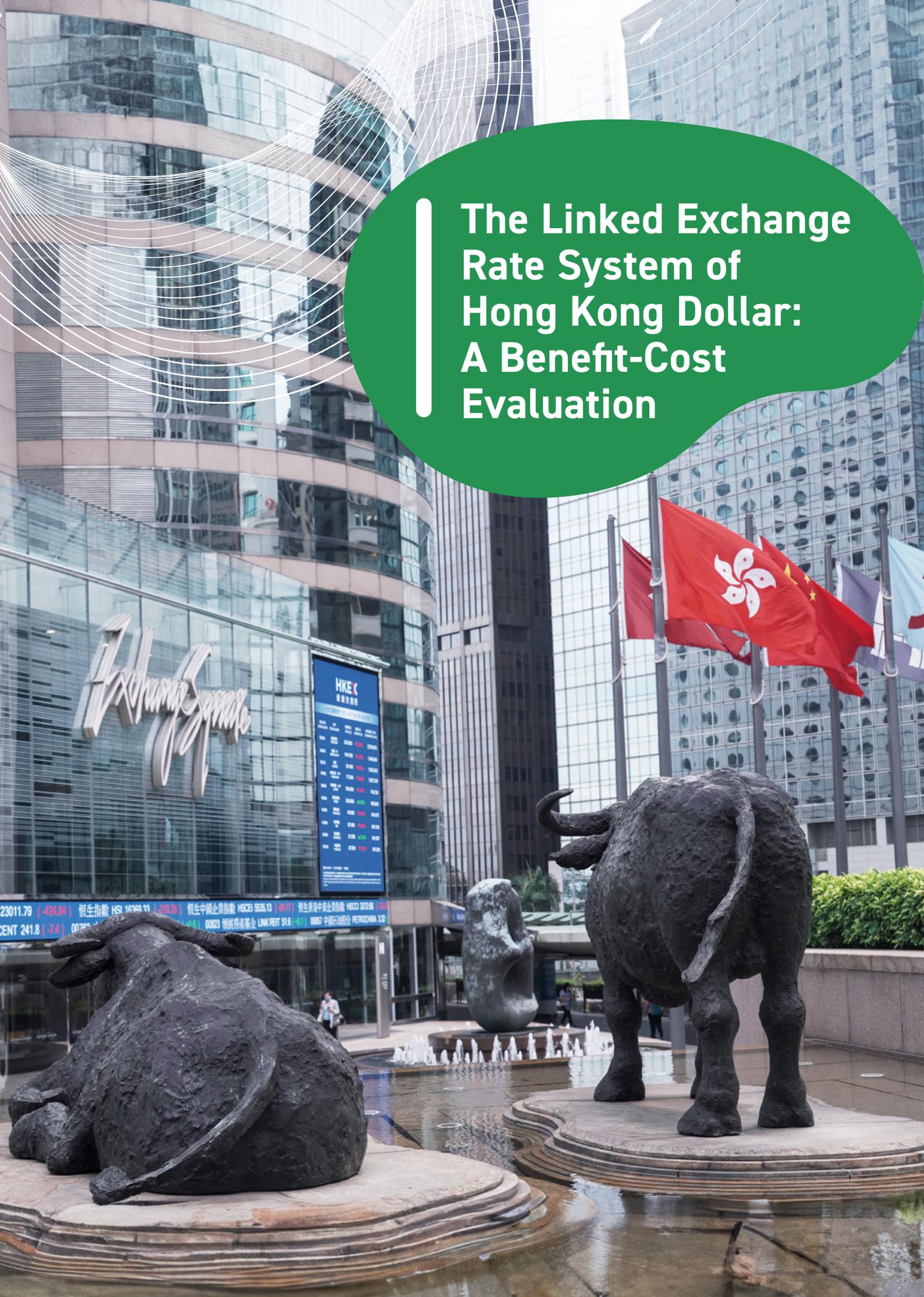7   Ukraine, Sanctions and Central Bank Digital Currencies: The Weaponization of Digital Finance and the End of Global Monetary Hegemony? - AsiaGlobal Papers No. 7 (hku.hk) (https://www.asiaglobalinstitute.hku.hk/news-post/ukraine-sanctions-and-central-bank-digital-currencies-weaponization-digital-finance-and-end-global-monetary-hegemony)

The Linked Exchange Rate System of Hong Kong Dollar: A Benefit-Cost Evaluation

The Linked Exchange Rate System of Hong Kong Dollar: A Benefit-Cost Evaluation

Xiang Fang   Yang Liu

Hong Kong has had a linked exchange rate system with the US Dollar (USD) since 1983. Over the past 40 years, this system has operated stably and successfully weathered major challenges such as the 1997-98 Asian financial crisis and the 2007-08 global financial crisis. To mark the 40th anniversary of the linked exchange rate system, this article explores the current status and development of the system in the new international economic situation. Based on the latest academic research in international economics, we quantitatively analyze the gains and losses for Hong Kong under different exchange rate systems.

1.   The linked exchange rate system

Under the current linked exchange rate system in Hong Kong, the exchange rate of the Hong Kong dollar to the US dollar is maintained within a narrow range of 7.75 to 7.85 HKD per USD. Unlike many other fixed exchange rate economies, Hong Kong's monetary base is 100% backed by US dollar assets, meaning any changes in the monetary base are accompanied by corresponding changes in the quantity of US dollar assets held by the Hong Kong Monetary Authority's Exchange Fund. The ample international reserves provide a solid foundation for implementing the linked exchange rate system smoothly. The system is implemented through the Convertibility Undertakings provided by the Hong Kong Monetary Authority: the authority commits to sell Hong Kong dollars at the strong-side Convertibility Undertaking of 7.75 HKD per USD and to buy Hong Kong dollars at the weak-side Convertibility Undertaking of 7.85 HKD per USD. When there is excess (insufficient) demand for Hong Kong dollars, the Monetary Authority sells (buys) Hong Kong dollars in the market to stabilize its price. Over the past 40 years, although the linked exchange rate system has undergone several technical adjustments, it has operated smoothly overall. As shown in Figure 1, the exchange rate of the Hong Kong dollar to the US dollar has successfully remained within the target range.

Figure 1. HKD/USD Exchange Rate
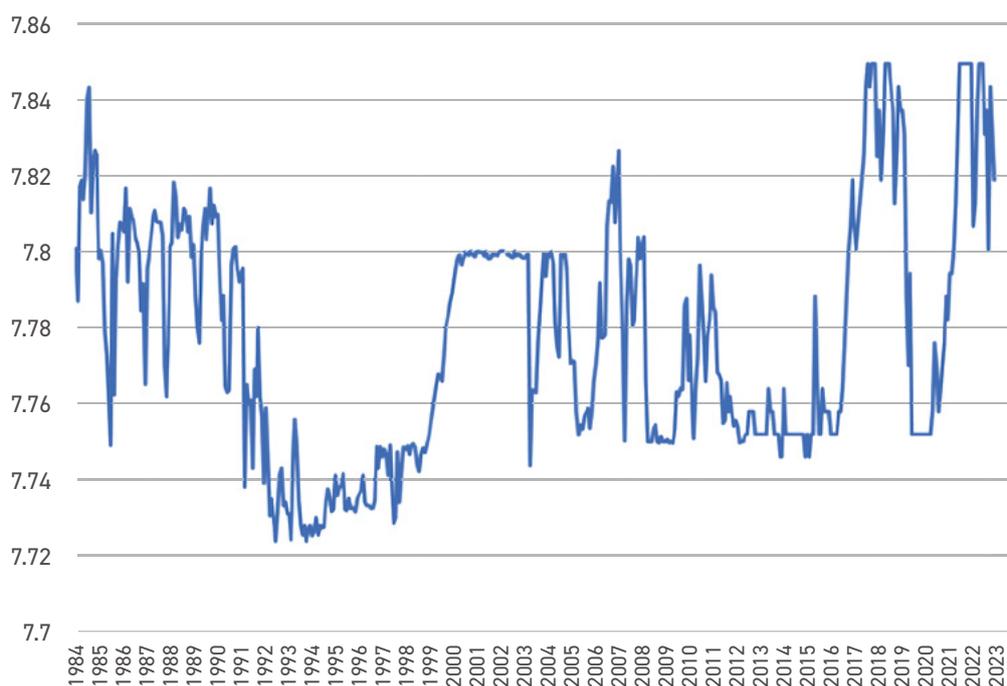
Source: Global Financial Database.

In recent years, there have been significant changes in the international economic and political environment, leading some to suggest that Hong Kong should consider adjusting its linked exchange rate system. The two most important changes are the increasingly frequent economic and trade linkages between Hong Kong and the mainland, and the growing complexity of US-China relations. In addition, the US Federal Reserve has raised interest rates from zero to over 5% in the 17 months from March 2022 to July 2023. Although Hong Kong has not experienced the same level of inflationary pressure as the US, due to the linked exchange rate system, it is forced to raise interest rates, which is detrimental to the local economy. The exchange rate of the Hong Kong dollar to the US dollar reached the weak-side Convertibility Undertaking of 7.85 HKD per USD several times in the past few years. Hong Kong's foreign exchange reserves have declined by 15% since their peak in 2021. Several well-known hedge funds have publicly announced that they are shorting the Hong Kong dollar through options positions, betting that the current linked exchange rate system will come to an end. The linked exchange rate system is indeed facing challenges.

However, we believe that the international economic and political challenges facing Hong Kong are temporary, while the benefits brought by the linked exchange rate system will be more long-lasting.

In the following sections, we will explore various aspects of the Hong Kong exchange rate system. Section 2 discusses the benefits of the linked exchange rate system for Hong Kong's financial and trade sectors. Section 3 explains why the benefits of a floating exchange rate for the Hong Kong dollar have not been as significant as anticipated. Section 4 highlights the challenges faced in maintaining the linked exchange rate system and proposes possible solutions. Section 5 analyzes the possibility of linking the Hong Kong dollar to the Chinese renminbi.

## 2.   The benefits of the linked exchange rate system

International Finance

As an international financial center, Hong Kong is an important financing platform for businesses, attracting a large amount of funds from around the world. In 2022, Hong Kong's foreign debt financing reached $1.5 trillion, four times the GDP, and significantly higher than equity financing. The robust development of debt financing could not have been achieved without the linked exchange rate system.

First, if Hong Kong were to abandon the linked exchange rate system, businesses would face significant limitations in their financing capabilities. Recent research has shown that debt investors have a strong currency preference and tend to hold bonds denominated in their home currency. As shown in Figure 2 (left), domestic investors in various countries hold around 90% of their own currency bonds, and for US investors, this proportion is close to 100%. In comparison, foreign investors generally do not hold bonds denominated in the issuing country's currency, but instead seek bonds denominated in their own currency. Therefore, if the Hong Kong dollar were floating, businesses would struggle to attract foreign investors through Hong Kong dollar debt and would need to issue foreign currency debt such as US dollars, euros, pounds, or yen to attract the corresponding investors. Large enterprises would face higher financing costs and risks, while small enterprises would have no choices. Further research has found that even in developed countries, small and medium-sized enterprises in Europe, the UK, and Canada find it challenging to issue foreign currency debt and can only rely on US dollar debt to attract foreign investors. In sharp contrast, small and medium-sized enterprises in the US can easily obtain financing from abroad through US dollar debt. This is one of the many advantages of the US-dominated international financial system for the United States. Under the current linked exchange rate system, businesses in Hong Kong also enjoy this financing advantage.

Figure 2. Share of Bonds Denominated in the local currency

Share of Bonds Denominated in the local currency out of all domestic investment — Share of Bonds Denominated in the local currency out of all foreign investment
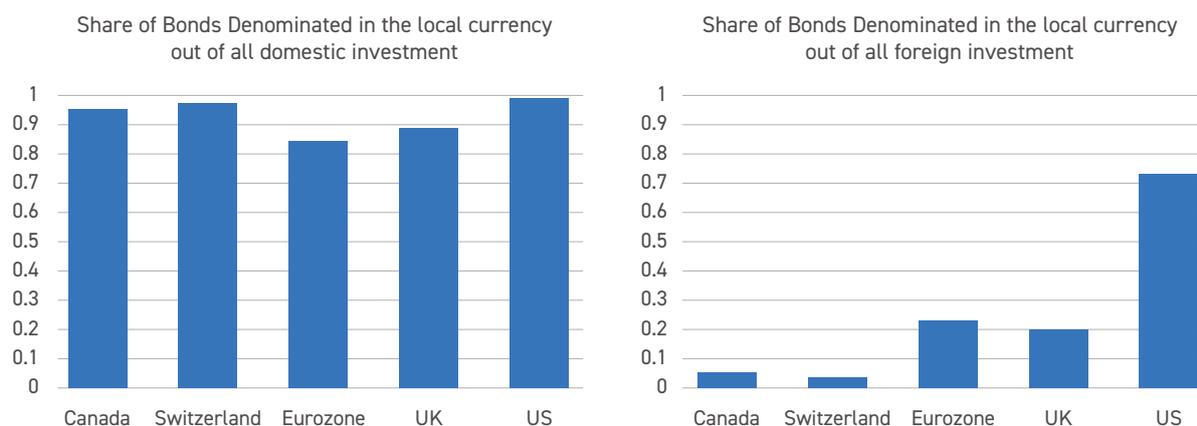
Source: Maggiori, M., Neiman, B., & Schreger, J. (2020).

Second, issuing foreign currency debt exposes businesses to significant exchange rate risk. When the Hong Kong dollar depreciates, the amount of foreign currency debt to be repaid remains the same, but rises for local currency debt. One of the important advantages of debt as a fixed-income financial instrument is certainty. However, foreign currency debt generates high uncertainty in terms of cash flows, which is unfavorable for businesses' production, investment, financing, and other decision-making processes. According to Figure 2 (right), 73% of external debt for US companies is denominated in US dollars, while other countries, including eurozone countries, can only issue 20% of their debt in their own currency, exposing the remaining 80% in foreign currency debt to exchange rate risk. This suggests that decoupling the Hong Kong dollar from the US dollar would lead to $1.2 trillion (HKD 9.4 trillion) of currency risk exposure for Hong Kong, out of its $1.5 trillion debt. Assuming a general annual exchange rate fluctuation of 10%, there is a 30% chance that the Hong Kong dollar will depreciate by 10% within a year (one standard deviation). Even if the amount of debt denominated in foreign currency remains fixed, this would lead to a rise of HKD 900 billion in Hong Kong dollar-denominated debt, equivalent to 34% of the GDP, creating systemic risk. While businesses have hedging methods available, these methods come at a higher cost, and in practice, not many companies fully hedge their exposure.

In addition to increasing financing channels and eliminating exchange rate risk, pegging to the US dollar also has the advantage of lower financing costs. The US dollar is considered a safe-haven asset and attracts a lot of capital. While the traditional view is that this advantage is mainly reflected in US Treasury bonds, recent studies have found that this effect also extends to all fixed-income products denominated in US dollars. Compared to other currency bonds with the same risk, US dollar bonds have an average yield reduction of 1.8% – an extremely attractive

advantage. The additional discount enjoyed by US Treasury bonds over US dollar bonds is only around 0.2%. Hong Kong dollar bonds can partially enjoy the low financing cost advantage of US dollar bonds. Hong Kong businesses can choose to finance in US dollars without being exposed to exchange rate risk. In contrast, companies in other countries have to bear exchange rate risk to enjoy the low-cost advantage of US dollar bonds.

The various financing advantages mentioned above not only benefit the businesses and individuals seeking financing, but also contribute to the development of Hong Kong's financial institutions. One-fifth of Hong Kong's GDP comes from the financial industry, and the prosperity of the financial sector largely depends on financing activities, financial transactions, and capital flows. While capital and financing may come from all over the world, the value created through financial activities benefits the local economy and people in Hong Kong. The linked exchange rate system creates favorable conditions for capital to choose Hong Kong, as it eliminates concerns about exchange rate risk and increases demand for Hong Kong dollar assets among investors. This helps attract international capital inflows and financial transactions, further driving the prosperity of Hong Kong's financial industry and the overall economy.

International Trade

As an important international trade hub, Hong Kong's trade volume is more than four times its GDP. Few other major economies have trade volumes exceeding their GDP. Trade, like finance, accounts for one-fifth of Hong Kong's GDP and plays a crucial role in driving the development of the entire economic system. In an economy highly dependent on trade, exchange rate fluctuations have a significant impact on companies' income and profits. Due to the lower risk of local business activities compared to international trade, companies often hesitate to engage in international trade due to exchange rate volatility, which affects the breadth and development potential of the entire market. Although there are financial instruments that can help companies hedge against exchange rate risk, these tools often come with high costs, making the cost of reducing exchange rate risk quite substantial. The linked exchange rate system adopted by Hong Kong provides free risk hedging for import-export companies, and creating a relatively stable exchange rate environment for businesses.

Entrepot trade accounts for a large proportion of Hong Kong's international trade, as Hong Kong plays the role of trade intermediary and logistics center. In trade settlement, currencies of other countries and regions, including the Chinese yuan, have a certain proportion besides the Hong Kong dollar and the US dollar. Some traditional views advocate pegging to a basket of currencies weighted by trade volume to reduce exchange rate risk. However, recent studies have shown that regardless of the currency used for settlement, the price of goods in international trade remains stable against the US dollar. In other words, using local currency for settlement does not eliminate exchange rate risk in trade, and the best way to reduce risk is to peg to the US dollar.

According to research, fixed exchange rate systems increase bilateral trade volume by 38% compared to floating exchange rate systems under the same conditions. Based on the existing trade volume and its contribution to GDP, the stable trade environment brought about by the fixed exchange rate has significantly increased Hong Kong's total import and export trade volume, as well as the value added of the trade industry, resulting in an 8% increase in Hong Kong's GDP. However, in recent years, Hong Kong's port cargo throughput has declined, which may indicate that Hong Kong's position in the international trade arena is facing challenges. In the current diversified and highly competitive international trade market, Hong Kong's linked exchange rate system can maintain its core competitiveness and position as an international trade center.

3. The gains and costs of a floating currency

The often criticized downside of fixed exchange rates is central banks' loss of autonomy in monetary policy. For example, from March 2022 to July 2023, the US Federal Reserve raised the federal funds rate from zero to 5.25% to address high inflationary pressures. Due to the linked exchange rate system, Hong Kong is forced to raise interest rates at the same pace, despite facing different inflationary pressures than the United States. This passive monetary policy may be inconsistent with the policy objectives of the local economy and may even result in efficiency losses in local investment and financing activities. Over the past 25 years, the correlation between inflation in Hong Kong and the United States has been only -0.02. Similarly, during a downturn in the local economy, Hong Kong does not have a flexible monetary policy to stimulate the economy or rescue the financial markets.

In this section, we argue that international financial centers like Hong Kong have limited autonomy of monetary policy, even with exchange rate fluctuations. Based on Hong Kong's primary involvement in entrepot trade, the role of monetary policy in stimulating the economy should not be overestimated.

The global financial spillovers to floaters

In recent years, global financial markets have become increasingly integrated, and cross-border capital flows have grown rapidly. According to recent research, global capital flows and the prices of risk assets are driven by the same common factors and are highly correlated with US monetary policy. When the Federal Reserve raises the federal funds rate by 1%, global risk asset prices decline by 8%, and both domestic and foreign credit in various countries decrease by 5%. This phenomenon is equally applicable to countries with floating exchange rates, which has led people to reassess the advantages of floating exchange rates. The floating exchange rate regime is not as capable as traditional views suggest of absorbing external economic shocks and protecting domestic financial markets from external economic disturbances.

One of the transmission mechanisms through which US monetary policy has a strong cross-border impact is its influence on the risk appetite of international investors. As the dominant currency in global capital markets, any changes in US dollar interest rates can alter the risk-taking behavior of international investors, particularly institutional investors. Studies have shown that US rate hikes significantly decrease investors' risk appetite. As an international financial center, Hong Kong has long been subject to substantial inflows and outflows of capital. Even with a floating exchange rate regime, Hong Kong would naturally be influenced by US monetary policy through the risk-taking preferences of international investors.

Many expect that adopting a floating exchange rate regime will restore autonomy of monetary policy. However, in reality, countries with floating exchange rates also have limited autonomy in monetary policy. According to research, the dependency of interest rate changes in floating exchange rate countries on changes in the US federal funds rate is 0.54. This means that if the Federal Reserve raises the federal funds rate by 25 basis points, on average, floating exchange rate countries will increase their policy rates by 13 basis points.

From another perspective, for local financial market participants, actual borrowing and lending rates are more important than the direct policy rates of the central bank. The spread between the actual borrowing and lending rates and the central bank policy rates reflects the supply of and demand for funds and the liquidity situation in the market. Taking Hong Kong's interbank rate (HIBOR) as an example, Figure 3 shows that its correlation with the US federal funds rate is as high as 0.93. In comparison, the correlation between the US interbank rate (LIBOR) and the federal funds rate is 0.99, while the correlations between the interbank rates of other major floating exchange rate economies such as the pound, euro, and yen and the federal funds rate are 0.90, 0.80, and 0.67, respectively. Although these economies all adopt floating exchange rate regimes, their interest rates are highly correlated with US interest rates, similar to Hong Kong. In comparison to interest rate levels, interest rate changes can better reflect the degree of linkage between short-term interest rate fluctuations in various countries. If we assess the correlation between changes in interbank rates and changes in the federal funds rate, the correlation for the Hong Kong dollar is only 0.24, while the correlations for the US dollar, pound, euro, and yen are 0.52, 0.20, 0.27, and 0.14, respectively.

Figure 3 conveys two important messages. First, even under a floating exchange rate regime, there is still a high correlation between interbank lending rates and the US federal funds rate. Second, there is a low correlation between the actual Hong Kong dollar interbank rate changes and changes in the US federal funds rate. This difference reflects the supply and demand factors in the local financial market and indicates that there is still room for adjustment of Hong Kong dollar interest rates even under the linked exchange rate system.

Figure 3. Correlation between the US Federal Funds Rate and the Interbank Rate
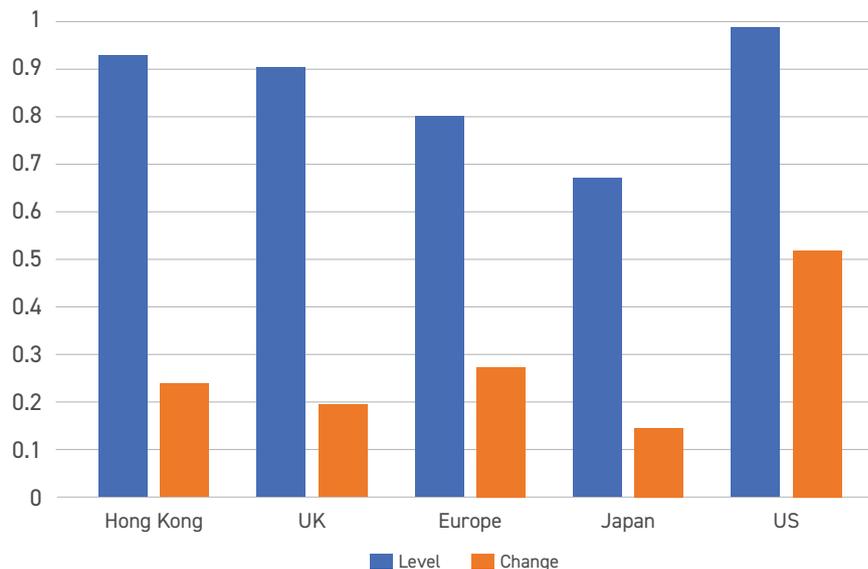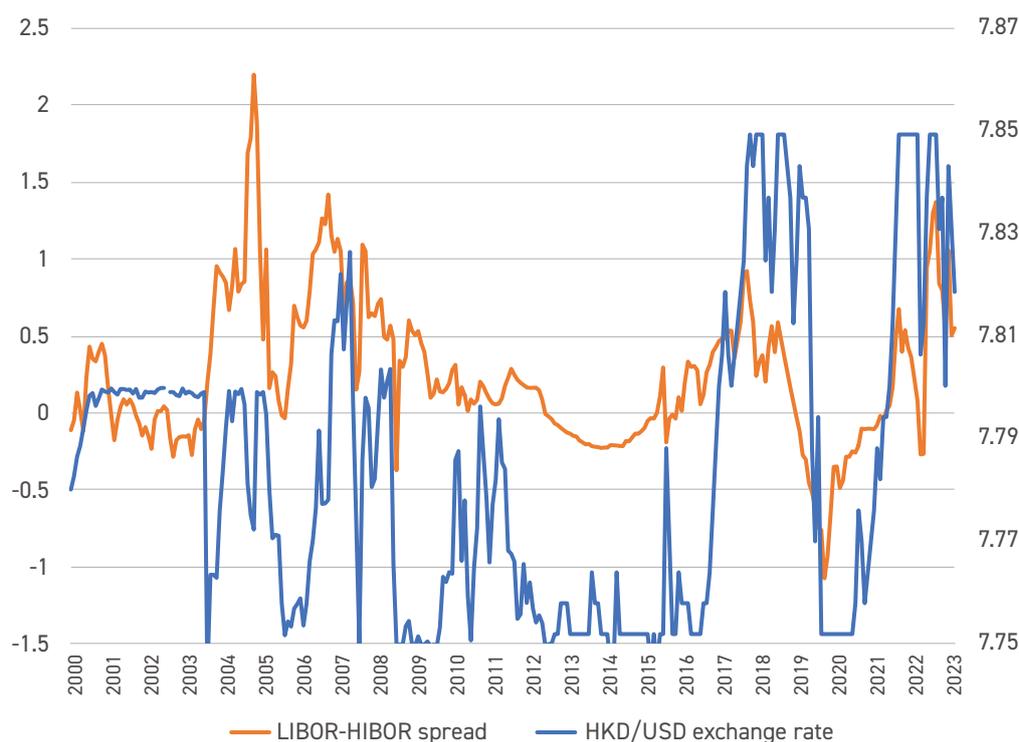

Source: Global Financial Database.

Figure 4 further explains the significant economic and financial market conditions reflected in the differences between US dollar and Hong Kong dollar interbank rates, which are related to the fluctuations of the Hong Kong dollar exchange rate. The left axis of the chart shows the difference between US dollar and Hong Kong dollar interbank rates, and the right axis shows the exchange rate. When the Hong Kong dollar interbank rate is higher than the US dollar rate, it usually suggests that there is strong demand in the Hong Kong dollar market, which can lead to capital inflows to the Hong Kong dollar market and a subsequent appreciation of the Hong Kong dollar. This mechanism still works even when the Hong Kong dollar exchange rate approaches the weak-side Convertibility Undertaking of 7.85 Hong Kong dollars per US dollar: the Hong Kong dollar will immediately appreciate when interbank lending rates rise.

Figure 4. LIBOR-HIBOR Spread and the HKD/USD Exchange Rate

Source: Global Financial Database.

The benefits of monetary autonomy are limited for Hong Kong

The previous analysis shows that a floating Hong Kong dollar cannot give Hong Kong a high degree of monetary policy autonomy. In this section, we further explain that autonomous monetary policy and floating exchange rates have limited benefits for Hong Kong. The traditional view is that if a central bank can autonomously formulate monetary policy, then monetary policy can adjust local employment and inflation, while a floating exchange rate can achieve external balance. However, this logic only applies to large countries where manufacturing of tradable goods is the main production, not to economies like Hong Kong, where re-export trade is the main activity. Standing in the middle of the global value chain, Hong Kong plays an important role in the trade of products between mainland China and other countries. The final import and export quantities still depend heavily on the supply and demand relationship between the final places of production and sale. A floating Hong Kong dollar can only change the relative prices of the value-added part in Hong Kong – a small proportion of the overall trade volume. Therefore, the prices of imports and exports are mainly affected by the exchange rate between the final place of production and the final place of sale, rather than the Hong Kong dollar as a transit point.

Furthermore, the majority of global commodity trade is priced in US dollars, making import and export prices relatively stable against the US dollar. Therefore, a unilateral depreciation of the Hong Kong dollar cannot promote exports because the prices paid by consumers do not decrease due to the depreciation of the Hong Kong dollar exchange rate. This factor further diminishes the benefits of a floating Hong Kong dollar.

4.   Managing the linked exchange rate system

Managing a linked exchange rate system is not costless, as demonstrated by the challenges faced during the 1997-98 Asian financial crisis. Multiple currencies in Southeast Asia came under speculative attacks, and some abandoned their linked exchange rate systems. Hong Kong overcame this crisis and continues to maintain a well-functioning linked exchange rate system. However, this experience reminds us to be prepared to face the challenges of managing a linked exchange rate system at all times.

Reserves must be ample

Under the existing linked exchange rate system, the monetary base in Hong Kong is fully backed by the US dollar assets of the Exchange Fund of the Hong Kong Monetary Authority. This US dollar asset backing is crucial for maintaining investors' confidence in the linked exchange rate system. The Hong Kong Monetary Authority must hold sufficient reserves to prevent possible massive capital outflows and establish investor confidence in maintaining the Hong Kong dollar linked exchange rate system.

Currently, the Hong Kong Monetary Authority's reserve assets amount to HKD 3.5 trillion, which is six times the money in circulation, twice the monetary base, and 40% of broad money (M3). This level of reserve assets appears sufficient to handle day-to-day capital flows. Worryingly, since peaking in 2021, reserve assets have declined by 15%. Figure 5 shows the recent changes in Hong Kong's reserve assets, indicating a significant decline. Continued capital outflows could jeopardize investor confidence in the Hong Kong dollar linked exchange rate and lead to further capital outflows. In such a situation, higher levels of reserve assets can help alleviate investor concerns.

However, if we examine another indicator, the ratio of reserve assets to broad money (M3), the current situation is not unprecedented. This ratio has decreased from 0.50 in 2021 to the current 0.4, but in the past, Hong Kong has experienced two instances where this ratio dropped to even lower levels, once during the SARS period in 2003 and once during the 2007-08 global financial crisis. While the significant decrease in foreign exchange reserve assets does serve as a warning to monetary authorities and requires attention to capital outflow pressures, we still have confidence in Hong Kong's ability to overcome the current situation.

Figure 5. Foreign Reserve

Total amount of foreign reserve asset
(billions of HKD)

Foreign reserve asset / M3
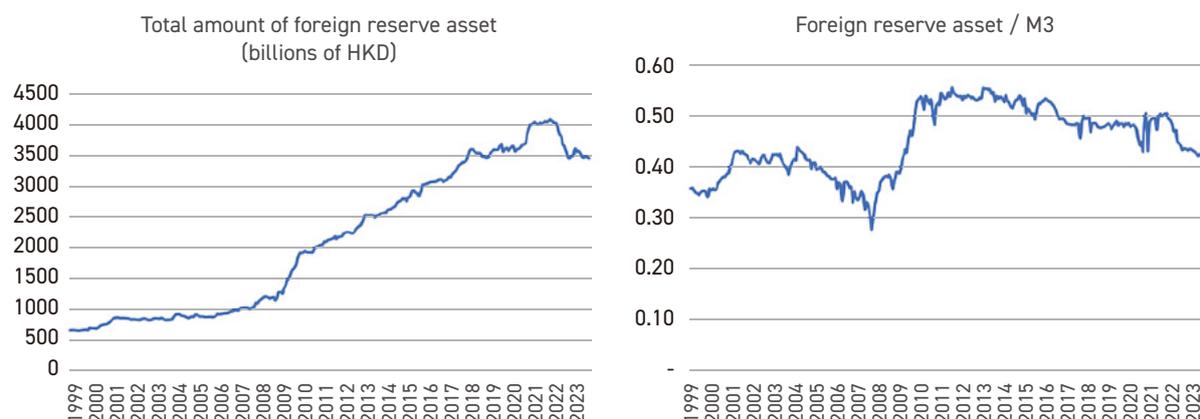
Source: HKMA

Confidence

Confidence, as emphasized earlier, is a key factor in maintaining the smooth operation of a linked exchange rate system. If investors do not believe in the sustainability of the linked exchange rate system, it can quickly collapse. Building investor confidence takes time and effort, but breaking investor confidence only takes one deviation from commitments. The Hong Kong and central governments' steadfast commitment to maintaining the linked exchange rate system during past crises has been an important assurance for investors' confidence in this system.

There have been discussions suggesting that the linked exchange rate system may not be sustainable or should be adjusted or even replaced, especially in the current context of frequent economic and political tensions between China and the United States. Indeed, the economic and trade frictions have diminished the benefits of the linked exchange rate system for Hong Kong. However, we believe that these frictions are temporary compared to long-term development, and the perseverance in maintaining the linked exchange rate system in this challenging environment will instill greater confidence in the stability of the Hong Kong dollar among investors in the future.

5. The Possibility of Linking to the Chinese Renminbi

Hong Kong's exchange rate system, in addition to the existing linked exchange rate system and floating exchange rate, can also adopt other forms of fixed exchange rate. Some viewpoints support Hong Kong's pegging to the renminbi, mainly based on several reasons such as trade and the internationalization of the renminbi.

First, pegging with the renminbi can promote trade between the Mainland and Hong Kong. Hong Kong's exports to the Mainland account for half of its total external trade. However, due to the dominant position of the US dollar in international trade, the volume of trade denominated in US dollars still far exceeds that in renminbi. Additionally, due to the nature of re-export trade, Mainland trading firms still need to consider US dollar settlements when pricing and invoicing for the next stage. Since goods prices are relatively stable with respect to the US dollar, the exchange rate risk faced by Mainland enterprises and Hong Kong trading companies is similar to that under the current linked exchange rate system. Therefore, pegging with the renminbi may have limited impact on the overall trade volume, even if trade with the Mainland increases. The analysis above is based on the current situation of currency settlement and pricing in trade. As the renminbi continues to increase its presence in trade settlement, if it were to dominate both ends of re-export trade in the future and goods prices remain stable with respect to the renminbi, the trade advantages of pegging with the renminbi could gradually emerge.

On the other hand, it remains uncertain whether pegging the Hong Kong dollar to the renminbi would significantly contribute to the internationalization of the renminbi. Hong Kong serves as a hub for offshore renminbi, and most measures to promote the internationalization of the renminbi can already be targeted towards offshore renminbi under the current system. These measures include expanding the use of renminbi in international trade, investment, and international reserves, as well as cross-border payment and clearing. Pegging the Hong Kong dollar to the renminbi would essentially align it with offshore renminbi. However, many financial assets currently denominated in Hong Kong dollars will be priced in US dollars rather than renminbi. This limits the impact on enhancing the role of the renminbi in the international financial system.

Pegging the Hong Kong dollar to the renminbi could also present operational challenges and mishandling could lead to systemic financial risks. International capital would be hindered by capital controls, making it difficult to engage in currency speculation targeting onshore renminbi. The Hong Kong dollar, pegged to the renminbi, has greater market depth, better liquidity, and a more comprehensive development of financial derivatives, making it a more direct target for speculation. In such a scenario, the government would need to use more foreign exchange reserves to maintain the value of the Hong Kong dollar, potentially creating hidden risks within the financial system.

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Income Inequality in Hong Kong

Income Inequality in Hong Kong

Eric Fong   Yulin Hong   Lichen Zhang   Xiaodong Zhu

1.   Introduction

Hong Kong was Milton Friedman's "favorite economy," as he believed it was the "freest" in the world with minimal government involvement. This idea of a free market with minimal government interference was first suggested by John Cowperthwaite, the colony's Financial Secretary, in the 1960s. The city's Financial Secretaries in the decades since have followed this golden rule without challenge. Sixty years after Friedman's visit to Hong Kong, the city is a key financial center in the Far East and has the second most billionaires in the world after New York, according to Forbes in 2023. It is also one of the world's richest cities, with a GDP per capita of $49,800 in US dollars as of 2021.

However, alongside this economic success, Hong Kong faces significant social challenges. Its housing market is the most expensive in the world. The high cost of housing has resulted in a homeownership rate of only 51.5% in 2022, compared to 89.3% in its competing sister city, Singapore. An estimated 220,000 people live in subdivided flats with living spaces as small as 30 square feet. Among them, approximately 34,000 are children.[1] Behind Hong Kong's housing inequality lies high income inequality, with the Gini coefficient of household income surpassing that of both San Francisco and London. This disparity has been suggested as one of the primary factors contributing to the major social unrest witnessed in Hong Kong in 2019.

Despite regular media coverage of income inequality in Hong Kong, there is a lack of comprehensive analysis on the city's cross-sectional inequality, including wages, individual earnings, household income, and government transfers. In this paper, we provide a systematic and multifaceted analysis of economic inequality based on Hong Kong Census data from 1981 to 2016, covering approximately 94,000 households per wave, or 5% of total households. Our data allows us to explore inequality trends before and after Hong Kong's 1997 handover. Such

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1   Source: https://www.scmp.com/yp/discover/news/hong-kong/article/3235398/hong-kong-set-open-community-living-room-residents-subdivided-flats-years-end.

discussion is important because excessive income inequality can erode social cohesion and lead to political polarization and social instability, making it a significant public policy concern.[2]

In this study, we aim to identify the changes in patterns of individual wages and household earnings in Hong Kong over the past 25 years. We find that the growing wage inequality may be driven by high-income earners, who contribute to higher overall household inequality. Despite the rising median household income, our findings suggest that the income of the poorest households is regressing. Together, these findings paint a picture of economic inequality in Hong Kong. However, there are some surprising findings as well. We observe greater gender wage equalization and find that government transfers have played a more significant role since the handover of Hong Kong. We also find that the wage gap between high-skilled and low-skilled workers have declined in Hong Kong, due to the government's investment in higher education that resulted in large expansions of college enrollment. These findings suggest that without government intervention, inequality in Hong Kong may be even higher. The idea of minimal government interference may no longer hold true in the area of income distribution in this city.

2.   Historical and Institutional Background

Before the Korean War in the 1950s, Hong Kong served as an entrepot. According to Sung's (1986) estimation based on historical records of the Hong Kong government, approximately 80% of the imports from mainland China to Hong Kong were re-exported prior to the Korean War. This volume represented 16% of China's total exports at that time. However, the role of re-exportation began to decline after the United Nations imposed an embargo on trade with China in 1951.

In response to the decline of Hong Kong's entrepot role, the city's manufacturing industries experienced rapid growth during the 1950s and 1960s. The influx of manufacturers and capital from mainland China during the civil war provided the necessary know-how and resources for industry development. In his classic work on emigrant entrepreneurs from Shanghai in Hong Kong, Wong (1988) depicted how the Shanghai textile industry reestablished itself in Hong Kong after 1949, becoming the cornerstone of the Hong Kong economy in the 1950s and 1960s. The industry expanded from 132,000 spindles in 1950 to 900,000 in 1970. Additionally, related industries such as toy and watch production experienced rapid growth.

The growing manufacturing base and the increased demand for a large volume of low-paid unskilled workers led many refugees fleeing China to fill these positions. This classic scenario

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2   See related discussions on inequality by IMF (https://www.imf.org/en/Topics/Inequality/introduction-to-inequality) and the Brookings Institution (https://www.brookings.edu/articles/rising-inequality-a-major-issue-of-our-time/).

of industrialization contributed to income inequality, with a clear division between labor and capital. Partly due to poor working and housing conditions among the workers, as well as the rampant corruption within the city during its rapid industrialization, and partly influenced by the Chinese Cultural Revolution (Yep 2023), major civil unrest erupted in Hong Kong in 1967. This unrest resulted in significant violence, leading to 51 deaths and close to 5,000 arrests.

Sir Murray MacLehose's November 1971 arrival as the new governor marked the start of government efforts to rebuild the colonial city following the 1960s unrest. MacLehose introduced policies that laid the foundation for the thriving Hong Kong economy in the decades to come, including implementing nine years of compulsory education and a ten-year housing program, establishing of the Independent Commission Against Corruption, and creating satellite new towns such as Sha Tin and Tuen Mun. In the 1980s, Hong Kong, along with Singapore, South Korea, and Taiwan, became collectively known as the Four Asian Tigers.

With the onset of economic reforms in China in the late 1970s, jobs in Hong Kong gradually shifted to mainland China as foreign investment was encouraged. Simultaneously, the expansion of education in Hong Kong during the 1980s led to an increase in the proportion of the labor force that had completed higher education. After Hong Kong's return to mainland China in 1997, there was an influx of highly educated migrants from the mainland seeking economic opportunities. The supply of highly educated labor exceeded the demand, leading to limited returns on higher education.

Income inequality in Hong Kong was accompanied by gender income disparity in the 1960s and 1970s. As the center of manufacturing industries, a large number of low-paid female workers were recruited, as described by Salaff (1995) in her well-known account of female factory workers in Hong Kong during the 1970s. This employment pattern exacerbated gender inequality. However, the growth of service industries in the 1980s created a large number of low-paying jobs for both males and females. Fan and Lui (2003) demonstrated that the transformation from a manufacturing to a service-oriented economy, coupled with a lower gender wage gap in services, helped narrow the gender income gap in Hong Kong.

The narrowing gender income gap was further reinforced by legislation as society became more aware of gender-related issues. The Equal Opportunities Commission, established in 1996, immediately implemented the Sex Discrimination Ordinance of 1995. The Commission played a vital role in raising awareness of gender issues and handling complaints of gender discrimination. Female workers have benefited from this increased social awareness, resulting in a considerable reduction in gender income inequality.

Although the Hong Kong government has adhered to a laissez-faire policy, it has made efforts to assist those in poverty through various programs. The "Comprehensive Social Security Assistance" (CSSA) program was initiated in 1993 to provide support to those in need. This

program was renamed from the previously established Public Assistance program, which began in 1971. Over the years, the amount of support and eligibility criteria of the CSSA program have been revised to adapt to changes in the economy. In addition to this program, the government has implemented the Working Family Allowance Scheme, which provides allowances to households based on the parents' working hours, as well as a monthly allowance for each child. Furthermore, schemes such as the Kindergarten and Child Care Center Fee Remission Scheme and the Grant for School-related Expenses for Kindergarten Students have been introduced to assist families in need. Various assistance schemes also provide support for children in primary, secondary, and tertiary education, including funding for continuing education. These programs have been implemented to support households with limited resources. However, critics argue that the support provided to households has been limited.

3.   Measuring Inequality in Hong Kong

Our paper uses Hong Kong Census/By-Census data (Census data), which collects 1 percent (before 1991) or 5 percent (after 1991) samples of the total population in Hong Kong. We include eight waves of Census data: 1981, 1986, 1991, 1996, 2001, 2006, 2011, and 2016. The basic unit of observation is a housing unit, so we report Census statistics on inequality at the household level rather than the family level. On average, there are nearly 94,000 households per wave (except 1981, 1986). Census data includes detailed demographic characteristics for each household member and income variables for individuals aged 15 or older.

Following the methodology from Heathcote, Perri, and Violante (2010) and Heathcote, Perri, Violante, and Zhang (2023), we use the household budget constraint as an organizing device and construct different samples for analyzing income inequality at different levels.[3]

We start with individual wages. Then we incorporated individual labor supply to study earnings, added other household members to analyze household earnings, and moved to broader income measures by including unearned income (e.g. rent, interest, and dividend income), private transfers, and government transfers. Our data enables us to explore inequality trends before and after Hong Kong's 1997 handover. We summarize our five key findings as follows.

3.1   Wage inequality widens and highest earners pull away

Monthly income from primary employment offers a simple yet significant perspective on inequality, as wages and salaries constitute the largest income component for most Hong Kong residents, excluding a small fraction of the ultra-wealthy.

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3   An appendix on data and method is available from the authors upon request.

Figure 1 illustrates an overall increase in wage inequality from the early 1990s to 2011, as evidenced by the variance of log and Gini coefficient, irrespective of gender. A distinct pattern emerges when comparing the top, middle, and bottom earners. The wages of the top 10% have significantly risen, particularly during the 1980s for men and the 1990s for women. However, this growth has slowed and even reversed in recent years, with the highest earners now making approximately 5.5 times the median. Conversely, the wage gap between median and low-income workers has remained relatively stable, though more volatile for women, over the past four decades.

3.2   Greater gender equalization

In line with global trends documented by 2023 Nobel Laureate Claudia Goldin in Goldin (2006), we also observe greater gender equality among Hong Kong workers. While many men's earnings have stagnated over the past 40 years, women's labor market outcomes have improved. Women have considerably narrowed the gap with men in both monthly wages and labor supply in terms of total employment share (Figure 2).

In 1981, the average working woman earned an hourly wage 60% that of the average working man, and women's total employment share was around 30%. By 2016, these figures had increased to approximately 74% and 50% respectively, although the pace of progress has slowed since the mid-2000s.

3.3   Wage premium for college graduates has declined

In most advanced economies, the skill premium – the wage premium for employed workers with college degrees relative to those without college degrees – has significantly grown since the 1980s. However, the skill premium in Hong Kong decreased significantly since the early 1990s. The decline is due to a cohort effect: Within a cohort, the skill premium increases over time, but newer cohorts start with a lower skill premium when they enter the labor force. (See Figure 3). Two potential explanations for this finding exist from the supply and demand sides of the high-skill labor market.

On the supply side, two higher education expansions in 1989 and 2001 resulted in dramatic growth of gross tertiary education enrollment. According to available statistics (UNESCO, 2021), the Hong Kong gross tertiary education enrollment rate grew from 10.12% in 1980 to 80.98% in 2019. Figure 4 shows that the share of college-educated workers increased across cohorts, especially after cohort 1965. The increasing supply of high skill workers helps explain the downward pressure on wages for skilled workers.

On the demand side, while the structural change from manufacturing to services has helped reducing gender wage gap, it has not generated enough demand for high skill workers. Figure

5 shows the value-added shares of high-skilled, low-skilled, and real estate services for Hong Kong, Japan, mainland China, and Singapore. Hong Kong's share of high-skilled services is comparable to that of Singapore, but low-skilled and real estate services account for much larger shares than their counterparts in other economies. Figure 6 shows the corresponding employment shares that exhibit similar patterns. Thus, high reliance on low-skilled and real estate services in Hong Kong has limited its demand for high skill workers.

3.4 Median household income is rising, while poorest households regress

When individuals with different wages live together, sharing income and expenses, their combined earnings contribute to the household's standard of living. Economists use a standard methodology to "equivalize" the earnings of different-sized households for comparison purposes (Figure 7). This approach reveals that median household earnings have more than doubled since 1981, after accounting for inflation.

Households in the bottom 10% have experienced less progress, with earnings declining, particularly during the 1997 Asian Financial Crisis (light blue curve in Figure 7). For the poorest households, real earnings have decreased over the past 40 years.

In contrast, households near the top have seen earnings rise between 2 to 3 times. However, this measure does not account for non-labor income from financial holdings or business ownership.

Strikingly, despite societal advancements in various dimensions over the past four decades, households in the bottom 10% of Hong Kong's income distribution now earn even less than they did 40 years ago.

3.5 Government transfers play a more important role after the Handover of Hong Kong

Atop wages and household income, the government provides transfers, such as food stamps and discounted services for low-income Hong Kong people. We include these transfers in our household income measure, creating a pre-tax income measure.[4] Figure 8 displays the evolution of household income inequality in terms of the 90th percentile to the 20th percentile ratio in household earnings distribution with and without considering government transfers. Comparing the household earnings inequality (blue solid curve) with the household pre-tax

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4   More precisely, pre-tax income = Earnings + other cash income (asset income + private transfers + government transfers). Due to data limitations, we cannot separate government transfers from the other two components of the category on other cash income. However, we believe that most of the other cash income should be government transfers since private transfers are generally a small component, and asset income is usually poorly measured in survey-based data.

income inequality (red dashed curve) reveals the significant role government transfers play in reducing inequality. Further analysis of household income inequality evolution at the top and bottom (Figure 9) confirms that government transfers have a more considerable impact on reducing inequality at the lower end.

This becomes even more evident in Figure 10 when we calculate transfers as a share of pre-tax income for the top 10%, middle 10%, and bottom 20% in the household income distribution. Before the 1997 handover, the transfer shares in the three groups of households were surprisingly similar. However, after the handover, there was a surge in transfers received by the bottom group, with the transfer share increasing from around 15% to almost 40%.

The key takeaway is that after the 1997 handover, although earnings inequality increased significantly, more government transfers or benefits were provided to lower-income households, which considerably reduced income inequality at the bottom. This conclusion differs from Piketty and Yang (2021), who measured income inequality based on wages and salaries without considering government transfers.

4   Conclusion

In this study, we have used comprehensive micro data to measure income inequality in Hong Kong and examine its trend over the last 25 years. We find a growing income inequality that is driven by faster income growth of high-income earners. Despite the rising median household income, our findings suggest that the income of the poorest households is regressing. We also find that government transfers and investment in higher education have played significant roles in reducing poverty and wage inequality between high-skilled and low-skilled workers, respectively. These findings suggest that without government intervention, inequality in Hong Kong may be even higher. We also note that over reliance on low-skilled and real estate services in creating jobs has limited job opportunities and income growth of younger generations of college graduates in Hong Kong. Finally, we should emphasize that due to high price of housing, wealth inequality are likely to be significantly higher than the income inequality we have measured in this study.

Therefore, to reduce inequality in Hong Kong, the government should invest more in public housing and promoting job creation in high-skilled services by reducing entry barriers.

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Figure 1: Wage Inequality

Note: X-axis is the survey year from 1981 to 2016. Gini coefficient measures the extent to which the distribution of income within a country deviates from a perfectly equal distribution. P50-P10 ratio compares the monthly wage at the 50th percentile to the one at the 10th percentile. P90-P50 ratio compares the monthly wage at the 90th percentile to the one at the 50th percentile.
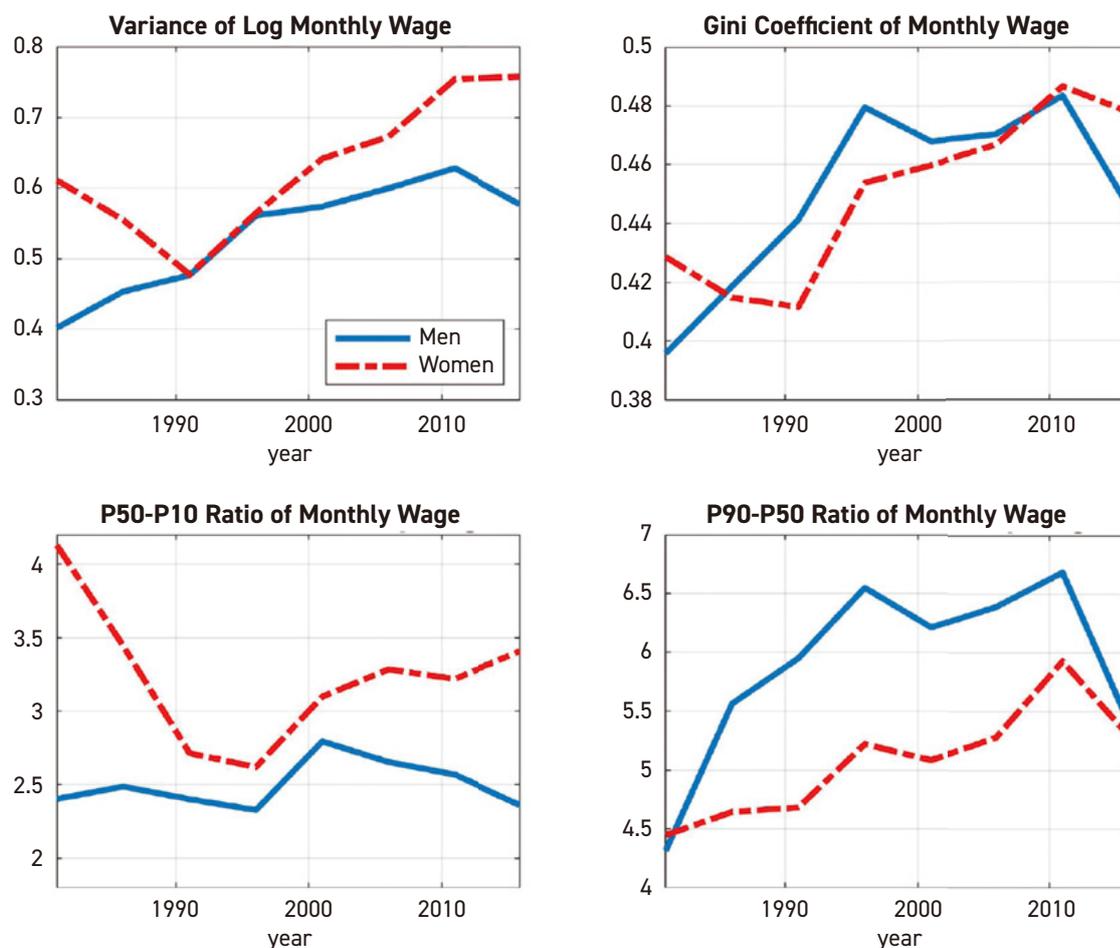
Figure 2: The greater gender equalization

Note: X-axis is the survey year from 1981 to 2016. Gender wage gap refers to the ratio of female average monthly wage to male average monthly wage. Employment share refers to the share of employed females/males in total employed population.
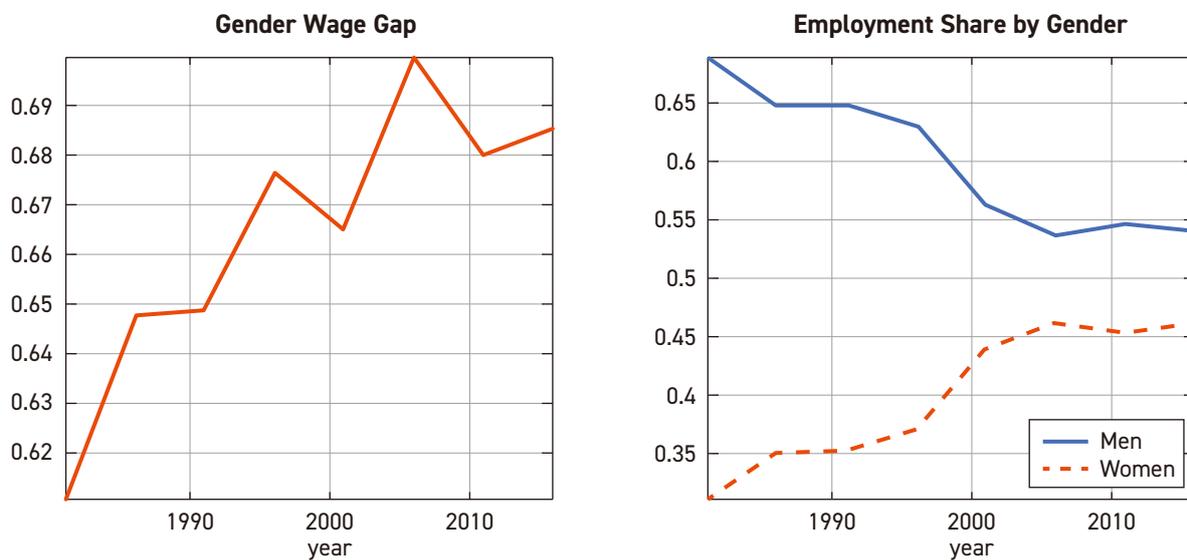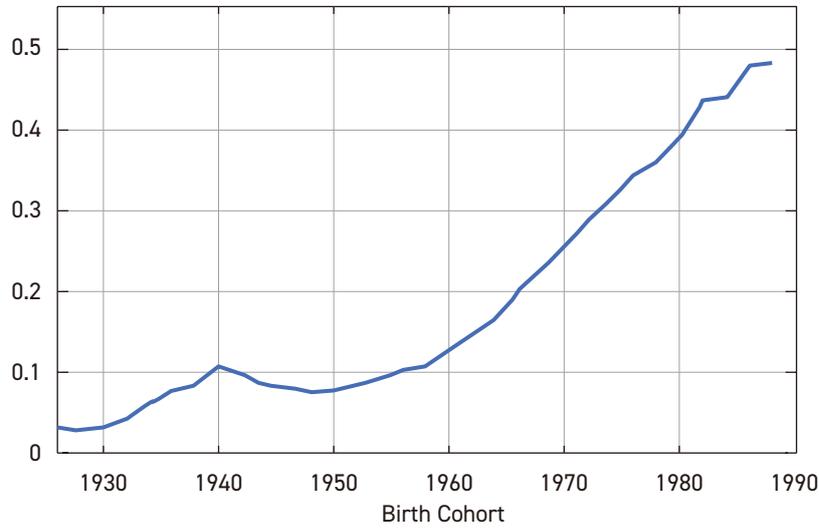

Figure 3: Skill Premium

Note: X-axis is the survey year from 1981 to 2016. "Cross-sectional" includes all samples, and "Cohort-Level" separates the sample into 5 birth cohort groups
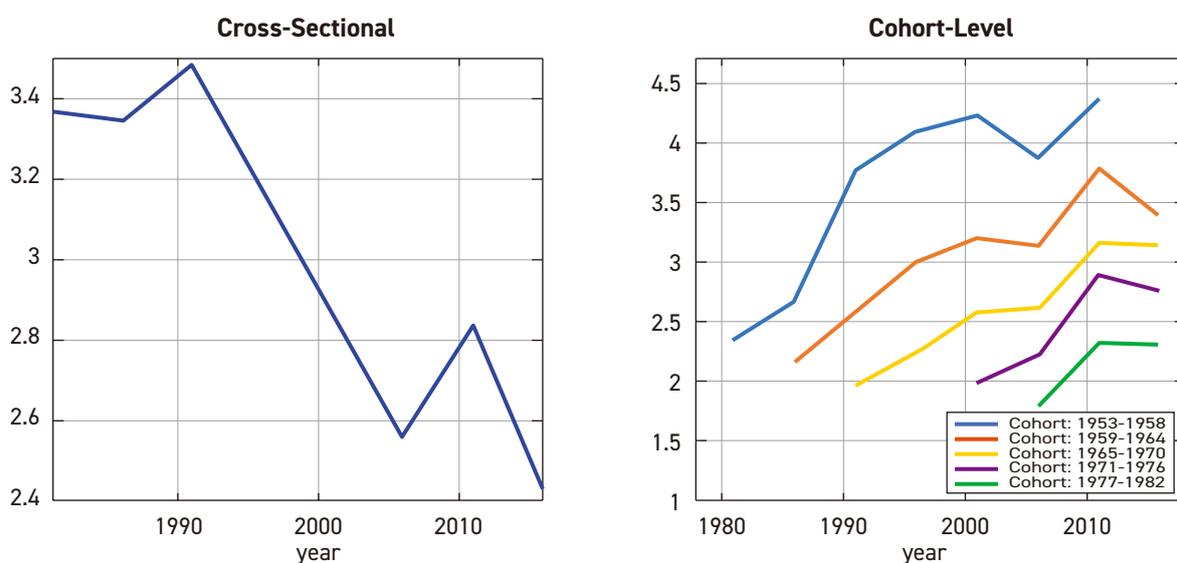
Figure 4: Share of Highly-Educated Workers by Cohort

Note: X-axis is the birth cohort from 1926 to 1988. Y-axis is the ratio of the number of workers with college degree to the total employed population by each cohort.

Figure 5

VA Share of High-Skilled Services

VA Share of Low-Skilled Services

VA Share of Real Estate

China (mainland) — Japan
Hong Kong — Singapore

China (mainland) — Japan
Hong Kong — Singapore

China (mainland) — Japan
Hong Kong — Singapore

Figure 6

Employment Share of High-Skilled Services

Employment Share of Low-Skilled Services

Employment Share of Real Estate
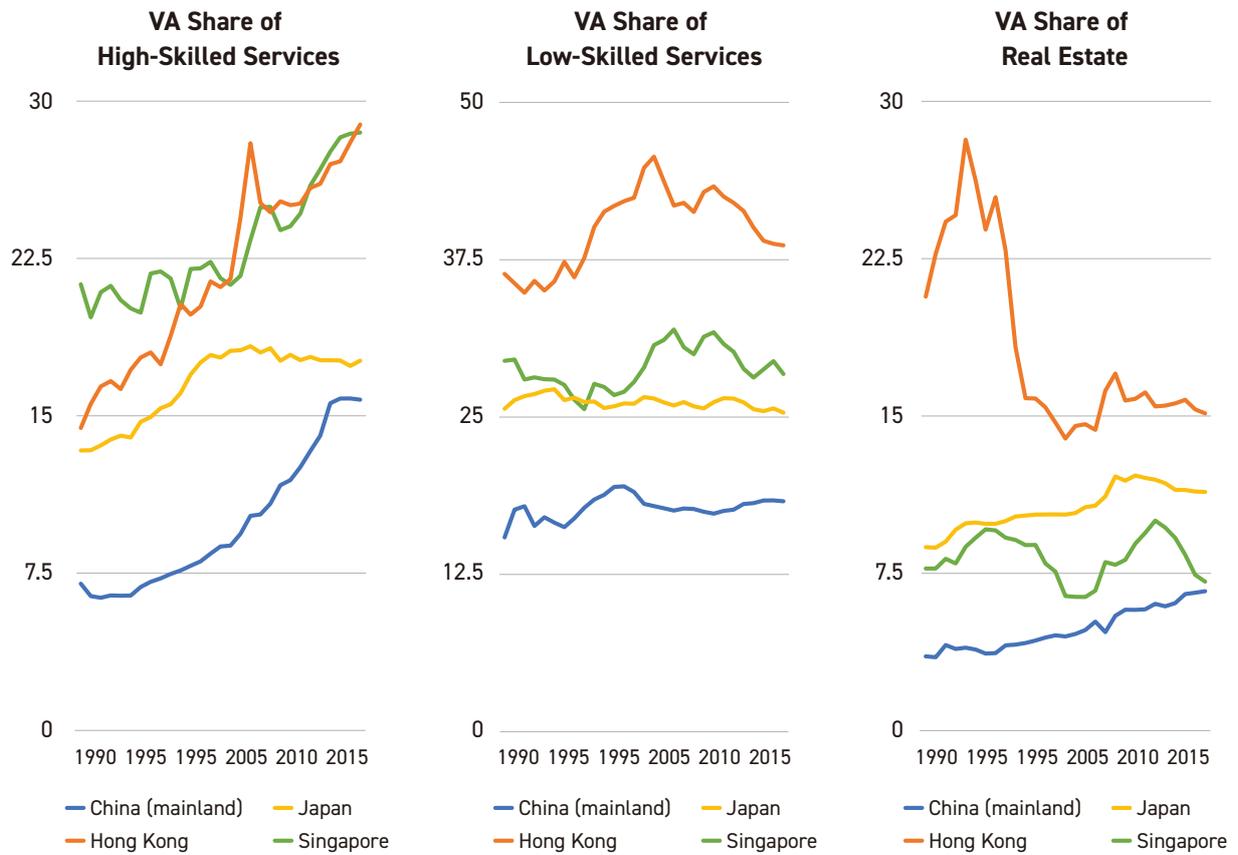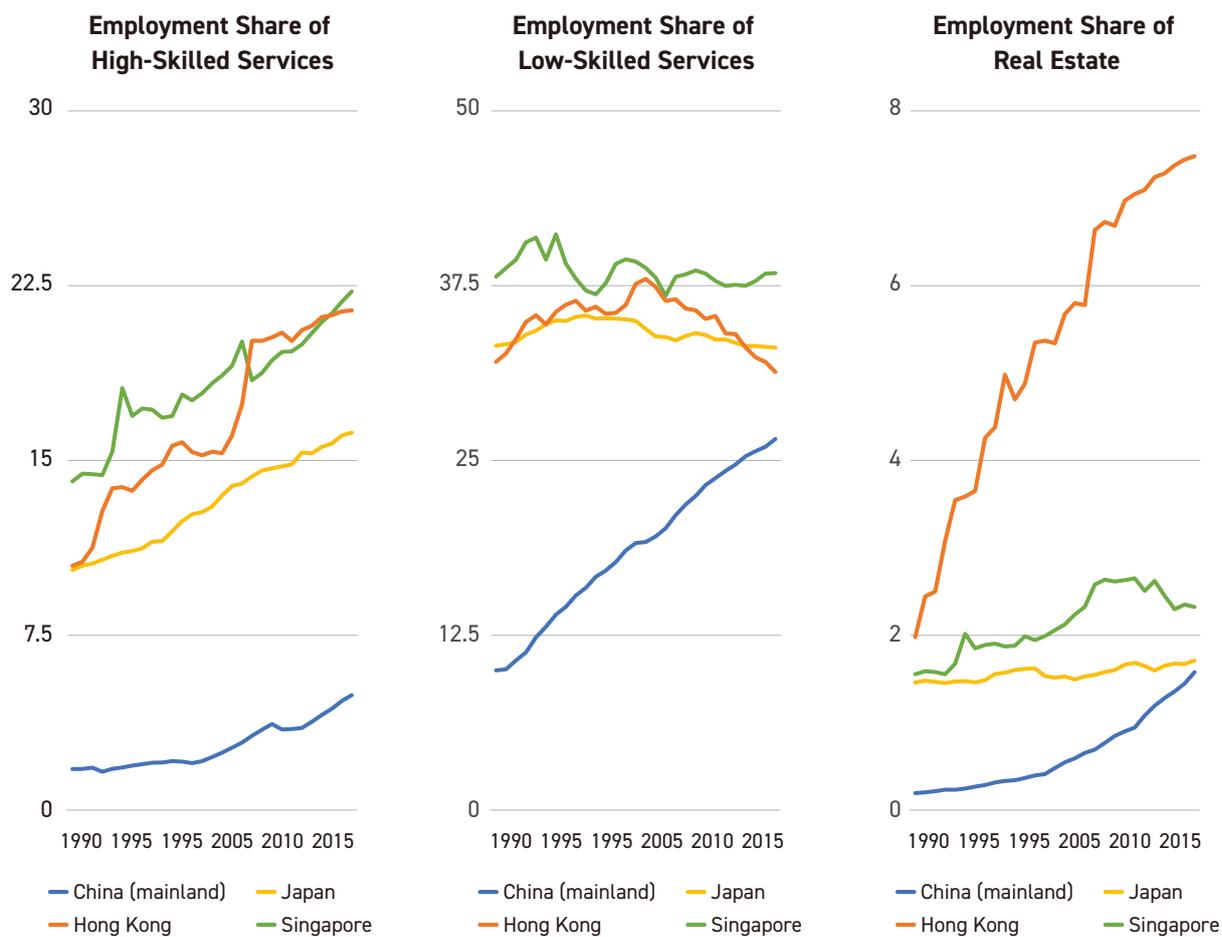
Legend: China (mainland), Japan, Hong Kong, Singapore

Figure 7: Evolution of household earnings distribution

Note: X-axis is the survey year from 1981 to 2016. Household earnings refer to the sum of all individuals' annual earnings in each household. Each line represents the trend of average household earnings by earnings percentiles and normalized to 0 in 1981.
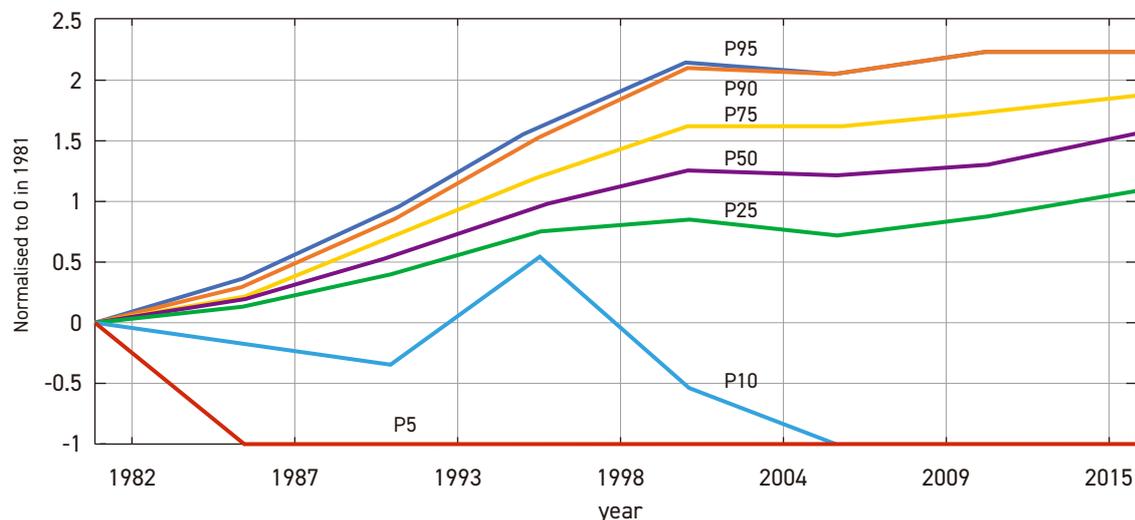
Figure 8: Household earnings inequality v.s. pre-tax income inequality

Note: X-axis is the survey year from 1981 to 2016. P90-P20 ratio compares household earnings/pre-tax income at the 90th percentile to the one at the 20th percentile.
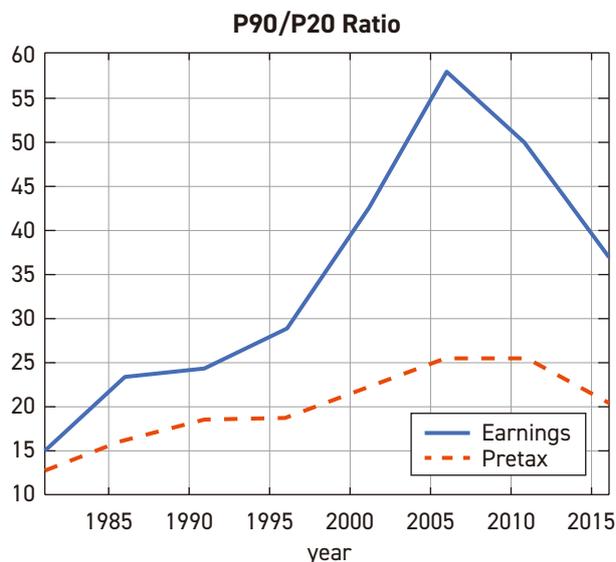
Figure 9: Household earnings inequality v.s. pre-tax income inequality: top and bottom

Note: X-axis is the survey year from 1981 to 2016. P50-P20 ratio compares household earnings/pre-tax income at the 50th percentile to the one at the 20th percentile. P90-P50 ratio is defined as in Figure 1.
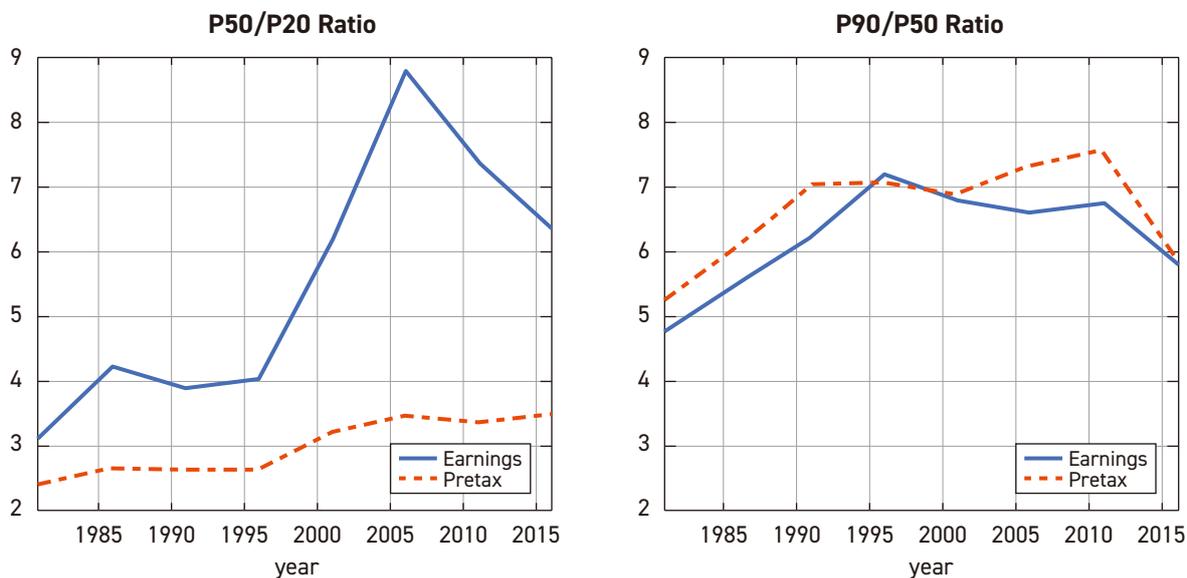
Figure 10: The distribution of government transfers

Note: X-axis is the survey year from 1981 to 2016. Y-axis is the average percentage of other income in household pre-tax income.
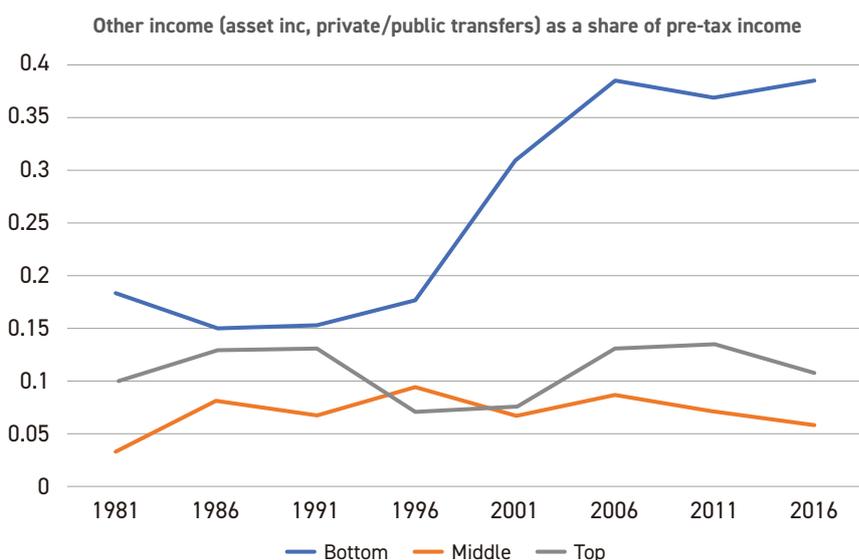
The Impact of Aging on Hong Kong's Future Health Spending

The Impact of Aging on Hong Kong's Future Health Spending

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Abstract

Objective: Recent health spending growth has outpaced the growth of Hong Kong's gross domestic product (GDP). Despite this, Hong Kong's government has maintained its historical 50% share in financing health spending, with out-of-pocket and insurance funds paying for 30% and 20%, respectively. This paper quantifies the future impact of population aging on the future total costs of health care from 2023 until 2040. We decompose predicted health spending growth by inpatient, outpatient, day curative care, medical goods, and long-term care.

Methods: The past 23 years of health spending per capita data was modeled as a time series depending on the share of the population over 60, GDP per capita, and medical inflation. The best-fitting autoregressive, integrated, moving average (ARIMA) models were used to predict total and sub-components of health spending until 2040.

Results: Health spending began to grow faster than GDP in 2010 and is currently growing twice as fast as GDP. If immigration successfully slows population aging, health spending growth will return to parity with GDP growth by 2028. In all scenarios, spending's share will rise from its current share of 7% to as much as 9% of GDP. Long-term care will be the fastest-growing component of health spending.

Discussion: Health spending in Hong Kong will continue to grow faster than GDP for the next half-decade. Proactive choices for the government include improving efficiency in the curative services of the Hospital Authority, improving the Health Department's ability to prevent disease through better population-level public health programs, keeping up with demand by increasing fiscal space through new sources of public revenue and enabling Hong Kong's health insurance markets to be a more effective pressure valve for the public system. The longer Hong Kong waits for a course correction, the harder reform will be. It is urgent for Hong Kong to deliberate on the best options to cope with population aging and rising health spending without suffering degradation of the publicly provided health services.

Introduction

Between 1990 and 2020, total health spending in Hong Kong rose by an average annual rate of 5.6%, while the corresponding GDP growth rate was 3.4%. Furthermore, health spending growth rates are accelerating. Health spending in the pre-Covid period grew at 6%, 6.5%, and 6.9% from 2017 to 2019. The fundamental reasons for rising health spending are population aging, rising prices for health commodities, increased sickness, and increased treatment intensity. In Hong Kong, aging is the most significant factor that will drive up health spending. Much more could be done in Hong Kong to address the price growth of new health commodities, prevent disease, and improve the cost-worthiness of treatments. Planning ways to finance the growing costs was urgent 20 years ago, and now in the throes of population aging, the problem is becoming larger and harder to fix.

In 2022, Hong Kong had 1.59 million seniors 65 or over, composing one-fifth of the population. By 2036, it will have 2.41 million seniors and they will make up one-third of the population (Hong Kong Census and Statistics Department 2023); (Hong Kong Hospital Authority 2022). Inevitably, the rising number of seniors will need an increasing supply of health services. Although this population is currently 20% of the population, they already account for half of all bed days and admissions (Hong Kong Hospital Authority 2022). Past trends in the health care utilization of seniors predict a future growing need to pay for health care. In addition, medical care prices are likely to rise as new drugs and treatments become available. New technology in health care is rarely cost-saving (Chernew and Newhouse 2011). Changes in treatment intensity can also raise costs as doctors do more things for sick patients because of an expanding range of diseases for which there are treatment options.

Health spending growth exceeds GDP growth in most countries (Farag, NandaKumar et al. 2012). This growth puts pressure on governments whose revenue typically rises only as fast as GDP. In Hong Kong total health spending was $189 billion HKD in 2019/2020 accounting for 6.8% of

GDP. The government funded 54% of total health spending coming to $102 billion government spending on health out of the $731 billion HKD of total government spending in 2019/2020 (Hong Kong Government 2021). Remarkably, the Hong Kong government has been able to keep pace with its share of rising total health spending, holding it between 48% and 54% of the total since 2005 (Hong Kong Health Bureau 2023) (See Figure 1). Even though over 1 million Hong Kongers have purchased voluntary health insurance policies in recent years, Figure 1 shows that these schemes have not succeeded in channeling a greater share of total financing.

Figure 1. Share of financing sources for health 2000-2021.
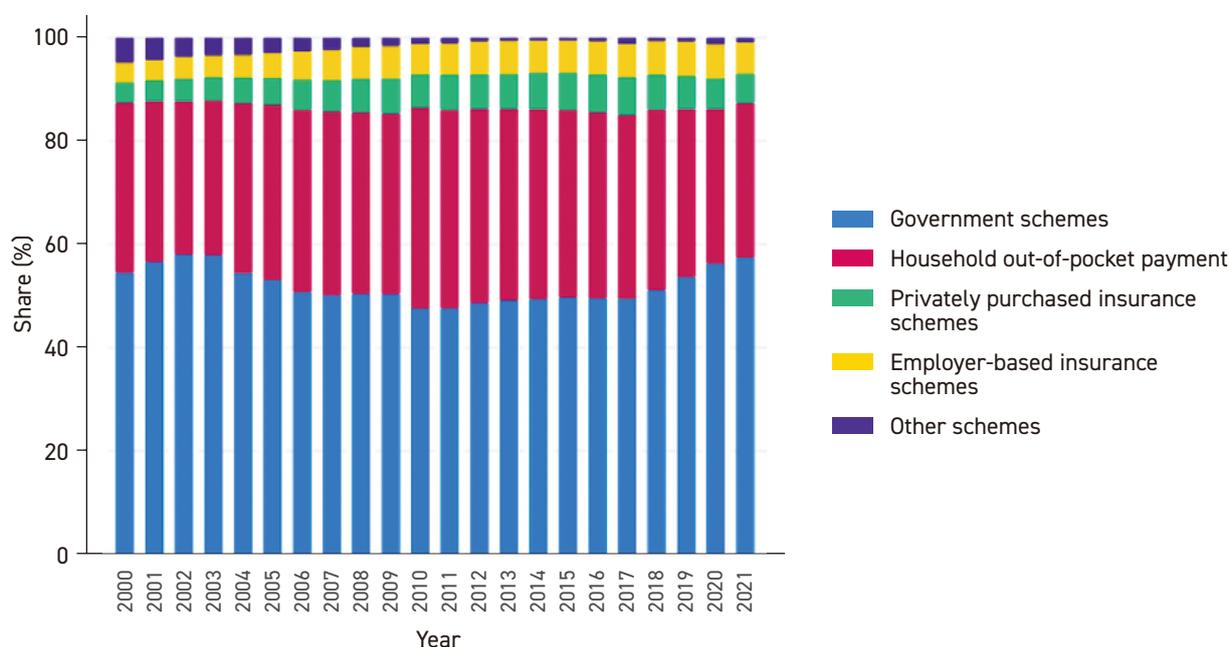
The projected aging of Hong Kong's population in the coming decades will put unprecedented fiscal stress on Hong Kong's health system. This paper offers new forecasts of health spending in Hong Kong from now until 2040 to help policymakers plan ways to sustain high-quality services and financial protection. The data for our analyses came from time-series from the Health Bureau and Census and Statistics Department spanning the years 2000 to 2022 (Hong Kong Census and Statistics Department 2023, Hong Kong Health Bureau 2023).

Methods

Autoregressive, integrated, moving average (ARIMA) models are widely used to forecast health spending (Getzen and Poullier 1992, Klazoglou and Dritsakis 2018, Zheng, Fang et al. 2020). They have the virtue of requiring a minimal number of assumptions because they just use the information about aggregated spending from the past to predict future aggregated spending[1]. We use a baseline unadjusted model as well as models adjusted for population aging, medical price inflation, and GDP growth.

Baseline Model

Our baseline ARIMA model aggregates prices, diseases and population aging together, and so assumes the future overall patterns will look like past overall patterns. As discussed in the appendix we first assessed the degree to which health spending in a given year depended on spending and random shocks in prior years[2]. Then we used data from 2000 to 2022 to fit a simple model as follows

$$[1] \quad H_t = C + \beta_1 T + \left(\gamma_1 \; H_{t-1} + \gamma_2 \; H_{t-2} + \; \gamma_3 \; \varepsilon_t + \gamma_4 \; \varepsilon_{t-1} + \gamma_5 \; \varepsilon_{t-2} \right)$$

Where H_t is the total health spending in time t and T is time in years. The terms in parentheses are inserted to correct for how much health spending in one year depends on health spending in the past and were determined using the Akaike information criteria. Once b is determined, the forecast estimate is simply $H_t = C + \beta_1 T$ for T from 2023 to 2040.

Aging Adjusted Model

The aging adjusted model used equation [1] but also included past data on the percent of the population over 60 (PP60). The forecast estimate is $H_t = C + \beta_1 T + \beta_2 PP60_{t+}$ and this required the census's forecast of $PP60_{t+}$ into the future. The Hong Kong Census bureau projects that population over 60 will stop rising by 2030 if Hong Kong succeeds in achieving net immigration of about 50,000 younger residents each year in coming decades.

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1   An actuarial approach (not used in this study) disaggregates health spending by age, sex, disease, inpatient/outpatient episodes per disease, and cost per episode (Wanless 2002, Leung, Tin et al. 2007). The actuarial approach uses multiple hidden assumptions about the future time course of medical prices, disease rates, hospitalization rates, and population size.

2   Spending patterns are called "autoregressive" when they depend significantly on past spending patterns from 1, 2, 3... years earlier. This happens because of multi-year labor contracts and capital financing. They are said to have "moving averages" when shocks in a given year influence spending in subsequent years e.g. due to sudden enduring changes in epidemics like tobacco-related disease, HIV or hepatitis.

GDP and Medical Inflation Adjusted Model

Other adjusted models used equation [1] but also included past data on the percent of the population over 60 (PP60) as well as past GDP and past medical price deflators. The forecast estimates in these models locked in GDP growth rate of 2.41% annually which equaled the average GDP growth rate of Hong Kong between 2000 and 2022. It locked in a medical inflation estimate of 4.67% based on the past medical inflation of 2000 to 2020.

Results

Summary of Data Used

Table 1. Description of Data Used

	Observations	Mean(SD)/Median (IQR)
Year (years)	23	2021 (11)
Percentage of population over 60 (%)	23	20% (12.56)
GDP per capita ($)	23	$35,868 (9159.91)
HE per capita ($)	23	$2,068 (851.84)
Medical inflation (%)	20	4.67 (2.05)

Data are presented as mean (SD) or median (IQR). HE, health expenditure; GDP, gross domestic product. All spending predictions are presented in current dollars.

Main results

Figure 2 compares the current dollar unadjusted forecast of health spending from the baseline model [1] as a blue dashed line and current dollar health spending adjusted for the population over 60 years old as a blue solid line. For reference, the trend in GDP in Hong Kong is predicted by locking in 2.41% GDP growth and is shown as a solid red line. Unadjusted HE is a linear trend from 2022 onwards, increasing from 3 times its baseline in 2020 to over 5 times its baseline in 2040. Adjusting for the census's predicted slowing of population aging, the adjusted health spending will only grow to 4 times its baseline in 2040.

Compared to either estimate of health spending, GDP will only approach 3 times its year 2000 baseline by 2040 if it keeps growing at 2.41%. Figure 3 compares the slopes of the curves in Figure 2 and shows that the HE growth rate will decelerate after 2028 as aging slows down. The demographic future depends on a Census Bureau projection where Hong Kong allows net

immigration of roughly 50,000 younger people per year in coming decades and this softens the increases in the share of the population over 60[3].

Figure 4 shows the trends of HE as a percentage of GDP over a 42-year period from 2000 to 2042. HE share of the GDP is projected to grow from 7% in 2020 to over 9% in 2040 under the baseline unadjusted trend model. However, adjusting for immigration-based demographic changes, despite peaking at nearly 8% around 2032, the share of HE in the economy is expected to be lower by 2040, at around 7.5%. This suggests that factors related to population aging have a moderating effect on the growth of economic resources allocated to health spending.

Additional models forecasting the sub-components of health spending are shown in Appendix 2. As can be seen from the Appendix Figure 2.1, the largest health spending components are outpatient curative care, inpatient curative care, day curative care, medical goods, and long-term care in 2000 and 2020. Their predicted relative contributions will be unchanged in 2040. Within these five primary components, as shown in Appendix Figure 2.2, long-term care will be the fastest-growing component of health spending. Long-term care will rise from over 6 times its baseline in 2020 to around 12 times its baseline in 2040. Day curative care will be the second-fastest growing component, growing to nearly 9 times its baseline in 2040. It is worth mentioning that the preventive care component peaked at around 10 times its baseline from 2020 to 2022, which can be attributed to the COVID-19 outbreak when preventive care became the fastest-rising component of health spending. For robustness, we found that the ARIMA models adjusting for GDP or medical inflation into the base case model did not substantially alter our results. This occurs because the effects of medical inflation and GDP on health spending were already embedded in the growth pattern of the HE variables from 2000 to 2020. (Appendix 1)

3   The Census estimate predicts net increases of 106,000, 104,600, 89,700, and 68,300 domestic households of 2.6 to 2.7 people between 2021-26, 26-31, 31-36, and 36-41. (Hong Kong Census and Statistics Department 2023)

Figure 2. Trend of HE&GDP over the 42-year period from 2000 to 2042 in Hong Kong normalized against their value in the year 2000. Blue dashed line, trend for HE based on the baseline model; Blue solid line, trend for HE based on the aging adjusted model; Red solid line, trend for GDP. HE, health expenditure; GDP, gross domestic product.
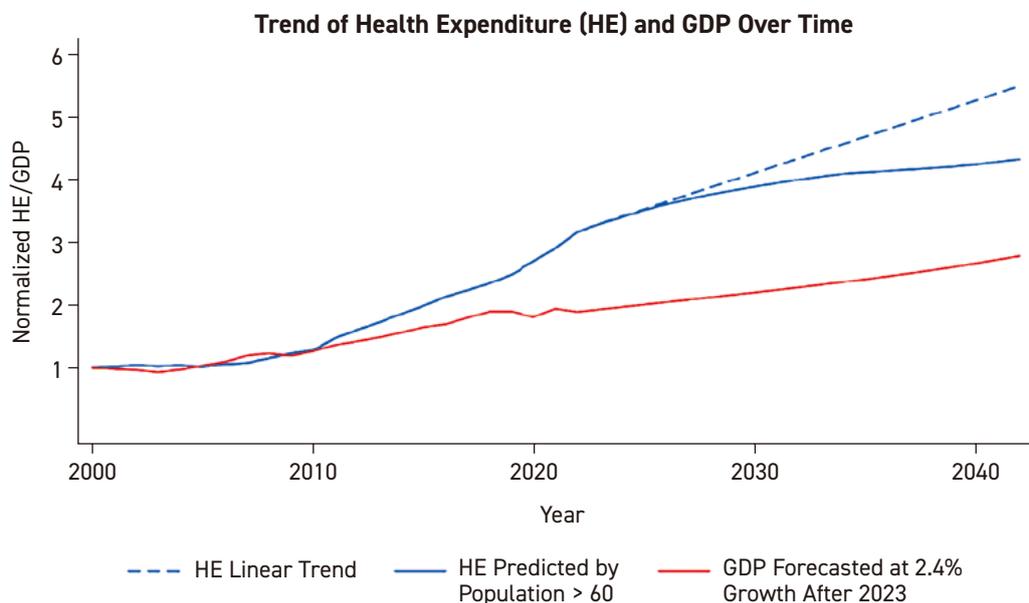
Figure 3. Predicted trends of growth rates for HE&GDP over the 20-year period from 2023 to 2042. Blue dashed line, predicted trend for HE growth rates based on aging adjusted model; Red dashed line, predicted trend for GDP growth rates. HE, health expenditure; GDP, gross domestic product.
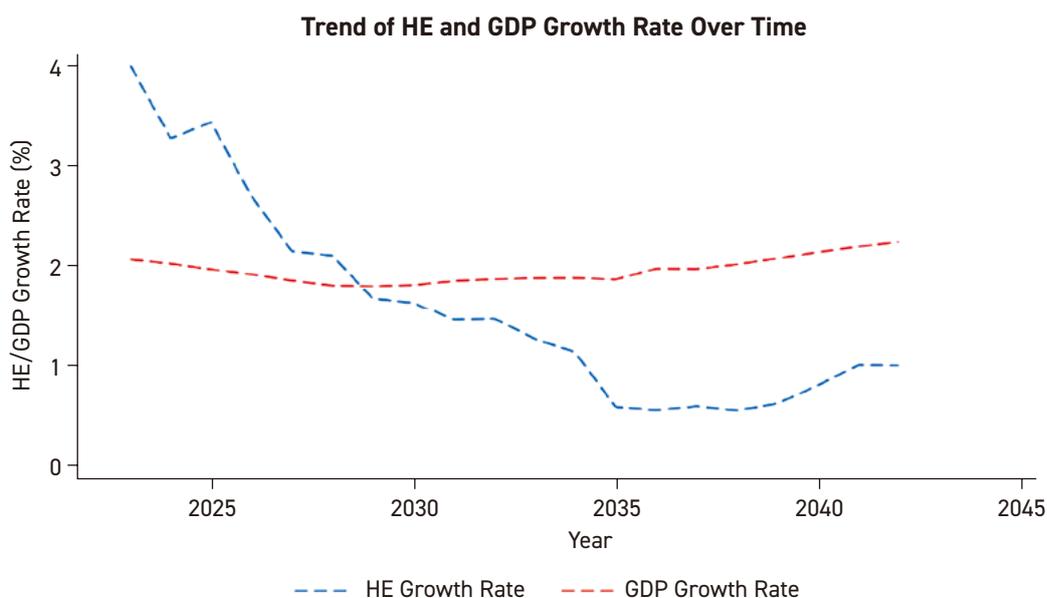
Figure 4. Trends of HE as a percentage of GDP over 42-year period from 2000 to 2042. Red dashed line, HE/GDP based on the baseline model; Blue dashed line, HE/GDP based on the aging adjusted model. HE, health expenditure; GDP, gross domestic product.

Trend of HE as a Pecentage of GDP
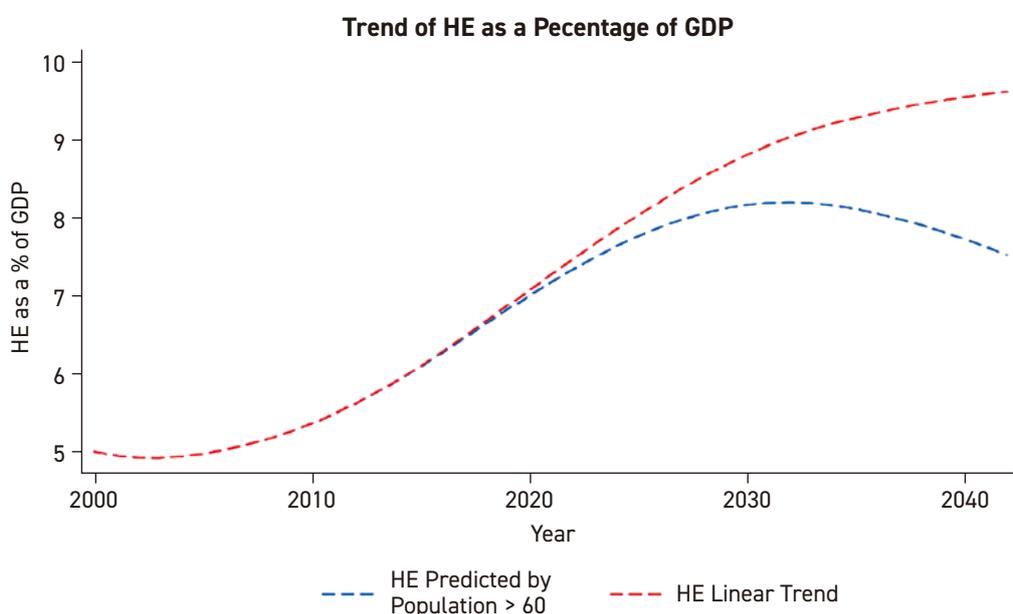
Discussion

The prospect of growth in Hong Kong's health spending will put an increasing strain on government finances. Health spending growth will outpace GDP growth at least until 2028. If Hong Kong can achieve net immigration of about 50,000 younger people per year in the coming decade, it could bend the curve and restrain health spending's share of the GDP to 7% by 2040. However, without the benefit of immigration to soften population aging, Hong Kong's health spending will rise to 9% of GDP by 2040.

Policy options to improve Hong Kong's health system have been extensively discussed, but major reform has been elusive. Solutions need to be multi-faceted. Principal options are 1) Invest more in keeping people out of the hospital through prevention, health promotion, and comprehensive primary health care; 2) Improve efficiency in the use of current health care resources through demand and supply side utilization controls; 3) Manage the entry and pricing of new drugs and technologies; 4) Help citizens plan and pay for culturally appropriate long term care; 5) Help Hong Kong's health insurance markets play a larger role in financing health care[4]; 6) Create new government funding by hypothecated revenues or social insurance (Leung and Bacon-Stone-J 2006).

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4   Hong Kong's private insurance market has grown its subscriber base without taking on a larger share of health spending (See Figure 1)

We have shown that health spending growth will continue to outpace the government's ability to pay. Because Hong Kong's health spending growth is driven mostly by aging, its lived experience in the public sector will be an increase in admissions, bed days and outpatient visits demanded by more seniors who need more services from bedraggled public sector health workers. Waiting times for services in the public sector that are already long, will get longer. Hong Kong's celebrated achievements in population health indicators (e.g. low infant mortality, long life expectancy) will become harder to maintain. It is beyond the scope of this paper to recommend which of the above-mentioned reforms are best suited for Hong Kong's population. Our results call attention to a financial sustainability problem that has been growing and will continue to grow unless more steps are taken.

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APPENDIX 1 Sensitivity analyses results

Appendix Figure 1.1. Trend of HE&GDP over 42-year period from 2000 to 2042 (GDP adjusted model). Blue solid line, trend for HE; Red solid line, trend for GDP. HE, health expenditure; GDP, gross domestic product.
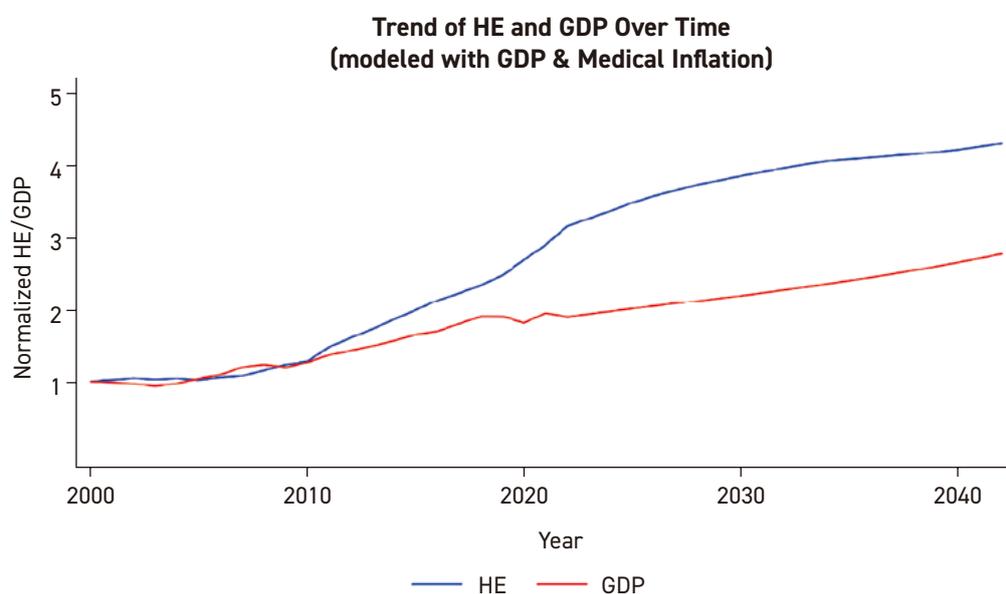
Appendix Figure 1.2. Predicted trends of growth rates for HE and GDP over 20-year period from 2023 to 2042 (GDP adjusted model). Blue dash line, predicted trend for HE growth rates; Red dash line, predicted trend for GDP growth rates. HE, health expenditure; GDP, gross domestic product.
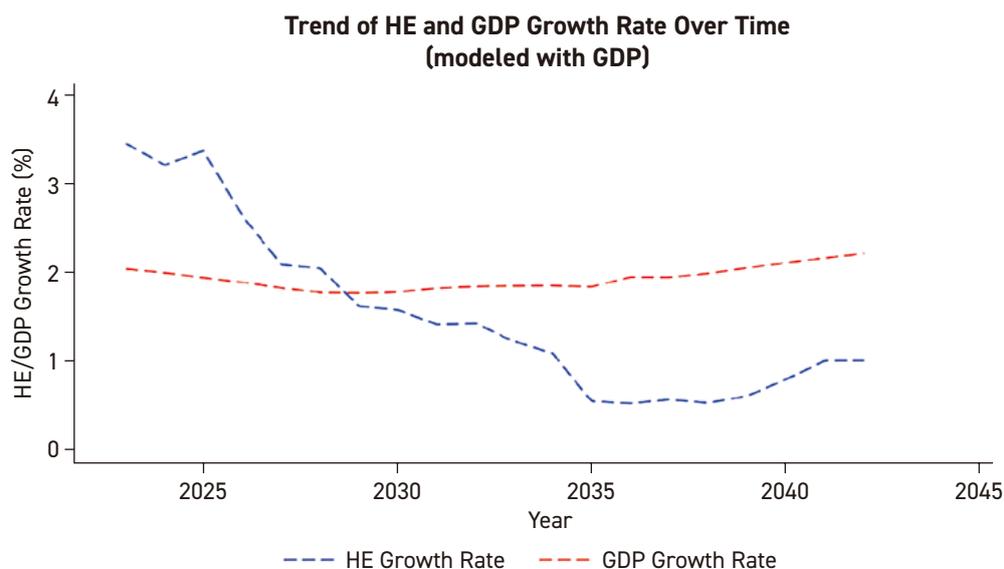
Appendix Figure 1.3. Trend of HE and GDP over the 42-year period from 2000 to 2042 (GDP and medical inflation adjusted model). Blue solid line, trend for HE; Red solid line, trend for GDP. HE, health expenditure; GDP, gross domestic product.

Trend of HE and GDP Over Time
(modeled with GDP & Medical Inflation)
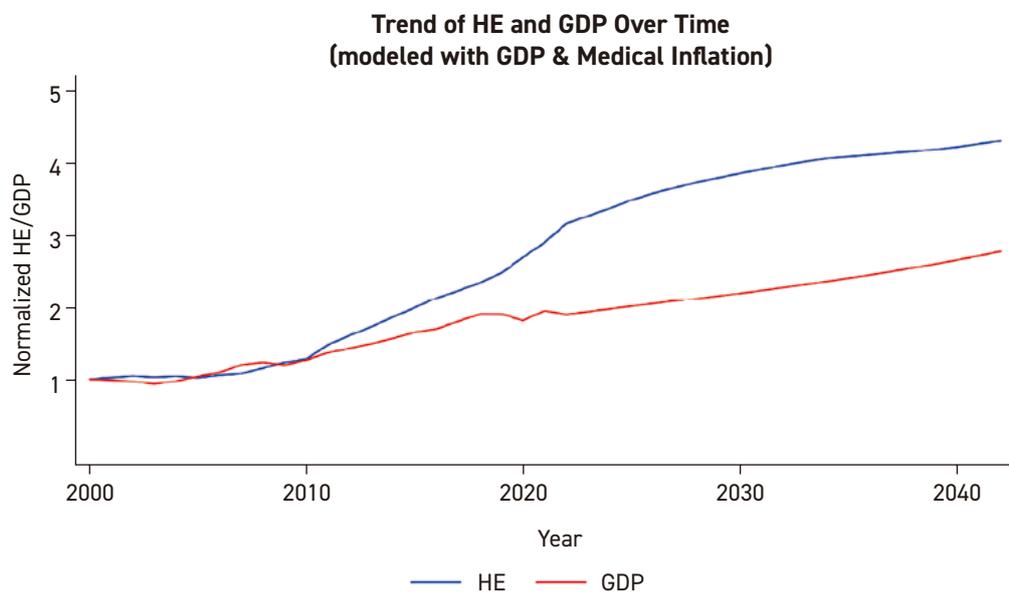
Appendix Figure 1.4. Predicted trends of growth rates for HE and GDP over 20-year period from 2023 to 2042 (GDP and medical inflation adjusted model). Blue dash line, predicted trend for HE growth rates; Red dash line, predicted trend for GDP growth rates. HE, health expenditure; GDP, gross domestic product.

Trend of HE and GDP Growth Rate Over Time
(modeled with GDP & Medical Inflation)
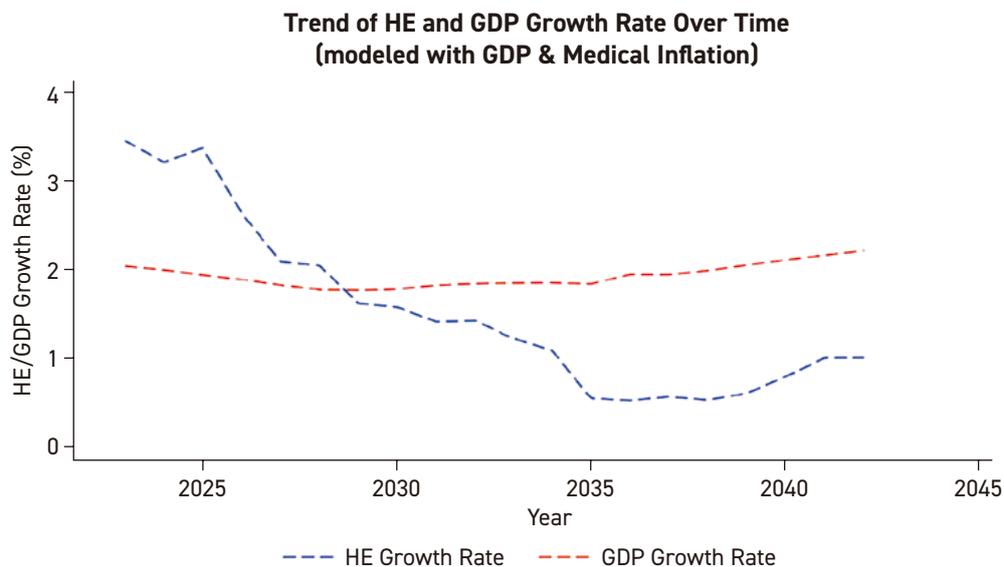
Appendix 2 Shares of HE Past Present Future

Appendix Figure 2.1. Share of components of HE in 2000, 2020, and 2040. HE, health expenditure.
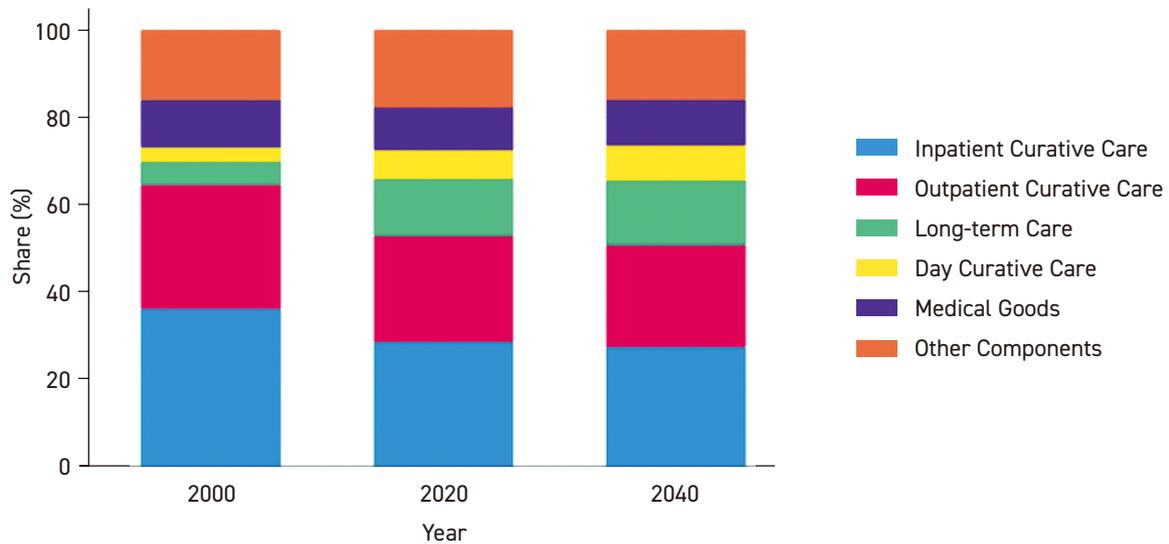
Appendix Figure 2.2. Trend of HE components & GDP over 42-year period from 2000 to 2042. Dash lines, trend for HE components; Black solid line, trend for GDP. HE, health expenditure; GDP, gross domestic product. The light blue spike in preventive spending due to COVID-19 pandemic is unlikely to lead to continued large increases in prevention.

Appendix Figure 2.3. Predicted trends of growth rates for HE components & GDP over 20-year period from 2023 to 2042. Dash lines, predicted trend for HE components growth rates; Black solid line, predicted trend for GDP growth rates. HE, health expenditure; GDP, gross domestic product. The upper panel is adjusted just for Population over 60. The lower panel is adjusted for Population over 60 and GDP and medical inflation.
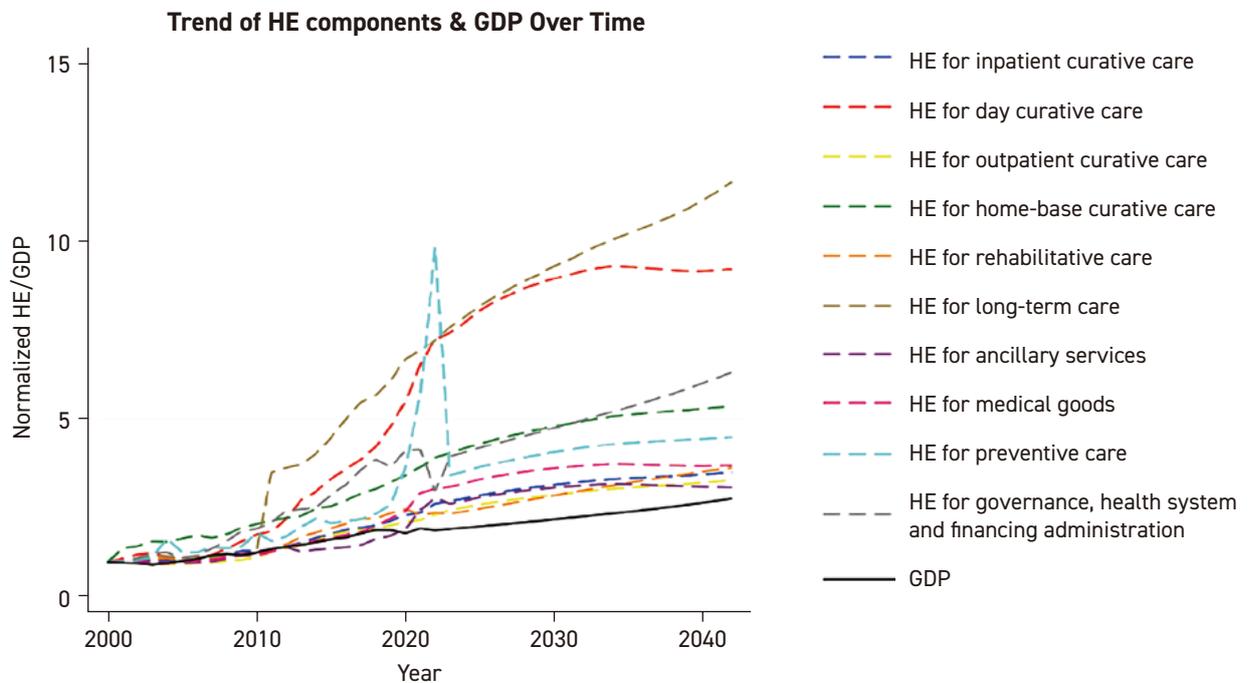

Trend of HE Components & GDP Growth Rate Over Time

Trend of HE Components & GDP Growth Rate Over Time
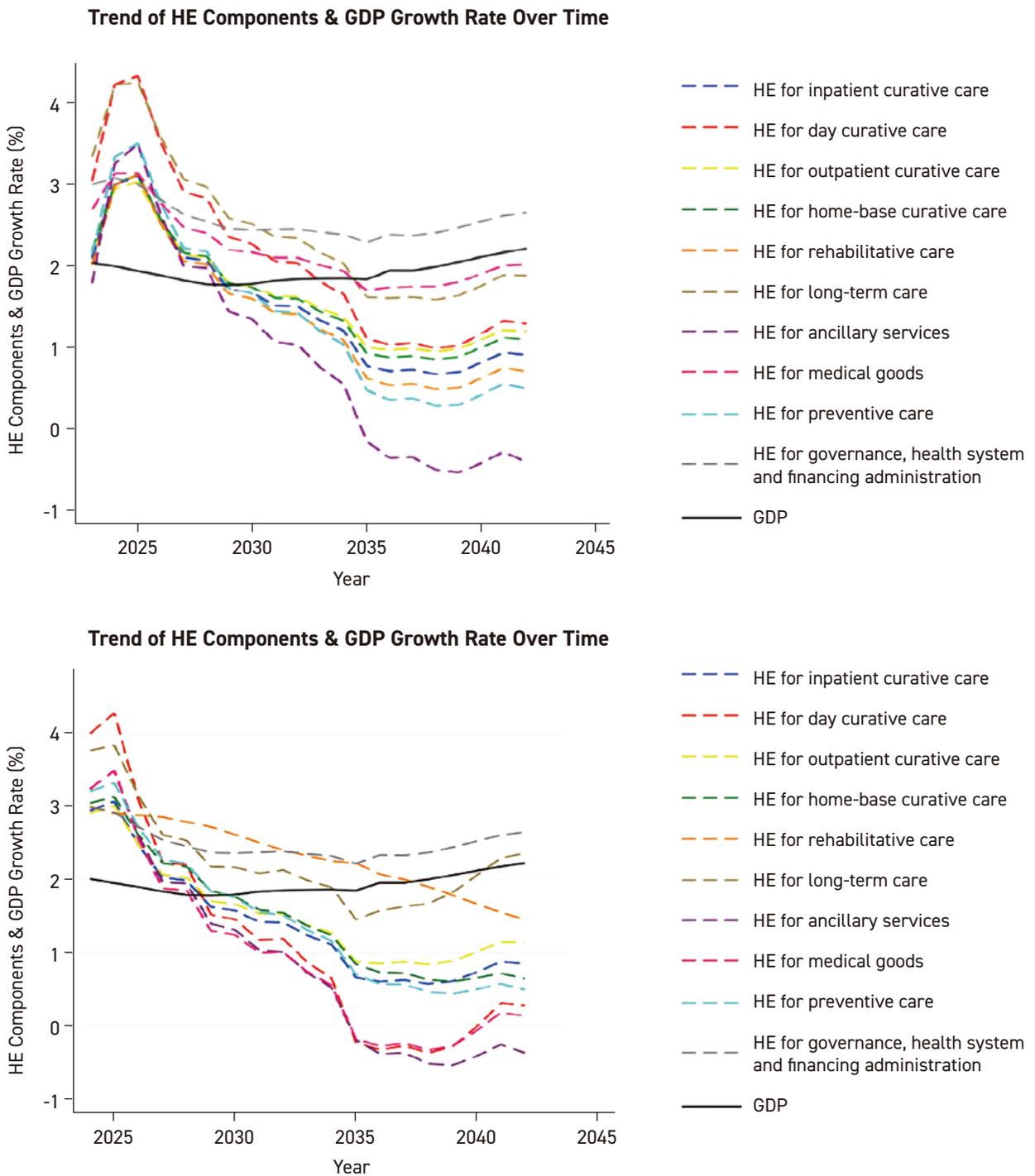
Appendix 3 on Methods

The alternative actuarial approach (not used in this study) breaks down a population by age, sex, utilization, and cost per visit (Wanless 2002, Leung, Tin et al. 2007). The total spending of a population is modeled as the product as follows:

$$[1] \quad \text{Total Cost} = \Sigma \ (N_{jt}) \times (D_{jkt}) \times (M_{jkt}) \times (C_{ijkt})$$

Where N_{jt} is the number of people in a group defined by age and sex. D_{kjt} Number of disease episodes of type k in group j. Mi_{jkt} is the number of medical treatments of type i for disease type k in group j. C_{ijkt} is the cost of treatment i at time t. The disadvantage of the method is that it requires dozens of separate forecasts about the future evolution of N, D, M, and C in different ages, diseases, and treatment types. The database of past costs, disease trends, and treatment trends is often limited so analysts have to introduce many assumptions that multiply the uncertainty around the forecasts.

In the ARIMA approach that we adopted the past trends in overall spending are assumed to aggregate all of the information about past trends in morbidity, utilization, and inflation.

Statistical method for model fitting

For the base case analysis, the model evaluation included the yearly trend and subsequent considerations for population aging. In the sensitivity analysis, additional predictors, such as GDP and the combination of GDP and medical inflation, were incorporated. Line plots were employed to visually represent the temporal evolution of growth rates for HE and GDP from 2023 onwards and the normalized HE and GDP over the 42-year period from 2000 to 2042. We used augmented Dickey-Fuller tests to assess the stationarity of total and sub-components of HE. The best fit number of autoregressive (AR) and moving-average (MA) lags were chosen in each ARIMA model according to the reported Akaike's information criterion (AIC). The equation for our ARIMA model is outlined below,

$$[2] \quad H_t = C + \beta_1 T + \beta_2 Pop60_t + \beta_3 GDP_t + \beta_4 MI_t + (\gamma_1 \ H_{t-1} + \ \gamma_2 \ H_{t-2}... + \varepsilon_t + \gamma_3 \ \varepsilon_{t-1} + \gamma_4 \ \varepsilon_{t-2}...)$$

Where H_t is the health expenditure at time t, ε_t is the error term of the health expenditure time series, γ_1, γ_2 are the autoregressive parameters for the lag terms, and γ_3, γ_4 are the moving average parameters for the lagged error terms, $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients for the independent variables including time, population over 60, GDP, and medical inflation, respectively.

Data

The dataset to train the model included past information from 2000 to 2022 on the growth of the total population(Hong Kong Census and Statistics Department 2023), the population over 60(Hong Kong Census and Statistics Department 2023), gross domestic product (GDP) at current market prices(Hong Kong Government 2021), and total health expenditure (HE) in constant 2019 Hong Kong(Hong Kong Health Bureau 2023). We also applied the forecasting technique to sub-components of total health expenditure: inpatient, outpatient, day curative care, medical goods, and long-term care. In each case we determined the best fit ARIMA model, fit the model to population share over 60, and current GDP then forecast the future based on projections of population over 60, and GDP. For robustness we also assessed models using past measures of Hong Kong's medical inflation. To project past trends into the future we used a quadratic interpolation of Hong Kong census bureau's predictions for population over 60 from 2023 to 2042. We also tested the sensitivity of the model to include a simple forecast of future GDP based on extending the last 23 year's average 2.41% annual growth rate into the next two decades.
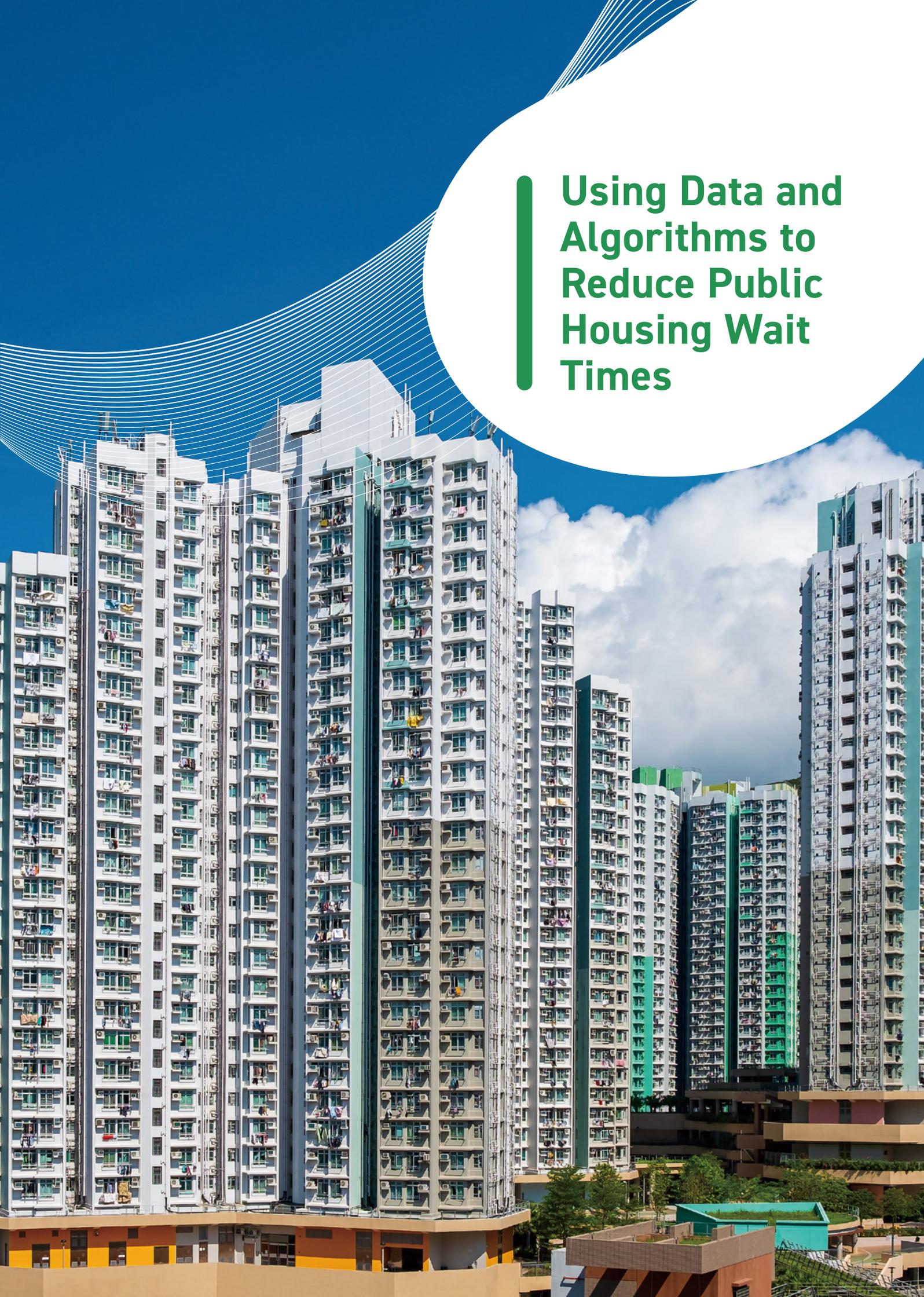
Using Data and Algorithms to Reduce Public Housing Wait Times

Using Data and Algorithms to Reduce Public Housing Wait Times

Shing-Yi Wang (UPenn)   Maisy Wong (UPenn)   Michael B. Wong (HKU)

Public housing waiting times have soared from an average of two years in 2010 to an average of 5.6 years in September 2023. Because of this, large numbers of low-income families reside in cramped and often substandard subdivided units. In response, the Government has launched the Transitional Housing and Light Public Housing programs. These initiatives aim to swiftly construct affordable housing options for those waiting for public rental housing.

However, there are concerns about the underutilization of Transitional Housing, especially in the New Territories, and the Government's ability to meet its target of eliminating subdivided units by 2049. These challenges call for a comprehensive and effective approach to tackle the housing crisis and improve the living conditions of the city's vulnerable populations in Hong Kong. In this paper, we propose using data analytics and computer algorithms to increase the utilization of Transitional Housing and reduce public housing wait times.

Problem: Low Utilization in the Transitional Housing Program

The Government introduced Transitional Housing (TH) and Light Public Housing (LPH) in 2018 and 2022 to provide short-term housing relief to vulnerable households, primarily on the public rental housing (PRH) waitlist and residing in subdivided units.[1] 8,420 and 5,540 TH units are expected to be completed in 2023 and 2024, respectively.[2] 30,000 LPH units are expected in the coming five years, with 2,100 in 2024-25. A large fraction of TH and LPH sites will be in relatively remote areas in the New Territories, such as Yuen Long and Sheung Shui.[3]

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1   There are roughly 133,700 general applicants waiting for PRH at the end of 2022. There are about 107,000 sub-divided units in Hong Kong and there are about 214,000 people living in sub-divided units.

2   6960 TH units were completed in 2020-21.

3   For LPH, two announced sites are in Tuen Mun: one site is in Sheung Shui, and one site is in Yuen Long.

However, observers and analysts are increasingly concerned that TH and LPH sites in the New Territories will have low utilization. According to the government, the average occupancy of projects in the New Territories was close to 70 percent, versus over 90 percent for projects in urban areas or near public transport hubs. For example, United Court in Yuen Long had 800 vacant flats (out of 1,800 total) in November 2022, according to SCMP. Utilization may deteriorate since upcoming TH sites have even fewer transportation linkages than existing TH projects in the New Territories.

The vacancies are financially costly. Government financial assistance for each transitional housing unit is: (a) up to $200,000 per unit in vacant residential buildings, and (b) up to $550,000 per unit for erecting temporary structures on vacant land and in non-residential buildings[4]. Failure to move people out of subdivided housing results in higher rents and lower living standards for the urban poor. In this paper, we identify difficulties in the implementation of the TH program and propose improvements to policy design.

Why is Transitional Housing Utilization Low?

Reason 1: Spatial mismatch between residents and TH projects

Subdivided units are generally located in urban areas, where employment opportunities are abundant. Moving to the New Territories would require that households uproot themselves. The costs of moving include: (1) increased distance from employment opportunities;[5] (2) difficulties of children switching schools; (3) separation from existing social networks.

Reason 2: Inefficient application process

Following the TH model, LPH projects are operated, managed, and maintained by invited organizations. Each operator will allocate units according to criteria set by the Government, handle tenancy matters, implement exit plans for tenants, and provide social services based on the needs of tenants.[6] Applicants apply separately to different projects. Operators do not know which other projects an applicant has applied to, or their relative preferences. Applicants are free to reject unlimited offers and can wait to apply for better options. Each operator assigns TH units in a decentralized manner.

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4   https://www.info.gov.hk/gia/general/201904/18/P2019041800364.htm?fontSize=1

5   In 2016, 42.2% of the low-income population who rented sub-divided flats worked in the same district where they lived. See: https://www.info.gov.hk/gia/general/201801/18/P2018011800590.htm?fontSize=1

6   See: https://www.legco.gov.hk/yr2022/english/panels/hg/papers/hg20221205cb1-847-1-e.pdf

To address these issues, the Government has recently started to provide moving cost subsidies and establish a centralized application portal. While these efforts are commendable, it is important to acknowledge that the current matching process is not optimized: applicants may choose to wait for better housing options, even when applicants prefer the units in the New Territories over their existing subdivided units. We believe that further adjustments are necessary to address underutilization.

Market Design: A Nobel-Winning Idea

To improve TH allocation and utilization, we turn to Alvin Roth's groundbreaking work in market design, which earned the Nobel Prize in Economics in 2012. The fundamental concept behind this work is to gather data about individuals' preferences regarding a given set of options, and then use computer algorithms to create matches that optimize overall utility. To illustrate, let's consider the case of TH applicants with varying preferences for different locations. These individuals would submit their preferences through a centralized portal, and the algorithm would then facilitate the matching process.

In recent years, computer algorithms have been successfully implemented to improve allocations across various domains. For instance, such algorithms have been used to match doctors with hospitals, students with schools, and kidneys to patients. An excellent example of this is the use of an optimized computer algorithm in New York City to assign students, which led to a significant improvement in the assignment process: from 31,000 unmatched students in 2003 prior to implementing the revised algorithm, to about 3,000 in 2004, according to the New York Times.[7] Since then, the algorithm has consistently assigned nearly half of all students to their first-choice schools. This is a testament to the effectiveness of computer algorithms in optimizing allocation processes and ensuring that individuals receive the best possible outcomes.

Illustrative Examples

Utilizing a centralized computer algorithm can significantly improve the allocation, utilization, and satisfaction of units when households have diverse preferences for housing options. To illustrate this, let us consider two simple examples where households have rank-order preferences for different locations.

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7   See: https://www.nytimes.com/2014/12/07/nyregion/how-game-theory-helped-improve-new-york-city-high-school-application-process.html

Figure 1 demonstrates the problems associated with decentralized assignment. In the current decentralized process, each household is limited to submitting one application at a time. However, if households prefer the same unit, vacancies can arise. For instance, suppose that a unit in Yuen Long is completed first, but no one applies for it, resulting in a vacant unit. Instead, as demonstrated in Figure 1, multiple families wait to apply for Sham Shui Po, only to discover later that it is oversubscribed. These inefficiencies can be resolved by eliciting household preferences and implementing an optimized algorithm that eliminates vacancies and oversubscriptions.

Figure 1: Vacancies Can Arise due to Decentralized Assignment

However, even with a centralized approach, using a basic algorithm may still yield suboptimal outcomes. Figure 2 shows an example. In this scenario, there is still only one available unit per location, and applicants are sequentially assigned to their top choice among the remaining units. The sequential algorithm assigns Family A to Yuen Long, Family B to Sai Kung and Family C to Sha Tin. However, this is an efficient algorithm because only one household gets its top choice. There exists a more effective algorithm called "Top Trading Cycles" (Shapley and Scarf 1974) that allows for better assignment of units based on households' preferences. In the example, if we assign Family C to Sai Kung, Family B to Yuen Long, and Family A to Sha Tin, two families get their top choice. Therefore, it is crucial to carefully study the properties of the assignment mechanism to ensure optimal results.

Figure 2: Optimized Algorithm Can Improve Satisfaction

Policy Recommendation

We recommend that the Housing Bureau leverage data analysis and market design theory to improve housing matches and increase TH utilization. In particular, we propose that:

1. Applicants submit preference rankings for TH projects to a centralized portal.

2. The central platform then uses an optimally designed computer algorithm, incorporating both applicants' preferences and operators' selection criteria and preferences, to allocate housing.

3. Applicants receive a limited number of housing unit offers to accept or reject, like in the PRH system.

4. Instead of a strict quota system reserving 80% of TH units to households with a ≥3-year wait in the PRH queue, such households are flexibly accounted for and prioritised in the assignment system, thereby minimizing vacancies.

These modifications can bring substantial benefits to TH applicants and residents. First, the proposed system's computer algorithm incorporates relative preferences, increasing the chances that applicants are matched with units they prefer.

Second, because the better matches are more aligned with applicants' needs, the proposed changes will increase offer acceptance rates. Meanwhile, limiting the number of offers to applicants will increase TH utilization in the New Territories by raising the incentives to accept an offer rather than waiting for an urban TH unit.

Implementation Requires Only Limited Investment

The proposed policy changes mentioned above would require only limited investment, making them a feasible solution. In particular, adding an assignment algorithm to the government's planned centralized application portal would require minimal software development.

Moreover, there is plenty of readily available expertise that can help design the centralized assignment algorithm. Local and international academic researchers have extensively studied the local context, making them a valuable resource in the implementation process.

A centralized system would not restrict operator autonomy, as operators can still retain the right to screen applicants post-centralized assignment to avoid unsuitable or potentially problematic tenants. In cases where applicants are rejected, they can re-enter the assignment algorithm to be reassigned to suitable housing options. This approach also reduces administrative overhead for operators since they will no longer have to handle overlapping applications.

Overall, the proposed policy changes offer a practical and cost-effective way to enhance TH allocation and utilization, ensuring that individuals are matched with suitable housing options while simultaneously reducing administrative costs and improving the efficiency of the allocation process.

Broader Benefits in the Housing System

While our initial proposal focuses on enhancing the Transitional Housing program, Hong Kong can leverage data analytics and computer algorithms to improve public housing provision on a broader scale. Scholars, such as Lui and Suen (2011) among others, have extensively documented significantly more spatial mismatch among residents of both Public Rental Housing and Homeownership Scheme homes compared to those in the private market. By collecting detailed preferences of housing location and characteristics and using computer algorithms to find optimal matches, we can substantially improve these allocations. These data can also be used to gauge the effectiveness of alternative housing policy interventions, such as allowing public renter households to swap units.

Using the methods we propose, policymakers can make data-driven allocations to achieve more efficient distribution throughout the public housing system. This approach aligns housing options with individual needs, thereby reducing spatial mismatch and generating significant welfare gains for a substantial population segment.

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Brain Drain, Brain Gain, and The Future of Hong Kong: Evidence from LinkedIn Profiles

Brain Drain, Brain Gain, and The Future of Hong Kong: Evidence from LinkedIn Profiles

Alan Kwan   Heiwai Tang   Michael B. Wong

Credit: DALL-E3: Watercolor painting of a serene Hong Kong harbor scene. Emerging from the waters, a jade Chinese dragon carries professionals towards the city, representing incoming talent. Flying above the city, a crimson dragon soars into the sky, with professionals behind it heading towards the horizon, illustrating the brain drain. The contrasting movements of the dragons bring attention to the labor market shifts in Hong Kong.

In recent years, Hong Kong's government, business community, and media have become alarmed about the negative socioeconomic impact of a brain drain. Former Chief Executive Carrie Lam acknowledged the "unarguable" brain drain triggered by stringent coronavirus measures. Political unrest and new pathways to British citizenship for Hong Kong residents have exacerbated this exodus. This migration may indicate a loss of human capital, and also broader societal and policy issues that could undermine future growth in Hong Kong.

But first, some questions: Is the brain drain real or overstated? Are workers with the highest human capital leaving? Are individuals migrating from Hong Kong primarily relocating to regional competitors like Singapore? Is the migration occurring through multinationals? Has the brain drain been offset by talent in-flows? How are talent flows affecting Hong Kong's competitive edge?

In this article, we draw on publicly available individual profiles from the professional networking platform LinkedIn and Government data to assess shifts in Hong Kong's population structure and economic prospects. We find that Hong Kong is experiencing brain drain, but is also seeing considerable in-flow of talent. The arriving population is older and better-educated, but less globally connected and less ethnically diverse than the departing population. A large fraction are highly educated populations from Mainland China, but there is also talent in-flow from other regions, including the United States. Overall, the narrative of a brain drain belies the more nuanced picture that Hong Kong remains a powerful magnet comparable to other major metropolitan cities.

Brain Drain and Brain Gain Since 2019, According to LinkedIn Data

To assess talent flows, we focus on LinkedIn users with identifiable locations and positions both pre- and post-pandemic. Our sample consists of anyone who has ever been in Hong Kong pre- or post-pandemic (see appendix).

Surprisingly, we find that the arriving population as measured using LinkedIn profiles exceeded the departing population. Overall, 255,911 LinkedIn users remained in Hong Kong throughout the pandemic; 31,835 entered; and 26,836 departed. In other words, there has been both a brain *drain* and *gain* in the past few years.

Recent emigration of LinkedIn users from Hong Kong is dominated by the young. Figure 1 (left panel) plots the net migration rate by age group into Hong Kong in the LinkedIn data, while the right panel plots the net migration rate for those whose occupation/seniority are modeled by Revelio as being potentially high salary positions *relative* to one's estimated age.[1] Both overall and in the subset of relatively talented individuals, we find that among more experienced and senior people, there has been a net inflow of talent into the city.

The arriving LinkedIn users are better educated but less internationalized. As shown in Table 1, the alma mater of the average arriving resident with LinkedIn profiles has a higher Times Higher Education (THE) ranking than that of the average departing resident, and the difference appears statistically significant. Compositionally, however, the talent pool has become less

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1 Within 5 year age buckets (25-29, 30-34, etc) we use Revelio's estimated model and pick individuals in the top 3 deciles based on estimated salary.

diverse and more insular. The probability that they are non-Asian has halved. Holding fixed diversity, the number of connections – or connections-per-age, to account for the overall size of one's network which grows as one gets older – is lower among the joiners than the leavers. These differences are statistically significant.

Table 2 shows where the joiners on LinkedIn come from and where leavers go. There is significant net migration from the United States, Mainland China, and India, in addition to net migration to Singapore, Canada, and Australia. Strikingly, the net arrival from the United States appears to be not only positive but also the largest. It is likely that the actual arrivals from Mainland China are much larger, since the Chinese are less likely to be LinkedIn users.[2]

There is also a loss of highly qualified workers with PhDs, a top 50 bachelor's, MBA or master's, to places such as Singapore and the UK. However, this loss was in total terms offset by the gains from Mainland China and the United States. Overall, there was a net increase in the total number of highly qualified individuals.

Population Size and Immigration, According to Government Data

Since the LinkedIn users are a selected sample, we supplement the above analysis with Government data. We first confirm that there has been substantial population in-flows. According to the latest numbers, there has been a post-pandemic surge in population. Even though Hong Kong's population dropped from its peak of 7.52 million at 2019 year-end to 7.35 million at 2022 mid-year, it has since almost fully recovered. As of 2023 mid-year, the population now stands at 7.50 million, as shown in Figure 2.

The data also strongly suggest that the in-flows from Mainland China are larger than implied by LinkedIn data. From January to September 2023, the Hong Kong Government granted roughly 100,000 working visas, significantly more than the previous year's 38,559. One contributor to this surge in immigration is the Top Talent Pass Scheme (TTPS), which was implemented in response to the brain drain and offers fast-track work permits to graduates from top universities and high-earning professionals. Of the 30,183 people who had received visas through TTPS as of July 31, 2023, 94.6 percent came from mainland China.

There has also been a substantial expansion of the Quality Migrants Admission Scheme (QMAS). According to the Immigration Department, 7,022 people obtained visas under QMAS in the first half of 2023, of which 98.3 per cent came from mainland China. In 2022, only 2,845 people were granted the QMAS visas.

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2   See the appendix for a discussion. Interestingly, conditioning on surnames of HK or other Chinese origin does not alter the picture that the largest source of inflows is from the United States.

Have Multinational Firms Left?

Contrary to popular belief, there has not been a massive exodus of multinational firms from Hong Kong. The headcount of multinational companies in Hong Kong, as revealed by LinkedIn data, has not diminished. In Figure 3, we focus on firms that employed people in at least three countries pre-pandemic. Surprisingly, we find that the average multinational increased their LinkedIn headcount in Hong Kong.

Table 3 shows that within-firm transitions are facilitating migration to Hong Kong, since leavers have predominantly changed firms, while many arrivals are due to transitions within firms.

The importance of non-local firms in Hong Kong's labor market has not diminished, either, according to government data. In 2018, roughly 16.9 percent of employed persons in Hong Kong worked for non-local companies. In 2022, it is 17.3 percent.

However, there is a shift in the composition of multinational firms, as shown in Figure 4. Between 2018 and 2022, the numbers of US and Japanese regional headquarters in Hong Kong have fallen, by about 17 percent and 13 percent, respectively. This decline is offset by the rise of Mainland regional headquarters, which has grown by about 27 percent during the same period.

Does Hong Kong Remain Internationalized and Skilled?

Hong Kong's talent pool remains very strong and internationally competitive, especially relative to other Chinese cities. In Table 4, we measure city-level human capital using education attainment and average THE school rank of LinkedIn users in that city. We then use these measures to rank a set of 16 selected cities and regions. We find that Hong Kong is competitive with top cities around the world and has a significantly stronger talent pool than Mainland Chinese cities such as Beijing, Shanghai, and Shenzhen.

There has not been a reduction in the number of foreigners in Hong Kong, either. According to Population Census data, Hong Kong's foreign population grew from 485,000 to 593,000 between 2011 and 2021. Excluding foreign domestic workers, the foreign population in Hong Kong grew from 185,000 in 2011 to 254,000 in 2021.

By contrast, Mainland Chinese cities witnessed a large long-term reduction of foreigners over the past decade. The combined number of foreign nationals and Hong Kong, Macao and Taiwan residents living in Beijing declined from 107,000 in 2010 to 63,000 in 2020, a whopping 42 percent. The analogous number in Shanghai fell from 209,000 to 164,000, or about 18 percent.

Hong Kong therefore remains, by a very large margin, the most internationalized Chinese city. Since there were only 846,000 foreign nationals in Mainland China in 2020, the total population

of foreign nationals in Hong Kong alone is equal to roughly 70 percent of the total foreign population in the whole of Mainland China. By comparison, Hong Kong's total population is only 0.5 percent of the total population of Mainland China.

What Drives Observed Talent Flows?

There are three likely drivers of the observed migration patterns. The first contributor to talent in-flow is reduced political resistance in Hong Kong to economic integration with the Mainland. Since the events of 2019-2020, Hong Kong has become much more open to skilled talent from the Mainland. The Hong Kong government has announced ambitious plans to develop housing in the New Territories to increase connectivity with firms in Shenzhen.[3] Hong Kong will soon double the quota of university spots for non-local students.[4]

The second driver is slower economic growth in Mainland China. Due to geopolitical realignment and macroeconomic cyclical forces, capital flows to China from abroad have significantly diminished. Mainland China's middle class increasingly desires to deploy their capital and talent in international markets instead, where rates and wages of return are higher.

The final driver is the increasingly testy geopolitical and race relations ethnic Chinese face abroad, particularly in the United States. This is likely to have encouraged some populations to migrate from overseas to Hong Kong.

Another driver may be Hong Kong's relatively strict COVID-19 policy. The effect is unclear. Stricter policies increasing safety may draw in those more concerned about health risk or disruption from public service closures, or may have driven away those who wished to avoid restrictions. Hong Kong over this period was less strict than the mainland, but stricter than many Western countries. Without rigorous additional analysis, it is difficult to ascertain the effect.

How will Talent In-Flows affect Hong Kong's Economy?

The in-flow of talent to Hong Kong is likely to benefit the local economy. There are signs that the in-flow will create new demand for local businesses. Already, there is rising enrollment of Mainland students in local schools. This influx has contributed to higher rents in university-adjacent neighborhoods such as Kennedy Town. Local primary and secondary schools have also seen significant uptick in enrollment by the arriving Mainland children. There is also a

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3   https://www.policyaddress.gov.hk/2021/eng/pdf/publications/Northern/Northern-Metropolis-Development-Strategy-Report.pdf

4   https://www.universityworldnews.com/post.php?story=20231025122118185

significant uptick in demand for banking and insurance products in Hong Kong, driven in part by higher interest rates.

The brain gain may also increase business dynamism and innovation in Hong Kong. For example, leading Chinese food delivery platform Meituan has laid out ambitious plans to expand in Hong Kong.[5] Historically it had not been profitable for Chinese firms to develop their presence in Hong Kong due to the market's limited size. However, market saturation and weak growth in the Mainland are leading Chinese companies to expand their investments and operations in Hong Kong, as a stepping stone towards international expansion.

Policy Recommendations

In conclusion, the data reveal that Hong Kong is not only experiencing talent out-flow, but also significant and offsetting talent in-flow. Unlike the low-skilled Mainland immigrants of the past two decades, the arriving population consists primarily of skilled workers with global ambitions. These immigrants will help power economic growth in Hong Kong and enhance the city's role as a gateway for Mainland Chinese households and companies seeking to participate in global markets. Given their importance to the future economic growth, Hong Kong should redouble its efforts to retain and attract talent now that the pandemic has eased.

First, Hong Kong can utilize and integrate a wider range of administrative and company datasets to better monitor the health of the city's labor force, improve policy design, and counter factually questionable narratives. As we've shown, the available data is inconsistent with the widespread and pessimistic narrative that Hong Kong is experiencing a long-term decline in talent. While the data does suggest that Hong Kong's population is increasingly Asian, they also show that Hong Kong continues to draw a wide range of people internationally, and the overall talent pool has likely become more skilled in recent years.

Second, Hong Kong can consider labor policies to retain younger residents. In the data, we find that young people are the group most likely to emigrate. This is because they are less established and have the longest career trajectory to consider. To reduce these departures, the Government may implement policies targeted at retaining these groups over a longer horizon, such as subsidies for continuing education or overseas scholarships that require recipients to return for work.

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5   https://pandaily.com/meituan-delivery-takes-four-months-to-expand-from-kowloon-to-hong-kong-island/

Figure 1: Distribution of Net Joining/Leaving by Age Group, LinkedIn

Net joiners/leavers by age bucket

Net joiners/leavers by age bucket, high-earners
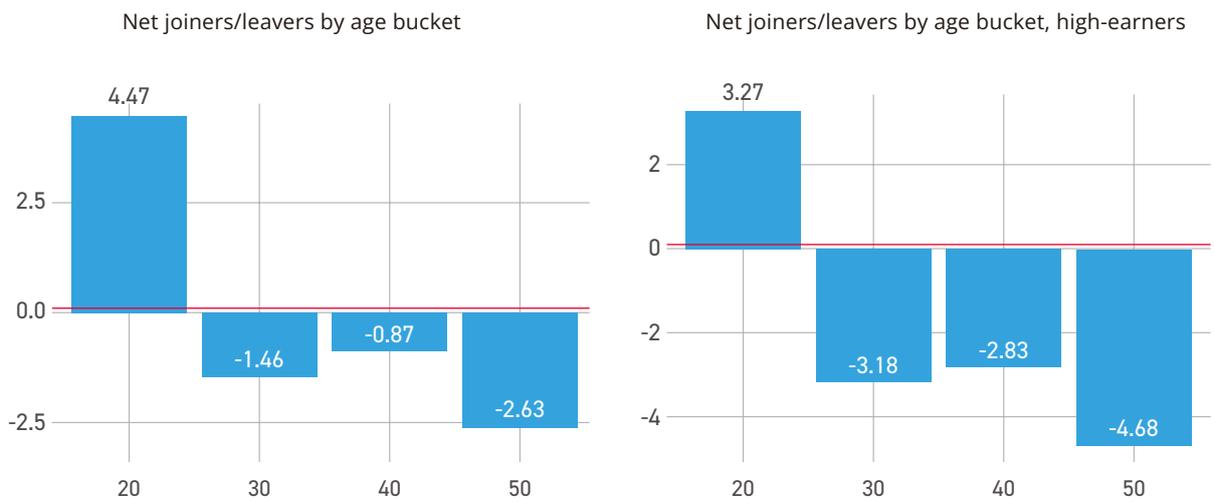
Figure 2: Population in Hong Kong, 2017-2022
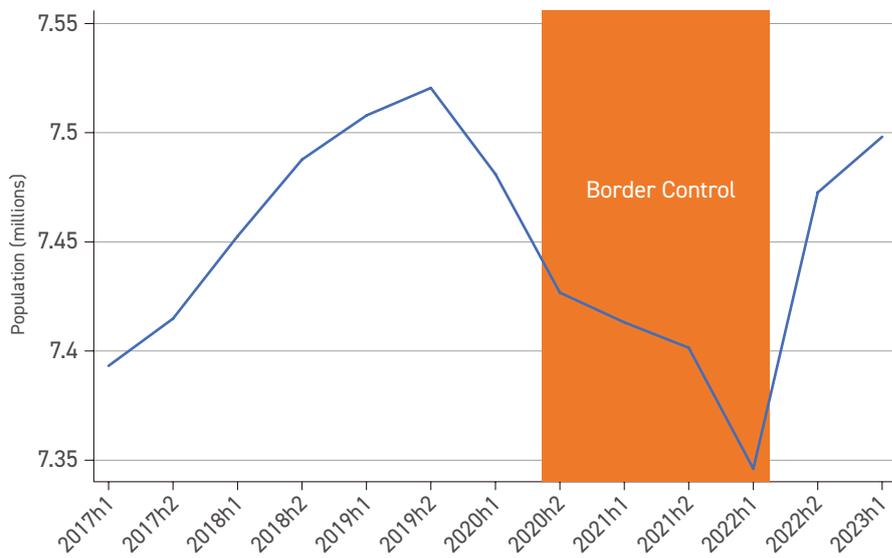
Figure 3: Distribution of Headcount Growth by Multinational, LinkedIn
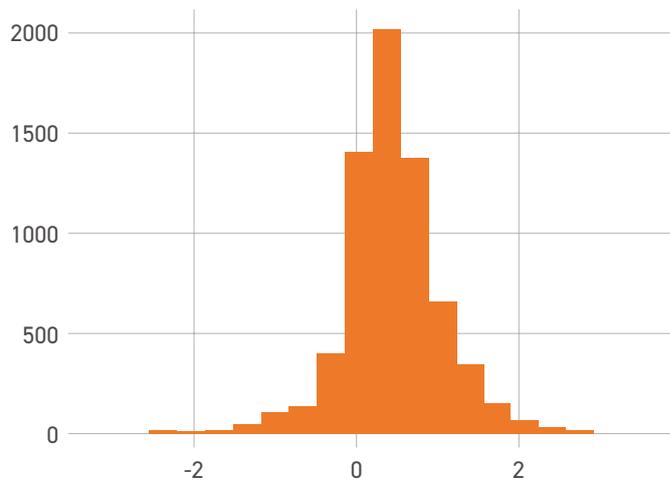
Figure 4: Number of Regional Headquarters in Hong Kong, 2018-2022

Number of Regional Headquarters by Company Origin
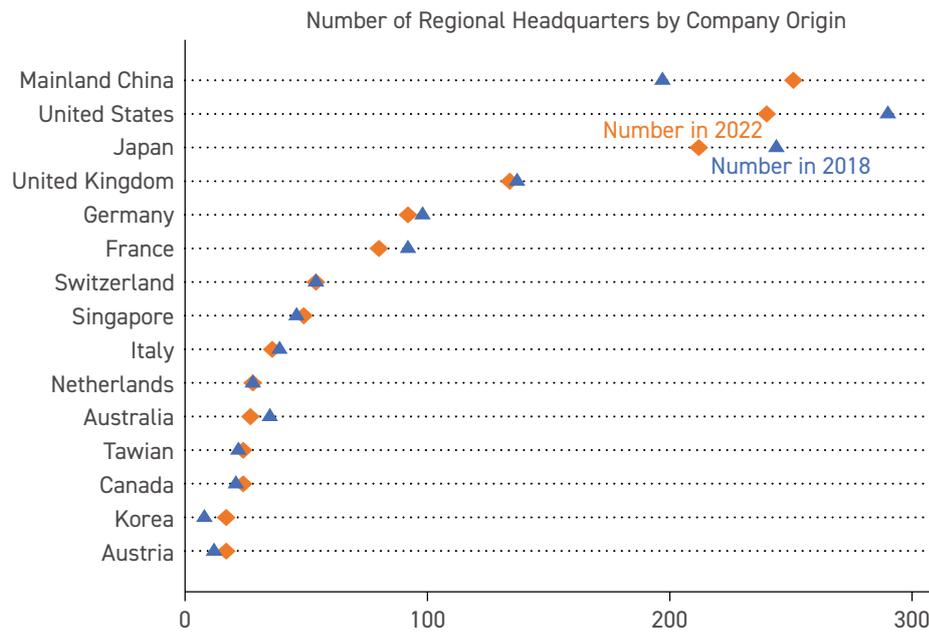
Table 1: Joiners and Leavers – Average characteristics, LinkedIn

	Joiner 來港者	Leaver 離港者	t-test t檢驗
Average Times Higher Education Rank (lower → more elite) **泰晤士高等教育世界大學排名平均數 (較低→較高)**			
Master's 碩士	163.48	191.84	-4.29
Bachelor's 學士	211.54	263.24	-16.11
MBAs 工商管理碩士	229.35	284.26	-2.86
PhDs 哲學博士	137.79	172.17	-1.97
Other statistics **其他統計資料**			
Age 年齡	33.59	32.28	17.61
Estimated Salary[6] 估計薪金[6]	59545	53624	31.01
Asian 亞裔	0.79	0.58	
Connections (LinkedIn) 聯繫人數目 (LinkedIn用戶)	200	339.04	-15.83
Connections/Age 聯繫人數目/年齡	6.55	10.63	-11.45

6 Estimated salary is based on Revelio's model, which considers various factors one of which is the location of the person. Although location is only one small determinant (and the occupation, industry, firm, education could be dominant factors), one must take into account this may be a slightly confounded measure if LinkedIn members are coming from areas with a higher cost-of-living or average salary than Hong Kong.

Table 2: Talent Flows by Region, LinkedIn

Region 地域	Leave HK 離港	Join HK 來港	Join – Leave 流入–外流	Turnover 更替
United States 美國	5654 (242)	10186 (302)	4532 (60)	15840 (544)
Mainland China 中國內地	3421 (141)	5032 (210)	1611 (69)	8453 (351)
United Kingdom 英國	3010 (151)	3126 (129)	116 (-22)	6136 (280)
Singapore 新加坡	2173 (138)	1497 (115)	-676 (-23)	3670 (253)
Australia 澳洲	1725 (46)	1321 (25)	-404 (-21)	3046 (71)
Canada 加拿大	1297 (81)	684 (48)	-613 (-33)	1981 (129)
India 印度	516 (5)	1275 (6)	759 (1)	1791 (11)
France 法國	984 (12)	725 (4)	-259 (-8)	1709 (16)
Taiwan 台灣	449 (15)	564 (26)	115 (11)	1013 (41)
Japan 日本	548 (18)	462 (20)	-86 (2)	1010 (38)

Table 3: Transitions, Within vs Across Firm, LinkedIn

Transition 調職	Move company 跳槽	Counts 人數	Proportion 比例
Leave HK 離港	Different company 跳槽	21690	6.83
Leave HK 離港	Same company 調職	5206	1.64
Join HK 來港	Different company 跳槽	21136	6.65
Join HK 來港	Same company 調職	11775	3.71
Stayed in HK 留港	Different company 跳槽	72659	22.86
Stayed in HK 留港	Same company 調職	185317	58.32

Table 4: Human Capital Rankings based on Linked Profiles, Selected major cities

Bachelor, PhD, MBA rates refer to the rates of attaining those degrees as reported by LinkedIn users. Bachelor rank, Master rank, and PhD rank refer to the THE rank of the overall institution (not conditioned on degree) of the institution.

Location 地域	LinkedIn users LinkedIn 用戶	Bachelor rate 學士比率	MBA rate 工商管理碩士比率	PhD rate 哲學博士比率	Founder rate 創辦人比率	Bachelor Rank 學士排名	Master Rank 碩士排名	PhD Rank 哲學博士排名
San Francisco 三藩市	1052372	2	2	1	2	2	3	3
Los Angeles 洛杉磯	1396690	10	13	8	1	4	1	2
New York 紐約	4531237	6	6	5	7	6	5	7
Hong Kong 香港	636742	9	7	10	12	1	2	1
Sydney 悉尼	1116363	3	10	12	5	3	7	4
Chicago 芝加哥	1307694	5	3	6	11	7	4	8
Melbourne 墨爾本	1052652	1	12	7	6	5	8	6
Switzerland 瑞士	778234	12	4	3	4	9	6	9
Toronto 多倫多	1372302	4	5	11	9	10	10	10
Singapore 新加坡	1289905	7	8	14	15	8	9	5
London 倫敦	3503532	8	14	13	3	11	13	11
Tokyo 東京	307889	13	11	4	10	15	15	15
Shanghai 上海	712040	14	9	9	14	13	12	13
Beijing 北京	508173	15	15	2	13	14	14	14
Dubai 杜拜	2209764	11	1	15	16	16	16	16
Shenzhen 深圳	375386	16	16	16	8	12	11	12

Appendix: Data and Sample Construction

The LinkedIn profiles that we study are captured by Revelio Labs, a company that specializes in collecting and aggregating publicly available workforce data to create a comprehensive database of employment records. Previous papers that have used the Revelio dataset include (Baker et al., 2022; Cai et al., 2022; Charoenwong et al., 2022; Liang et al., 2022). For our main sample, we construct a person-quarter panel and extract all users who have ever been in Hong Kong either through their profile or point-in-time position location (e.g. user A works at company B, listed as being in Hong Kong). Oftentimes, users do not associate locations with positions but have one associated with their profile. To identify the location of users, we presume the location position is more accurate, if available, than the profile location.

These data provide highly detailed information about the demographic characteristics of migrants, but a few biases of the data are worth noting. First, the data is not updated in real-time. While our snapshot of the data was from October 2023, there are delays as to when people update their profiles. The typical delay is unknown, but Revelio provided an informal estimate of up to several months. Second, the data is scraped at intervals and may not always capture all profiles on LinkedIn. Third, users may update their profiles with false information or information that is updated with a delay. Revelio Labs has machine learning models to try to remove spam profiles but as with all machine learning models these may not be fully accurate. Fourth, Chinese users are less likely to use LinkedIn due to censorship rules and the emergence of local competitors. This makes benchmark comparisons against Chinese cities somewhat fraught. Fifth, workers in high-skilled occupations are more likely to use LinkedIn, so our sample disproportionately captures skilled workers. We supplement these data with various Government data sources.

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IP Commercialization Benefits High-Quality Economic Development of Hong Kong

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Heiwai Tang

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The late Nobel laureate in Economics, Douglass North, reviewed the rise of Western economies and pointed out that the 18th-century "Industrial Revolution" originated from a series of institutional changes in society. By the end of the 17th century, Britain had gradually established a set of institutions and laws that encouraged production efficiency, ensuring that each factor of production received a large portion of returns commensurate with its economic value. Among these changes, the development of patent systems and other intellectual property (IP) laws encouraged innovative growth. These institutional innovations not only enhanced the profitability of private economic activities but also internalized externalities, ultimately driving improvements in social efficiency and output. [1]

Today, the IP system is no longer a novelty. However, significant differences persist among regions in terms of laws, enforcement, commercialization, and even societal culture. In the context of the Fourth Industrial Revolution, the success or failure of various economies in the fierce global competition may depend on their ability to establish efficient IP systems, thereby maintaining a leading position in innovative technologies.

Hence, institutional innovation remains crucial for Hong Kong's future economic development. Despite Hong Kong's respectable international reputation in IP protection, it must still accelerate the progress of IP commercialization to amplify the economic benefits of the IP system. While arrangements outlined in the "National 14th Five-Year Plan" provide Hong Kong an opportunity to develop as a regional IP trading centre, the positioning and development strategies are yet to be clarified.

Considering the aforementioned points, the subsequent paragraphs will briefly introduce the worldwide progression of IP commercialization and offer recommendations for the economic development of Hong Kong, referring to the development experiences of China, the United States, and Singapore.

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1   North, Douglass C., and Robert Paul Thomas (1970). An Economic Theory of the Growth of the Western World. *The Economic History Review*, vol. 23, no. 1, 1970.

1.   Exploring the Vast Potential of IP-intensive Industries

The global IP economy is experiencing robust growth. Data from the World Intellectual Property Organization (WIPO) indicates that the total number of global IP applications increased from 11 million in 2012 to 26 million in 2021 (see Figure 1). Additionally, data from the World Bank reveals that the total value of global IP trade rose significantly from USD 278 billion in 2012 to USD 435 billion in 2021 (see Figure 2).

Figure 1: Total IP Applications in the World, by Types (2012-2021)

Industrial design (design count)   Patent   Trademark (class count)   Utility model
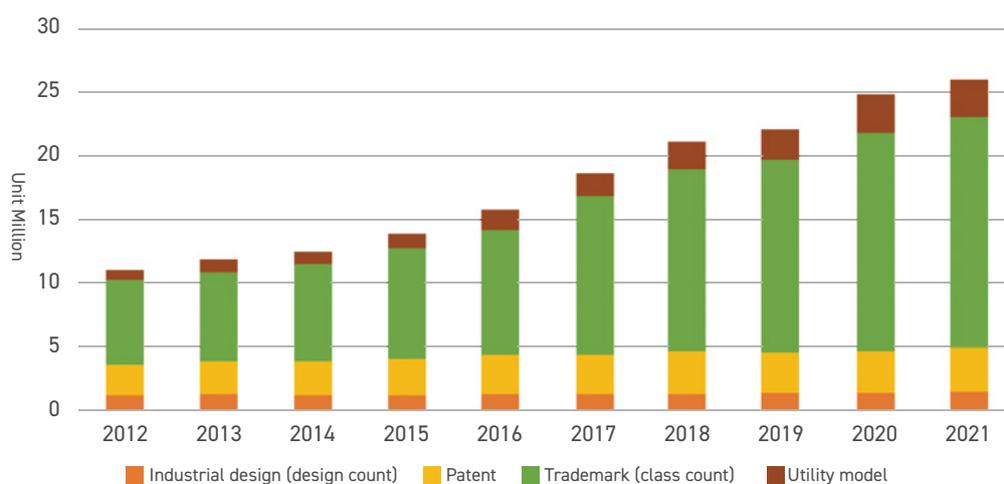
Data source: WIPO statistics database (Last updated: February 2023)

Figure 2: Total Value of Global IP Trade, 2012-2021

Charges for the use of IP, receipts
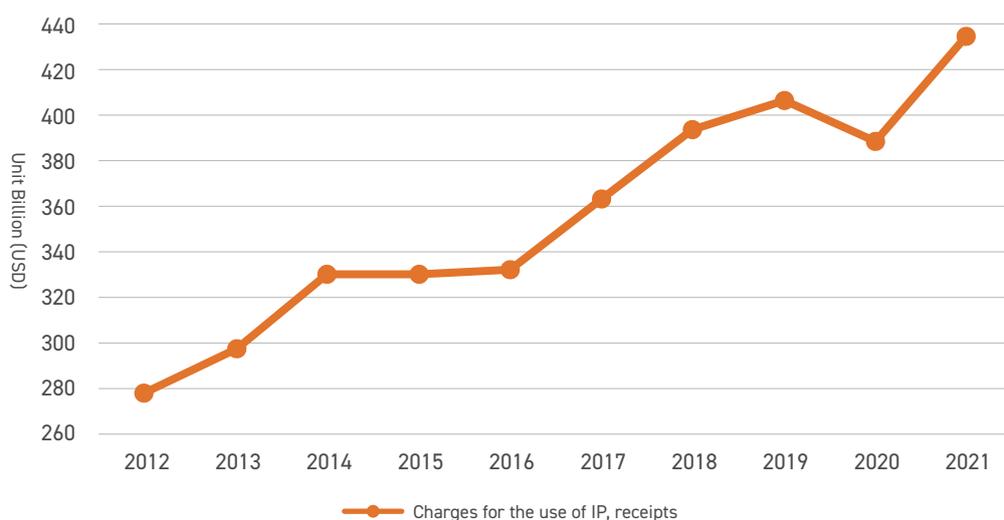
Data source: World Bank

Meanwhile, IP has also been proven to generate significant positive externality, promote high-quality economic growth and create more high-quality employment opportunities. For instance, research by the United States Patent and Trademark Office[2] shows that IP-intensive industries accounted for 41% of the U.S. domestic economic output in 2019, creating 44% of employment opportunities in the country. Meanwhile, employees in IP-intensive industries had an average weekly income of USD 1,517, 60% higher than USD 947 for non-IP-intensive industries.

Research by the European Patent Office and the European Union Intellectual Property Office[3] also found that from 2017 to 2019, the average weekly cost per person in IP-intensive industries was EUR 840, nearly 41% higher than EUR 597 for non-IP-intensive industries. During the same period, IPR-intensive industries were responsible for 39.4% of all employment in the European Union, contributed to over 47% of the EU's gross domestic product (GDP), accounting for over 75% of intra-EU trade, and over 80% of external trade, generated a trade surplus of EUR 224 billion.

The importance of patent-intensive industries to the Chinese economy is also increasing. According to data from the China National Intellectual Property Administration[4] (CNIPA), the added value of patent-intensive industries in China rose from CNY 10.7 trillion and 11.6% of GDP in 2018 to CNY 14.3 trillion and 12.44% of GDP in 2021. In 2021, patent-intensive industries created 48.7 million jobs in China, accounting for 6.52% of total employment, higher than 6.18% in 2018. Meanwhile, the annual income of workers in China's patent-intensive industries was CNY 116,000, 10.2% higher than that of non-patent-intensive industries. The seven major patent-intensive industries, including pharmaceutical and medical, information and communication technology, and manufacturing, achieved growth rates ranging from 12.5% to 40.9%, effectively supporting high-quality economic development.

2.   The Focus of IP Activities is Shifting towards the Asia-Pacific Region

With the global trends of the digital revolution, the Fourth Industrial Revolution, and the technology race, there has been significant worldwide demand for IP commercialization. Meanwhile, the focus of IP activities is shifting towards the vibrant Asia-Pacific region. Data from WIPO reveals that the total number of IP applications in the Asian region accounted for 73% of the global total in 2021 (see Figure 3). Over the past decade, from 2012 to 2021, the total number of patent applications filed by CNIPA has continued to rise. Among the top 20 IP offices

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2   U.S. Patent and Trademark Office (2022). *Intellectual property and the U.S. economy*. Third edition.

3   The European Patent Office and the European Union Intellectual Property Office (2022). *IPR-intensive industries and economic performance in the European Union, industry-level analysis report*. Fourth edition.

4   中國國家知識產權局（2023）：《知識產權統計簡報》，2023年第2期。

worldwide in terms of patent application volume, CNIPA's share has risen from 29% to 49% (see Figure 4).

Figure 3: Total IP Applications in the World, by Regions (2012 & 2021)

Data source: WIPO statistics database (Last updated: February 2023)
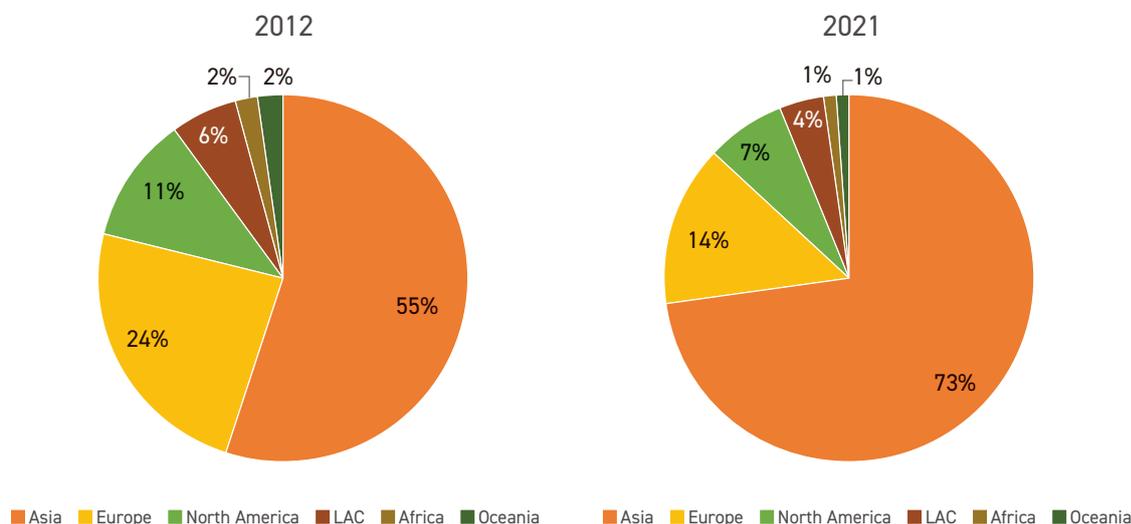
Figure 4: Patent Applications for the Top 20 IP Offices (2012-2021)

Data source: WIPO statistics database (Last updated: February 2023)

In this context, there is growing demand for a regional IP trading center in Asia.

However, if Hong Kong is to seize opportunities and stand out, we also need to understand the various challenges in the IP commercialization process. Furthermore, building upon the experiences gained from other regions, we should design our development strategies based on Hong Kong's unique strengths.
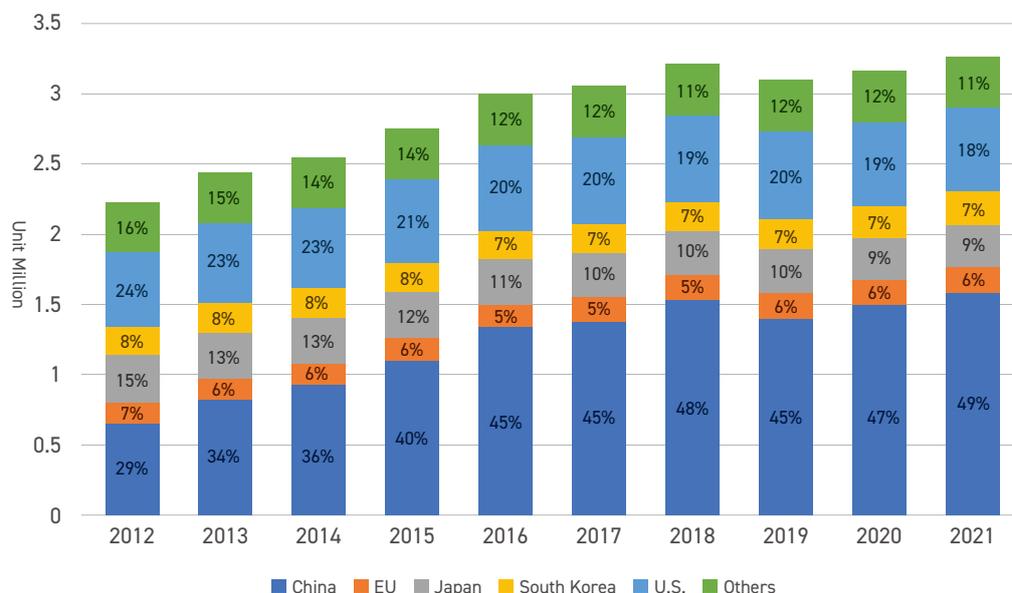
3. Challenges in Building an Ecosystem for IP Commercialization

According to interviews conducted by the author with over 20 experts in the IP ecosystem (covering areas such as creation, adoption, commercialization, trade, and professional services), the challenges of IP commercialization encompass almost all parts of the ecosystem.

- **Legal Framework and Law Enforcement:** A robust legal framework and effective enforcement are essential for safeguarding IP. Dealing with legal disputes related to IP often involves substantial costs. On the other hand, the lack of coordination in IP-related laws between different jurisdictions and inadequate enforcement mechanisms in certain countries complicate cross-border IP commercialization. Therefore, governments need to establish clear and consistent legal frameworks, coordinate legal system differences between various jurisdictions, ensure adequate protection for IP both locally and internationally, and explore cost-effective mechanisms, including alternative dispute resolution, to promote IP commercialization.

- **Valuation Mechanism:** Accurate valuation of IP is necessary but could be expensive and challenging due to the involvement of financial and technical expertise. On the other hand, considering the cross-border nature of IP transactions, third-party valuation services are often required. Therefore, governments need to collaborate with stakeholders to establish common standards for IP valuation. It would lower the costs for small and medium-sized enterprises to conduct IP valuation, making it easier to bring innovative products to market and leverage IP for financing purposes.

- **Information Dissemination:** Buyers and sellers of IP require accurate information to make informed investment decisions. Therefore, there is a need to establish a transparent information-sharing framework and effective transaction platforms that enable stakeholders to easily access necessary information and facilitate connections between buyers and sellers, thus reducing transaction costs.

- **Risk Management:** It is necessary to assess the risk of technological obsolescence and continuously monitor market changes to optimize the IP investment portfolio. Additionally, prior to acquiring or licensing any IP, it is important to manage infringement risks through due diligence and develop enforcement strategies to protect IP rights.

- **Incentivization of Stakeholders:** The early-stage investment costs in IP commercialization, especially in research and development, could be significant, involving substantial investments in personnel, equipment, and materials. Additionally, marketing and distribution expenses could be expensive. The government needs to encourage stakeholders' participation through policies such as funding support and tax incentives.

4. IP Commercialization in China, the United States, and Singapore

4.1 International Trade

The United States holds a massive global IP trade and trade surplus (see Figure 5). From 2016 to 2021, the amount of IP trade for the United States ranged from USD 154.96 billion to USD 167.96 billion, and the amount of IP trade surplus increased from USD 67.85 billion to USD 81.27 billion. These figures demonstrate the dominant position of the United States in global IP trade.

Figure 5: Charges for the use of IP, receipts & payments, United States (2016-2021)
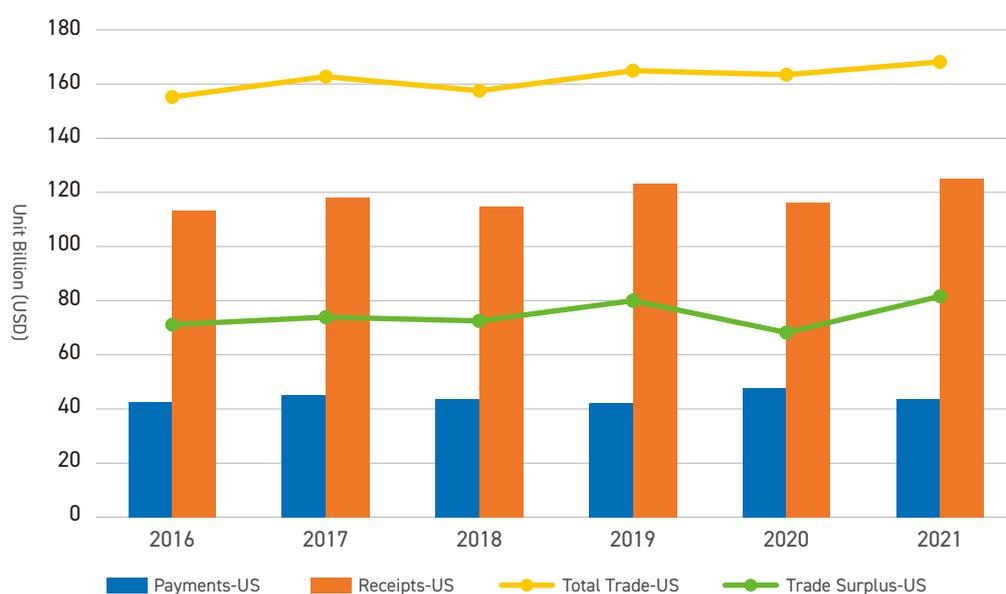
Data Source: World Bank

Singapore's IP trade deficit has rapidly decreased (see Figure 6). From 2013 to 2022, the total value of IP payments for Singapore fluctuated with a downward trend, and the total value of IP receipts rose significantly, resulting in the IP trade deficit plummeting from USD 19.58 billion to USD 3.46 billion. Meanwhile, the overall scale of Singapore's IP trade remained relatively stable. These figures illustrate significant progress in Singapore's transition from an IP consumer to an IP producer country.

Figure 6: Charges for the use of IP, receipts & payments, Singapore (2013-2022)
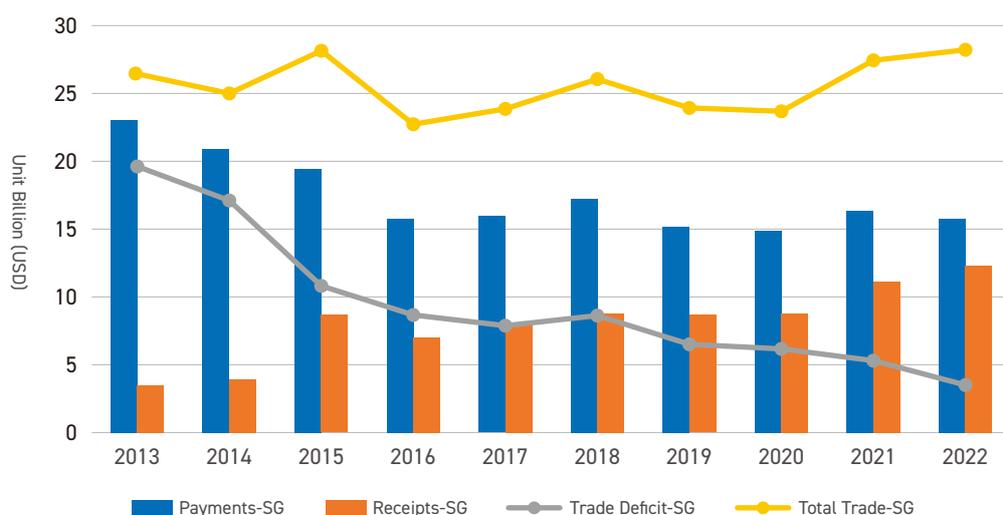
Data Source: World Bank

China's IP trade scale experienced continuous growth (see Figure 7). From 2016 to 2021, the total IP trade for China more than doubled, increasing from USD 25.14 billion to USD 58.59 billion. Meanwhile, IP exports climbed over ten times from USD 1.16 billion to USD 11.74 billion. However, due to simultaneous growth in IP imports from USD 23.98 billion to USD 46.85 billion, China's IP trade deficit still rose from USD 22.82 billion to USD 35.11 billion.

The data reflects China's rapid development in IP trade. The significant growth in both IP import and export signifies the increasing role of IP in China's economy. The substantial growth in IP exports signifies China's emerging prominence as a global player in IP-driven industries. However, the persistent growth of the IP trade deficit also indicates that China still has a high degree of dependence on foreign countries.

Figure 7: China's IP Trade Import and Export Statistics, 2016-2021
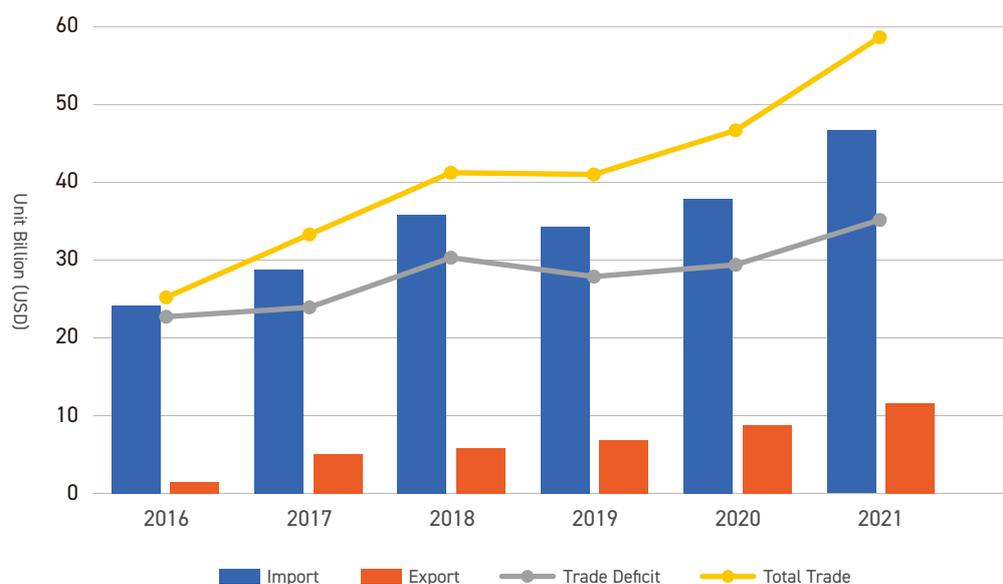
Data Source: World Bank

4.2 Development Characteristics of the United States

The United States and China have distinct approaches to addressing the challenges of IP commercialization. The driving force behind IP commercialization in the United States primarily comes from the private market. On the other hand, in China, the government often takes the lead in promoting IP commercialization through top-down initiatives.

In the United States, where the private sector dominates the IP market, IAM Market and other private platforms allow patent sellers to publicly showcase their patents and engage in direct transactions with interested buyers. Additionally, the Industry Patent Purchase Program simplifies the transaction process and reduces the cost of price negotiations by setting fixed deadlines and prices.

The role of the United States government is primarily to create a favorable environment that encourages inventors, businesses, and investors to participate in IP commercial activities. For example, the United States Patent and Trademark Office (USPTO) has established the "Patents 4 Partnerships" platform, integrating information related to U.S. patents, reducing the cost of information search, and connecting technology owners with potential buyers. The USPTO has also launched the Law School Clinic Certification Program, which grants clinic law students, under the supervision of registered attorneys or agents, the authority to represent innovators

to file and register patents and trademarks. This program provides a low-cost alternative for early-stage innovators to access professional legal services.

Moreover, the National IP Rights Coordination Center (IPR Center) collaborates with both public and private entities, such as Alibaba, Merck, 3M, the Motion Picture Association, the USPTO, and Europol, to combat infringement activities and safeguard IP rights in the United States.

The case of the United States demonstrates the importance of fostering an efficient IP market and highlights the crucial government role in creating a conducive environment for IP commercialization. The successful experiences of the USPTO and the IPR Center emphasize the significance of establishing robust IP institutions.

4.3 Development Characteristics of Mainland

China's role in global IP commercialization has become increasingly important, as evidenced by its annual patent licensing volume, IP trade volume, and influence within the global Patent Cooperation Treaty (PCT) system. Driven by the demand for innovation and financing of indigenous technologies, China's IP financing primarily focuses on cultivating small and medium-sized enterprises, as well as high-tech companies.

As a rising player, China has been vigorously promoting IP commercialization in recent years through top-down initiatives. For example, the State Council released the "Outline of Building an Intellectual Property Power (2021-2035)" in September 2021, which sets various working and development targets. One of these targets is to increase the contribution of patent-intensive industries to the country's GDP to 13% by 2025.

While China's capabilities in developing market-oriented financing models and implementing internationally recognized standards may be relatively weak, the Chinese government has taken proactive measures to incentivize IP commercialization. The China National Intellectual Property Administration announced its plans to establish several national-level institutions in 2022 to build an effective secondary market for IP transactions. Additionally, several provinces in China have implemented subsidy policies for IP financing, aiming to reduce costs such as loan interest rates, insurance premiums, and valuation expenses.

The Chinese government has also made efforts to strengthen legal protection for IP by establishing the Intellectual Property Court of the Supreme People's Court and multiple specialized IP courts. Similar to practices in other regions, China has set up the Intellectual Property Dispute Mediation Committees to offer a cost-effective solution for resolving IP disputes. In Beijing, multiple professional organizations have also been established to handle internal disputes in industries such as electronics, software, and medicine.

China's IP valuation mechanism consists of internal valuation within financial institutions and valuation services provided by independent third-party professional institutions and government-affiliated organizations. However, there are still noticeable deficiencies due to the lack of a nationwide standardized framework for intangible assets valuation, as well as a shortage of professionals and the immaturity of the secondary market for transactions.

To enhance the risk mitigation mechanism for IP commercialization, the Chinese government has provided special funds to guarantee institutions and share risks with financial institutions on a proportional basis. Another approach China has taken to reduce the financing risk of IP is requiring a basket of assets as collateral. This basket can consist of tangible and intangible assets or the bundling of IPs, such as patents, copyrights, and trademarks.

The case of China highlights the efforts made by the Chinese government in promoting IP commercialization. While China's position in global IP commercialization is becoming increasingly important, it still faces challenges in developing a mature secondary market, implementing internationally recognized valuation standards, enforcing IP rights, and training professionals in the field. It presents ample opportunities for Hong Kong to contribute to the nation and develop into a regional hub for IP trading.

4.4 Development Characteristics of Singapore

Singapore has positioned itself as a leading international hub for IP trade through government-led initiatives and substantial investments. The Singaporean government has established efficient secondary markets for IP transactions and facilitated connectivity across the ecosystem. For instance, vibrant platforms, such as *the Innovation Marketplace* by Innovation Partner for Impact and *the Collaborative Commerce Marketplace* launched by the Agency for Science, Technology, and Research (ASTAR), connect technology providers with businesses. Additionally, the Intellectual Property Office of Singapore (IPOS) has established "Patent Prosecution Highway" arrangements with major countries, including China and the United States, to solidify its position as a global and Asian IP hub.

In addition, Singapore has actively taken measures to strengthen its legal system and talent development in the field of IP. The Singaporean government established the IP court in 2012 and released the IP court guide in 2013. In recent years, Singapore has also introduced the Copyright Act 2021 and the IP (Amendment) Bill 2021 to ensure its relevant laws keep pace with the times. Starting from April 1, 2022, the IPOS extended the "Enhanced Mediation Promotion Scheme" for three more years and renamed it the "Revised Enhanced Mediation Promotion Scheme". The scheme provides subsidies to parties involved in litigation proceedings with the IPOS, encouraging them to choose mediation as an alternative to litigation. Furthermore, Singapore established the IP Academy in 2003 to nurture legal professionals in the field of IP.

Regarding IP valuation, Singapore adheres to the standards set by the International Valuation Standards Council. It has also tried to develop its valuation guidelines for intangible assets and IP based on the International Valuation Standard (IVS 210). Additionally, the IPOS has committed to training a group of qualified intangible asset/IP valuators. In recent years, the Singaporean government has actively encouraged companies listed on the Singapore Exchange to disclose their intangible assets. In 2020, the Singapore Exchange and IPOS jointly initiated the "Intangible Disclosure Evaluation and Audit Scheme," providing financial support for businesses to evaluate their intangible assets. Recently, Singapore has released the "Intangible Asset Disclosure Framework," which provides guidance to companies listed in Singapore on voluntary disclosure of relevant information about their intangible assets.

In 2021, the Singaporean government launched the "Singapore Intellectual Property Strategy 2030," providing comprehensive support to the ecosystem. The strategy encompasses three interrelated areas: strengthening Singapore's position as a global hub for IP, attracting and growing innovative enterprises using IP, and developing good jobs and valuable skills in IP.

The case of Singapore demonstrates the critical role of the government in fostering an IP ecosystem. It includes establishing effective secondary markets for IP transactions, maintaining up-to-date legal frameworks, promoting transparent information dissemination, and cultivating legal talent. Furthermore, the Singaporean case highlights the significance of building a comprehensive ecosystem for IP financing instead of merely offering subsidies.

4.5 Summarizing the Development Experiences of the Three Regions

While the strategies employed by the United States, China, and Singapore governments to address IP commercialization challenges may differ, we can still identify common elements within their respective frameworks. In order to build an ecosystem conducive to IP commercialization, all three economies have established effective secondary markets to promote information transparency and encourage IP transactions. Additionally, the three economies have strengthened their legal frameworks by establishing IP courts, updating laws and regulations, formulating valuation standards, and promoting mediation as a cost-effective alternative for dispute resolution.

Due to the high costs associated with registration, legal services, valuation, financing, insurance, and other IP services or products, the three countries' governments often provide subsidies, tax incentives, or other cost-effective alternatives to stakeholders involved. Additionally, the three countries emphasize talent development and professional training. Whether through universities, industry organizations, or government initiatives, various IP-related courses and even sponsorships are offered to support the cultivation of expertise in the field.

Lastly, the three economies pursue international collaboration to strengthen their positions in the global IP arena. For example, they established the "Patent Prosecution Highway" to enhance

cooperation with patent offices in different jurisdictions. It involves mutual recognition of approved patents and streamlining the examination processes.

The unique experiences of these three economies also have limitations. The thriving IP markets in the United States can be attributed to its world-class research and development capabilities, financial system, and economic scale. While allowing private players to establish platforms and brokerage firms in the market has clear benefits, it can also lead to the incentive for brokerage firms to acquire patent clusters, reducing market competition among innovative companies and potentially stifling innovation through monopolistic practices. The Chinese model, driven by government intervention, leverages the power of state-owned enterprises to ensure effective policy implementation. On the other hand, Singapore provided subsidies for IP valuation to incentivize enterprises' participation in its IP Financing Scheme. However, the participation rate in the scheme ultimately fell below expectations, resulting in its failure in 2018.

5.   Eight Recommendations to Promote IP Commercialization in Hong Kong

In recent years, the HKSAR government has made significant efforts to promote IP commercialization. For example, the government developed the "Original Grant Patent" system, facilitated the local implementation of the Madrid Protocol (the Madrid Agreement Concerning the International Registration of Marks), and introduced tax incentives through the "Patent Box" scheme. The Patent Box scheme provides tax concessions for profits sourced in Hong Kong from qualifying patents generated through R&D activities.

Despite these efforts, Hong Kong's progress in IP commercialization has not been as satisfactory due to intense regional competition. Therefore, it is necessary to consider how to more efficiently enlarge the "cake" and mobilize stakeholders to develop Hong Kong into a regional hub for IP trade.

Hong Kong possesses a wealth of experienced and efficient professional services, a robust legal framework, a favorable business environment, and strong research and development capabilities. While drawing lessons from experiences elsewhere, it is also important to leverage Hong Kong's advantages and explore a unique development path for the city.

Based on country case studies and interviews with over 20 stakeholders and experts in Hong Kong and Shanghai, Hong Kong could consider the following eight recommendations to enhance its ecosystem for IP commercialization:

1.   Using the green finance framework as a model, develop standards to encourage companies to disclose IP-related investments and projects and support enterprises using IPs as collateral for financing.

2. Establish valuation criteria, use big data to provide reference prices, and provide subsidies and risk-sharing programs to reduce the cost and risk of IP valuation.

3. Establish an IP stakeholder alliance to pool resources to promote the commercialization of scientific research results.

4. Strengthen cooperation with the Mainland to combat infringement; encourage dispute resolution through mediation to reduce IP-related legal costs.

5. Provide annual financial support and develop an IP trading platform to stimulate stakeholder participation and build an IP commercialization ecosystem.

6. Collaborate with universities and international organizations to provide local courses related to IP; provide recruitment subsidies for IP-related professionals to strengthen the IP talent pool.

7. Deepen cooperation with the Mainland, join the Patent Prosecution Highway, and expand the international network of IP platforms.

8. The Government procures IPs in advanced industries such as life and health technology through investment funds such as the Hong Kong Growth Portfolio.

Great Cities:
The Importance of Enhancing Hong Kong's International Aviation Hub Status

Great Cities: The Importance of Enhancing Hong Kong's International Aviation Hub Status

Philip Chen

The Great City Challenge

Many suggestions have been made in recent decades for how to develop Hong Kong as "Asia's World City" and a leading city in China. These have sparked a lively debate on what makes a city great, and how this greatness can be enhanced.

This paper details my analysis on one key requirement for a world-class metropolis, and whether Hong Kong has such a requirement.

Many key factors determine a city's wealth and influence. These include geographical location, proximity to natural resources, culture, religion and tradition, fiscal and monetary policies, tourism attractions, and availability of human resources etc. All of these are important, but they alter in relative importance over time to reflect social, political, cultural and technological developments.

In fact, many of these factors might not be the single determining feature. Historical heritage and centres of religions are not necessarily the only pillars for the greatest cities on earth today. Cities with plentiful resources are not necessarily places with many travellers, or great cities. Population size is certainly not the key factor in measuring a city's greatness and influence. Geographically, London, New York and Amsterdam are not most favourably located cities. Even many capital cities, political centres of sizeable nations, are not amongst the top cities.

And Seattle poses the question of the role of corporate headquarters. It may boast many headquarters of world class corporations — Microsoft, Expedia, Nordstrom, Costco, Starbucks, Paccar, MOD, Boeing, Amazon, Redfin, Alaska Airline , etc.— but as a city it does not compare with New York, Chicago or Los Angeles.

From Silk Road

History offers a number of strong clues as to what makes a city great. About six to seven centuries ago, Venice prospered as it dominated the lucrative trade routes from Europe to the Middle East and Asia. The same could be said a millenium ago of the Chinese city of Changan (now Xian) owing to the Silk Road. It was a hub between the west and China. Two millenia ago, it was Rome - with the Romans expanding their empire to ensure "all roads lead to Rome".

Closer to our time, Malacca, Goa, and Macau were major trading ports in Asia before Singapore was developed. It was not fertile land or natural resources that were key to these cities' success but their positions on the main trade routes of the time. They grew as these trade and travel routes boomed. And as trade routes changed with the development of new transport technologies, these cities declined.

This particular component in the development of great cities – their relationship with transportation routes – is a key focus of this paper. The issue is often overlooked yet its continuing significance is still very much evident.

With the rise of air travel, it is notable that the foremost commercial and business centres are all major aviation hubs. Obvious examples are London, Singapore, Hong Kong, Tokyo, Dubai and New York.

People may debate what comes first: a great city or the transport links that support it. Yet, in the last 50 years, fostering strong aviation links has gone hand in hand with developing modern-day great cities as focal points for trade, finance, services, travel and tourism. The ease of getting to and from these aviation hubs has provided a key pillar for economic development. Strong aviation links have enabled cities to grow in wealth, influence and population.

The Contribution of Home Carriers

One common strand links leading aviation centres: they all have strong international home carriers. This is not just an argument for Cathay Pacific and Hong Kong; it applies with equal force to British Airways and London, Singapore Airlines and Singapore, Emirates and Dubai, and United Airlines and Chicago.

The advantages of having a strong home carrier are self-evident. A strong home carrier will promote its base aggressively as a travel, tourism, service and business centre. It is in its natural self-interest to do so. An overseas carrier has its own set of loyalties to its home base.

A strong international home carrier makes a significant contribution to the local economy. It is typically a major foreign exchange earner. Roughly three-quarters of Cathay Pacific's revenue

was from overseas. The ratio for Singapore Airlines is roughly comparable. The airlines – especially those from small home bases – are essentially exporting empty seats and getting foreign exchange. And it is a huge amount of foreign income. In many countries the airline's "export function" and its role as a foreign exchange earner are crucial.

Further, a home carrier has a wide range of high value-added headquarter operations in its home economy, as well as a range of support operations such as pilot, cabin crew and other training, sophisticated IT, catering, ground services, cargo logistics, purchasing and aircraft maintenance.

Local airlines also provide significant employment. Cathay Pacific and its subsidiaries, employ some 26,000 people in Hong Kong. The Singapore Airlines group employs similar numbers in their own home cities. Compare these figures to the number of people that airlines employ overseas. For instance, Cathay Pacific typically carries around a million passengers to Japan but only has less than 300 people based there. British Airways, Qantas, Thai Airways, Singapore Airlines and Canadian Airlines are all important players in the Hong Kong market but employ a hundred people or less for their operations here.

Home carriers also generate a large proportion of high-skill quality jobs in their home bases. Airlines' headquarter functions create a pool of value-added jobs around their own industry that enhances the home base economy's workforce. Examples include aircraft maintenance, planning, management, operations, finance, customer service, computer technology, and cargo logistics.

A strong international home carrier is frequently amongst a country's major universally recognised brands. The carrier acts as *de facto* ambassador and influences perceptions of its home base. It can be a source of national pride. Ask an individual to name any five leading companies in a foreign country, and the national airline is invariably mentioned.

Strong home carriers also help to boost tourism. In pursuing market share, airlines actively pursue passengers and bring them to their home cities. Every visitor that is brought to a city will spend money and support other industries such as restaurants, retail shops and hotels. In turn that creates employment and benefits not merely to tourism and trade, but also the directly related industries, like retail and land transportation. The multiplier effect of this industry on the economy is substantial.

The outbreak of SARS in 2003 and Covid in 2020 had huge global impacts. They also underscored the importance of tourism to Hong Kong's economy. Aviation and people flow in a city are like bloodflow in the body. A city's economy becomes sluggish without meaningful aviation and travel activities.

Home carriers have an obligation to its home base. When Hong Kong was suffering from the aftermath of 9-11, Cathay Pacific launched the World's Biggest Welcome and gave away 10,000 free roundtrip tickets. That was the first of such grand campaigns. After SARS, local airlines continued to work closely with local tourism, retail and food industries and launched the "We Love Hong Kong" campaign in order to encourage Hong Kong people to spend money and support their home. Furthermore, CX maintained Hong Kong's link to the world by continue to operate, even without profit. The Covid recovery was equally active. During and after these difficult periods, local airlines everywhere were willing to work for the overall benefit of their home cities/countries.

Developing the Hub

Yet the most significant way the base airline can help the home city is to build up the latter as a global hub. Home carriers contribute directly to the development of the hub's network by carrying business travellers and tourists to and from their primary hub via the route network.

In other words, the airline is not just carrying a passenger to and from Hong Kong, but through Hong Kong to elsewhere. This vastly expands the market beyond the home city to encompass the whole world.

Casual observation alone will reveal how much a traveller's routing is affected by an airline's network. A traveller from Mexico to Mainland China, for example, is unlikely to travel via Hong Kong if he or she is travelling on a Japan Airlines ticket. A traveller from Australia to Europe holding a Malaysian Airlines or Singapore Airlines ticket is unlikely to go through Bangkok or Hong Kong. And the foreign revenue goes elsewhere. By the same token, if Cathay Pacific has a strong network, this is more likely to attract the passenger to go via Hong Kong, thus bringing all the related benefits to Hong Kong, and further enhance Hong Kong's status as a world aviation hub. In this sense, the airlines and their hubs are competing for international business on a global stage.

Competition in international aviation is increasingly determined by "network strength". The strength of an aviation hub is determined by the multiplying effect of connecting routes that radiate from its centre. Maximising the connectivity offered by a hub requires high service frequency, competitive offers and schedule co-ordination that only a strong home carrier can deliver.

The Hong Kong to Colombo service is a good example. The number of end-to-end passengers between Hong Kong and Sri Lanka is quite limited and could not justify a regular scheduled service. However, by offering strategic connections via Hong Kong, Cathay Pacific attracts passengers from Mainland China, North America, Japan, Korea, the Philippines and even Australia to go via Hong Kong to Colombo. As a result, Hong Kong people now enjoy regular

direct flights to Sri Lanka. Cathay Pacific, for obvious reasons, is keen to develop the end-to-end market. That has to be good for tourism and trade in both places.

If, however, this route is denied to Cathay Pacific or if the economics (such as high aviation costs or oversupply) make it undesirable, the whole network connectivity offered by the Hong Kong hub would suffer—not just the direct route between the two cities.

Contrary to the views expressed by some, a strong home carrier does not "crowd out" other carriers. In reality, it tends to attract more airlines to come to the hub. Foreign airlines still want to fly to Frankfurt, for example, where Lufthansa has 55% of airport movements, or to Singapore, where the strong home carrier has 40% of the flights. Other cities that many airlines want to go to include London, New York, and Tokyo - all crowded airports. Developing a strong home carrier establishes the core of the hub, attracting more airlines to serve routes that broaden the network.

Even though a city might enjoy an excellent geographical location, and even a distinguished history, without a strong airline it will struggle to attract the necessary critical mass of international air routes and struggle to become a great city. Take Brussels: located at the heart of western Europe and housing the headquarters of NATO and the European Commission, and with interesting historical sights and tourism attractions, Brussels lacks a strong home carrier. People travelling to Belgium will often go via other great cities such as London, Amsterdam or Frankfurt that offer better frequencies and connections.

The opposite is also true. London and Amsterdam, although geographically much less central to the European continent than Brussels, are better developed today than Brussels. The strength of their respective airlines, BA and KLM, has supported their ongoing development. Amsterdam has maintained its position as a trading centre with the help of KLM, not to mention its continued success as one of the world's leading seaports.

The significance of the home carrier's contribution to the local economy is clearly apparent in the efforts of home carriers, home governments, local airports, regulatory authorities, and aviation authorities to ensure a hub can deliver its maximum economic value. The capital-intensive nature of airport infrastructure and related projects and airline operations make it necessary that all parties work together.

Singapore is an excellent example. Its government has built one of the best airports in the world in a country of less than six million people. As far back as 1972, then Prime Minister Lee Kuan Yew identified the economic returns of a strong airline: "Singapore runs an airline… for plain economic benefit." Several ministers have further elaborated on the same theme. When Singapore was still a newly independent country, facing a lot of challenges, with a small population, yet the big vision on aviation was set. It is no surprise to find the image of Singapore

Airlines adorning the back of old Singaporean $20 and $100 bank notes. Even today, the Singapore Airlines image appears on TV when the national anthem is played.

Home Carriers and Technological Change

Technological change can alter trade routes and erode a city's greatness. History provides numerous examples. New and faster sailing ships meant new routes between Europe and Asia. Venice, Xian, Goa, and Malacca all declined as the trade routes they once dominated lost significance.

In aviation, technological developments have given aircraft greater range. This has meant airlines no longer needed to make as many transit stops on the way to their final destinations. Shannon and Honolulu do not appear in route maps anymore. Once aircraft can operate non-stop long-haul, many cities in between could suffer a similar fate.

However, Dubai in the Middle East proves that this need not be the case. With the assistance of a strong and vigorous home carrier, transit hubs can remain strong despite technological change. In the 1970s airlines flying between Europe and Asia would typically make a transit stop in the Middle East, most often in Bahrain. In the 1980s, advances in airline technology meant airlines could fly direct to their destinations with no need to stop in the Middle East. This threatened to deprive cities like Bahrain and Dubai of their roles as air transport hubs. Yet the strength and rapid growth of the Dubai-based airline Emirates has ensured the city remains an important global aviation hub. Today Abu Dhabi and Doha play the same game and have been enjoying various levels of success.

The Role of Cargo

In discussing the role of trade and transport routes, we must mention the important role of air cargo. Air cargo growth has been substantial and is rapidly taking on an increasingly important role in the economic development of many countries. In this region, airline profitability often depends on air cargo, from which many Asian airlines derive 20% to over 40% of their income.

Much cargo is carried in the bellies of passenger aircraft. Policies to promote aviation centres should therefore not overlook the impact of cargo. It would be dangerous to treat air cargo as a separate industry when we talk about air traffic – it is often a vital component in ensuring the viability of passenger services to both new and existing destinations.

Yet cargo alone is not enough for the city's greatness. Consider the highest volume sea and air cargo ports in the USA, Europe and Asia. Few are considered the world's greatest cities.

Opportunities for Hong Kong

Some have suggested that Hong Kong needs a new approach to become a successful aviation hub. Let's be clear: Hong Kong is currently one of the world's leading aviation hubs. It occupies an enviable role as a great city and an important trade centre. Hong Kong is amongst the top airports in terms of international passenger throughput – 75 million international passenger throughput a year before the pandemic. In terms of international air cargo, Hong Kong is the undisputed leader. Even though Hong Kong has a population of merely seven million, the Hong Kong International Airport ranks as one of the world's best.

There is no cause to believe that Hong Kong is inadequate or substandard as our aviation centre. The remarkable growth we have enjoyed over many years is the envy of the region. A great deal of credit must go to the Central Government's consistent implementation of the "One Country, Two System" principle and its continuous support to the Hong Kong SAR Government, with 14th Five Year Plan's declaration that Hong Kong should be an international aviation hub and the Greater Bay Area vision promulgated several years back. The farsighted policy by the Government and the hard work of everyone in the aviation industry certainly matter. But there is no shortage of competitors and, in order for Hong Kong to maintain its pre-eminence, we must concentrate on enhancing the factors which have contributed to our stunning success.

To stay at the top, we need to consider the following key questions:

a.   *How can we improve our air transport facilities and infrastructure?*

b.   *How can we enhance and strengthen the role of our home carriers?*

c.   *How can we complement and reinforce the growth of our aviation industry with related industries?*

Let us examine each of these three points briefly:

a.   *Infrastructure*

The old airport at Kai Tak did not allow room for growth and frustrated the local airline industry's ambition for expansion. The new airport in 1998 was a tremendous infrastructure gain for Hong Kong. The additional capacity has been put to good use. Today, the new 3rd runway and the many impressive new facilities and services at the Hong Kong International Airport provides the best stage for aviation development. It is a world-class airport. Residents, visitors, transit passengers and cargo would find the Hong Kong airport a desirable airport to use.

Aviation costs must be competitive and reasonable. High costs discourage airlines, especially home carriers. All governments must remember the multiplier effect of increased passenger numbers and not overlook the overall benefit to the economy. This is competition on a global

level. Many airports, including Hong Kong, are well aware of this, and are competitive on this front.

Having a good airport alone is not sufficient to guarantee the development of a hub. Sharjah, Jeddah, Kuala Lumpur and Zhuhai all have stunning airports, but their future development will depend significantly on the successful performance of their respective home carriers. Kuala Lumpur has a wonderful airport, but many people go to Singapore, probably to take another flight out of Singapore. The truth is that the Singapore Airlines' network is a much stronger network, and it can attract traffic from Malaysia to the Singapore hub.

b.   *Hong Kong must enhance its airline industry*

The Government has a role to play in ensuring that airlines in Hong Kong are provided a level playing field and have the market access required to compete effectively with foreign competitors.

Although this is an industry laced with politics and diplomacy, and with very large and specialised capital investments, there can be no question of our government granting subsidies or "special treatment" for home carriers, as I am afraid some other counties continue to do. That has never been the Hong Kong way. Subsidies kill business motivation. However, business-friendly Government policies would enhance the competitiveness of Hong Kong and the industry while upholding free-market principles.

The aviation industry is entirely different from local transportation businesses. It is – as said earlier – competing with other global players. The airlines' interests and the Government's vision and policies must be in sync in order to generate synergy for the benefit of Hong Kong, and China.

Some have argued we should allow unlimited access for any foreign airline to mount services to, from and beyond Hong Kong. They say this would lead to additional flights and wider customer choice. Hong Kong is never afraid of competition, and we should welcome other airlines flying to Hong Kong. Yet we need to bear in mind that the prime motivation for overseas airlines is to draw traffic back to their own home hub. States and airlines that lobby for unilateral concessions from Hong Kong very rarely reciprocate by granting our own requests for more market access. In an industry still dominated by government-to-government agreements, unilateral concessions equate to a slow death for the local airline industry and the shrinking of the hub.

But above all – and this is a point ignored by many commentators – Hong Kong already has a liberal aviation industry. Hong Kong could not have grown to become one of the world's leading international airports by being closed. There are plenty of airlines linking Hong Kong to hundreds of destinations. This emphasises the benefits of the prudent bilateral policy pursued by the Government over the last several decades.

One vital factor for ensuring the future role of Hong Kong as a leading aviation centre is Mainland China. The Chinese mainland is already a large market and an important aviation hinterland for Hong Kong and its importance will only grow. The number of Chinese flying, and the fleet sizes of mainland airlines have a lot of room for growth relative to the US today. China's high growth rate means we must continue to enhance Hong Kong-Mainland China links. This will depend on the effective role the Hong Kong Government, the home carriers, the strength of the hub, and the interests of the travelling public.

c.   Developing related industries

Firstly, tourism and visitor events and attractions are essential for attracting passengers. More resources are welcome on that front. Yet events and attractions on their own are not enough to draw visitors. Petra, Angkor Wat, Machu Pichu, and Agra Taj Mahal all have plenty of attractions, but how does one get there? In fact, the number of visitors to some of these lifelong 'dream' destinations is far less than that to some "boring" cities! The reason, again, is because the "boring cities" are hubs and have a better home carrier network.

There are also many other important ways to encourage tourism. Appropriate and effective marketing is vital – and efforts are being made in this area. Visa requirements are also a consideration. As seen in many countries, once entry formalities are simplified, more people would enter.

One would also think about retail, food and beverage and hotel industries as related to aviation. But there are many more. One might count the direct suppliers to aviation – materials, maintenance, catering, entertainment, procurement, etc. Yet a more significant sector is the service industries related to aviation. London is a global shipping centre because of the supporting businesses – legal services, financing, insurance, arbitration and mediation, registry, design, sourcing, IT...the list goes on. There is no reason why Hong Kong cannot develop these, especially when China (and Hong Kong) can expect rapid growth in aviation.

Hong Kong as an Aviation Centre

Hong Kong is blessed by a favourable geographical position. A radius of five hours flying time from Hong Kong encompasses Mainland China, Japan, Korea, Southeast Asia and much of India. It also reaches northern Australia. All major cities in Asia and half of the world's population are covered. The five-hour living circle includes seven of the eight countries or territories with the highest foreign reserves. Many would agree that this five-hour living circle region also covers the areas of the highest economic growth potentials.

Asians will no doubt travel in much greater numbers in future. The current ratio of travellers in the Asian countries is relatively low. If we look at the United Kingdom, the Netherlands, or

Germany, 35-40% of the population take an international air trip every year. In Asia, the ratio in Japan was only around 12%. In Korea it was about the same. The ratio in Mainland China might be much lower today. Yet think what will happen with growing affluence. Who would have predicted the economic growth in Mainland China and other Asian countries 50 years ago?

Hong Kong will be a beneficiary of Asia's growth. We must aggressively and proactively seize the opportunity. Get the travellers to or via Hong Kong!

Hong Kong is truly at the "Heart of Asia". The history of Hong Kong's many achievements needs no elaboration, but the more important issue is how we can ensure that this success is enhanced.

Continued greatness on the global stage in this new century is inextricably linked to the strength of our aviation links. That, in turn, is dependent on the vision of the Government and the strength of the local airline industry with its indelible commitment to making a success of the Hong Kong hub.

Hong Kong stands to gain tremendously from the increase of Asian air travel. There will be ups and downs, but foresight, tenacity and determination are what working towards a grand vision is about.

With the renowned "Spirit of Hong Kong" – the hard work, innovation and dynamism of Hong Kong people – coupled with appropriate government policies, and the efforts of the home carriers, I am confident Hong Kong will continue to enhance its role as an aviation centre and remain one of the world's great cities.

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