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# Hong Kong Economic Policy Green Paper 2025

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# Hong Kong Economic Policy Green Paper 2025

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Online Version





# Preamble

It is with great pleasure and enthusiasm that I present the fourth annual Hong Kong Economic Policy Green Paper, compiled by the scholars of the HKU Business School. This publication reflects the dedication and research rigor of our academic community in addressing Hong Kong's economic landscape.

Given the current global challenges and heightened geopolitical tensions, it is imperative for our city to chart a clear and strategic course. The insights and guidance offered in this year's Green Paper are invaluable for navigating these uncertain times. The ongoing efforts and scholarly expertise of the University of Hong Kong faculty members are timely and essential in contributing to a future prosperous Hong Kong that will be resilient.

The Hong Kong Economic Policy Green Paper is a commendable endeavour, and I wholeheartedly recommend this year's edition to all those deeply concerned about the future of Hong Kong. May this Green Paper ignite thoughtful discussions, informed decisions, and collaborative efforts as we confront challenges and seek out opportunities together.

With sincere regards and congratulations to the authors and contributors of this exceptional publication, I encourage you to delve into the fourth annual Hong Kong Economic Policy Green Paper and join us in crafting a brighter future for Hong Kong.

**Y C Richard Wong**

Deputy Vice-Chancellor and Provost  
The University of Hong Kong

1 January 2025

# Introduction

Hong Kong stands at a critical juncture in its economic landscape, grappling with a myriad of challenges that necessitate a reevaluation of its traditional approaches. As the city faces increasing pressure on multiple fronts, such as geopolitical tension and a rapidly evolving digitalization landscape, there is an urgent call to chart new courses and redefine its economic positioning for the future. In response to these imperatives, the Hong Kong Economic Policy Green Paper 2025 has emerged for the fourth consecutive year as a collaborative effort among the esteemed academics of the HKU Business School and a consortium of scholars. This comprehensive document delves into various facets of Hong Kong's economic domain, encompassing themes ranging from fiscal resilience, stock market dynamics, the Mandatory Provident Fund (MPF) system, housing concerns, to the exploration of novel pathways for fostering a vibrant startup ecosystem. Moreover, the Green Paper also scrutinizes Hong Kong's role within the global supply chain, advancements in artificial intelligence (AI) development, and the implications of climate risks on the city's economic future.

The first chapter, written by Liu, examines Hong Kong's fiscal deficits. In recent years, fiscal deficits have emerged as a significant new challenge for the Hong Kong government, with the deficit levels reaching record high and ranking among the top in developed economies. The analysis finds that a significant portion of this deficit stems from structural deficits, which cannot be passively alleviated by economic growth alone but require proactive fiscal policy adjustments. While land revenue contributes a substantial proportion of fiscal income, its volatility also poses high risks, having driven most revenue fluctuations. More prudent risk management is therefore necessary. Looking ahead, the government must strike a balance between reducing deficits and implementing fiscal policies. Indeed, the government has actively adjusted fiscal policies. On the other hand, Hong Kong has accumulated substantial fiscal reserves over the years. Despite a decline in recent years, these reserves remain among the highest globally, with limited downside risks. Meanwhile, the government should consider making full use of the government bond program's capacity to raise funds for infrastructure investment. This approach would not compromise long-term fiscal sustainability but foster the development of capital markets and the internationalization of the renminbi.



As an international financial center, Hong Kong has long played a significant role in global capital markets. However, in recent years, the local stock market has faced mounting challenges. Market performance has remained sluggish and the IPO market has experienced a concerning downturn, significantly reducing market activity. Liquidity issues have become increasingly pronounced, driven by an outflow of foreign capital and a decline in local trading activity that together undermine market stability. The trend of foreign capital outflows not only indicates external investors' negative expectations of the market but also reflects the challenges posed by geopolitical and economic conditions to Hong Kong's status as a global financial hub. What are the solutions that can revitalize Hong Kong's stock market and restore investor confidence? Lin & Qin explore the potential solutions which include attracting more investors and leading companies from the Middle East and Southeast Asia, lowering the threshold for the Shanghai-Hong Kong Stock Connect to enhance liquidity, launching government-guided investment funds and optimize the Mutual Recognition of Funds between mainland China and Hong Kong, promoting High-Frequency Trading, facilitating innovative technology firms to list on the Hong Kong Stock Exchange, lowering investment thresholds to broaden the investor base and strengthening regulatory oversight and corporate governance for better investor protection.

Mandatory Provident Fund (MPF) is a compulsory saving scheme for the retirement of residents in Hong Kong. Over the past 25 years, the MPF has succeeded in encouraging household participation in securities markets and played a crucial role in improving financial inclusion in Hong Kong. However, it has faced ongoing criticisms for its low annualized rate of return. With the upcoming launch of the e-MPF platform to integrate disparate savings schemes into a single digital system, it presents a well-timed opportunity to drastically improve Hong Kong's primary retirement savings system. Kwan, Maurer and Tai analyze the three primary drivers of its underperformance which are overly conservative asset allocation, inferior products, even after accounting for asset allocation, and elevated fees, and offer four recommendations to the government, which acts as a facilitator and regulator under a market-based approach to the MPF. First, the government could revise the default investment strategy to drive down fees, while the MPFA could also invite new service providers that charge lower fees into the market. Second, the government should actively monitor asset allocation by being prescriptive, promoting financial education and curating information to help market participants navigate the complex product space. Third, the government could boost the product space of the MPF to introduce more diversified investment options. Finally, the MPFA should enhance data transparency and better harness their data for analysis.

Besides retirement, another ongoing concern of Hong Kong people is the city's housing affordability. For fourteen years in a row since 2010, Hong Kong has been ranked the least affordable housing market in the world. In chapter 4, Ho, Hong and Wong measure the distributional effects of Hong Kong's housing affordability crisis by decomposing population, price, and construction data. The study shows that large-scale public housing insulated a large fraction of households from rapidly rising private-sector housing costs between 2006 and 2016. However, as private-sector costs rose, public housing became

increasingly misallocated, and the population of private renters dramatically increased. The prices and rents of smaller private-sector units disproportionately increased. The result was a significant increase in the price of small units, as well as a disproportionate burden borne by young renters, who increasingly lacked the ability to move up Hong Kong's housing ladder. The continuing lack of affordable housing is highly detrimental to Hong Kong's economy, which hampers the city's ability to attract talent and investment. To secure its economic future, it is imperative that Hong Kong deepens its housing and development reforms. Hong Kong should reposition its housing policy back towards aggressive urban development, as well as shift its focus away from constructing low-quality subsidized rentals towards constructing higher-quality ownership housing. Meanwhile, the city should reform its public housing system, for instance, making public sector rents proportional to income and relaxing Housing Bureau's restrictions on leasing and reselling public-sector units.

Startups are often drivers of innovation, job creation, and economic growth. As Hong Kong undergoes a reinvention of its innovation and technology development, there is a need to frame Hong Kong's startup ecosystem development from a qualitative firm-level microeconomic perspective. In chapter 5, Moel examines how the ecosystem structure relates to startup lifecycles and finds that the ecosystem is weakest at the intermediate "Valley of Death" stages – precisely where startups need the most support. Because technology entrepreneurship in Hong Kong remains poorly understood, existing research often develops in isolation from industry needs, making it difficult to tease out a product and market. Moreover, interactions and integration between business schools and early-stage R&D efforts are weak, and the current accelerator and incubator programs usually fail to provide tools for long-term growth. It is also found that early-stage investor education is weak, while early and mid-stage venture capital remains scarce. Hong Kong's end markets for technology startups are also small and likely insufficient to support large and scaled revenue models. While Hong Kong demonstrates considerable strengths, this research identifies a critical pain point: a dearth of resources following firm formation and proof of concept, creating a notable gap between prototyping a technical concept and commercial viability. This shortfall leaves startups poorly positioned to attract traditional venture capital. Therefore, the author proposes several high-level policy suggestions for strengthening the ecosystem, such as fostering a culture of innovation, establishing a clearinghouse for innovation and startup support, promoting cross-university collaboration, bridging the industry-startup divide, and supporting market expansion.

Hong Kong, historically a vital trade hub, faces challenges from the development of cargo ports in Asia, the rise of cross-border e-commerce, and disruptions caused by the COVID-19 pandemic and geopolitical tensions. Increasing number of companies are adopting strategies like "China+N" to diversify production networks and mitigate risks. As China and neighboring nations drive industrial development in Asia, Tang explains that Hong Kong must redefine its strategic position and focus on becoming a gateway between China and emerging economies, identify segments where it has a competitive advantage in regional supply chains, and adapt to geopolitical tensions by capitalizing on new globalization trends. Efficient coordination between different parties along the supply chain is





crucial that optimal supply chains should be agile, adaptive, and aligned with incentives of partners. Hong Kong can leverage its financial strength to support new economic activities and serve as a hub for Chinese enterprises expanding into foreign markets. By embracing these changes, Hong Kong can maintain its relevance as an international commercial and supply chain management center.

In chapter 7, Chau explores three key dimensions linked to AI, namely Hong Kong's competitiveness, the labour market, and safety considerations. First, to maintain Hong Kong's competitiveness globally, it is important for all sectors to embrace AI. In the midst of fierce competition from regional rivals and the US-China technology war, Hong Kong needs to forge a distinctive strategy, and build her own strengths in both basic research and real-world applications. Second, the author observes that the current AI wave is likely to impact high-skilled, high-income jobs. AI will also profoundly impact global and local labour markets, replacing and creating many jobs in a complex interplay. Third, AI can pose certain safety issues to society, such as in cases of missteps, hacking, viruses, software bugs, bias and discrimination. Government must therefore educate the public about the power and risks of AI, and devise regulations and guidelines on the responsibilities and ethical considerations of AI. To prepare for the AI era, Hong Kong could consider several major policy recommendations: promoting AI education at all levels, assisting organizations in adopting AI through training workshops and funding, supporting frontier AI research and development across universities and startups, attracting non-local investments in AI with incentives and subsidies, and reviewing existing regulations and guidelines on AI.

As a coastal city with low-lying terrain, Hong Kong is frequently affected by extreme weather events and has experienced multiple climate disasters in the past decades. He, Wang, Hui, and Bi explain that two climate risks are particularly concerning: the occurrence of severe typhoons and rising sea levels. In this regard, the authors have studied how typhoons and sea level rises would affect public housing and conduct scenario analysis on the potential economic losses under different climate pathways. Their analysis shows that the potential damages caused by sea level rise can be more severe, especially in the long run. Under the high carbon-emissions pathway, it is also projected that the asset loss due to sea level rise for the three selected public housing estates would be significantly higher than that caused by typhoons. If climate risks are tackled appropriately, they can be transformed into development opportunities. The authors propose seven major policy recommendations for Hong Kong to better adapt to climate change. These recommendations include promoting data integration and creating a geo-coded platform for comprehensive climate-risk analysis, conducting adaptive retrofits for old buildings and infrastructures, and considering sea level rise when selecting locations for new buildings. They also suggest targeting vulnerable groups, improving the climate disaster prediction, warning, and response system, developing the climate catastrophe insurance and reinsurance market, supporting early-stage climate-tech companies and the application of climate-adaptation technologies, and paying attention to transition risks towards a net-zero future.

In conclusion, we aim to utilize this green paper as a catalyst to spark conversations and discussions on enhancing Hong Kong's competitive positioning. By recognizing the abundance of opportunities and risks ahead, it is imperative for policymakers and the business community to collaborate closely. The research and analysis presented by our colleagues serve as a valuable resource in guiding collective efforts towards navigating challenges, seizing opportunities, and shaping a prosperous future for Hong Kong.

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1 January 2025





# Hong Kong Fiscal Deficits Analysis

# Hong Kong Fiscal Deficits Analysis

Yang Liu

In recent years, fiscal deficits have emerged as a significant new challenge for the Hong Kong government. The impact of the COVID-19 pandemic, the slowdown in global economic growth, and heightened uncertainties have led to a substantial decline in Hong Kong's fiscal revenues. To address this issue, the government has implemented large-scale counter-cyclical fiscal stimulus measures. At the same time, government expenditures in areas such as infrastructure development, social welfare, healthcare, and education have continued to rise. While investments in these sectors are crucial for stimulating the economy, improving people's well-being, and promoting the long-term development of Hong Kong, they challenge the city's ability to maintain fiscal balance.

This article will analyze Hong Kong's fiscal deficit in recent years, exploring the relationship between fiscal deficits and economic cycles, along with the impact of land revenues, to assess the city's fiscal sustainability. Moreover, it will look ahead to future fiscal conditions and explore the feasibility of using fiscal reserves and debt instruments to address deficits.

## 1. The Size of Fiscal Deficits

Hong Kong has long adhered to the principle of keeping expenditures within the limit of revenues, maintaining prudent fiscal management and even running budget surpluses for more than ten years. However, Hong Kong's significant fiscal deficits in recent years have attracted widespread attention. In the 2022 and 2023 fiscal years, Hong Kong's consolidated account recorded deficits of HKD 188.3 billion and HKD 171.9 billion, accounting for 6.7% and 5.8% of the city's GDP, respectively. To gain a deeper understanding of the scale of these fiscal deficits, we will compare them from both a historical perspective and a cross-regional perspective.

From a historical perspective, as shown in Figure 1, the deficit levels of the past four years have reached highs not seen in 25 years, even surpassing those of several major economic downturns including the Asian Financial Crisis and the Global Financial Crisis. These deficits have persisted even as the economy began to recover from the pandemic in the last two years, raising concerns about Hong Kong's medium- to long-term fiscal outlook.



From a cross-regional perspective, the conclusions are equally alarming. Figure 2A presents the fiscal balances of 36 developed economies worldwide for the fiscal years of 2022 and 2023. The cyclical and structural balances, marked in the figure, will be analyzed in detail later; their sum constitutes the total fiscal balance. Hong Kong's deficit ranks second highest globally, behind Italy and followed by the much larger economies of the United States, the United Kingdom, and France. Compared to Hong Kong, these economies have more tools at their disposal to handle financial pressures and external shocks. Meanwhile, Singapore, whose economic features are closest to Hong Kong's, boasts a high fiscal surplus, ranking fourth. Financial centers such as Switzerland and Luxembourg are also in strong financial shape, in stark contrast to Hong Kong's situation.

Looking further back to the height of the COVID-19 pandemic in 2020 and 2021 (Figure 2B), Hong Kong actually managed its finances better than most, with its fiscal balance ranking above the median. Therefore, the pandemic is not the primary cause of Hong Kong's current deficit woes – other structural and policy factors are at play.

When compared to the fiscal conditions of local governments in mainland China, Hong Kong's situation looks somewhat better. Multiple factors including economic transformation, the real estate downturn, and local government debt have contributed to generally high levels of fiscal deficit across regions<sup>1</sup> (see Figure 3). Nevertheless, economically developed regions such as Beijing, Guangdong, and the Yangtze River Delta (Shanghai, Jiangsu, Zhejiang, etc.) are in better fiscal condition, with deficit levels similar to Hong Kong's.

To summarize, Hong Kong's current deficit level is relatively favorable within the national context, but remains high when compared to its own historical record and other developed economies.

## 2. Cyclical and Structural Fiscal Balance

Economic cycles play a critical role in shaping government fiscal conditions. Government fiscal balances can be divided into two major categories: cyclical and structural balances. Cyclical balances are primarily driven by economic cycles. During a recession, government revenues fall while spending on economic stimulus and unemployment benefits rises, creating fiscal deficits. As the economy recovers, these gaps gradually shrink and eventually disappear. Structural balances, however, are less tied to economic cycles. They typically reflect imbalances in the government's revenue and expenditure structure. Even when the economy is operating at its potential output level and growing steadily, government expenditures may still exceed revenues due to structural factors. These deficits often result from investments in areas like social welfare, public services, and infrastructure development. While

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1 The fiscal balance includes the "four accounts," namely the general public budget, the government fund budget, the state-owned capital operation budget, and the social insurance fund budget.

cyclical deficits follow the rhythm of economic cycles, structural deficits can be brief or prolonged, depending on the intensity of policy actions.

Although economic theory draws a clear distinction between cyclical and structural fiscal balances, they do not have directly observable data in practical analysis and typically require model-based estimations. This article uses various methods to estimate both types of fiscal balances to ensure robust conclusions. The results below are primarily based on estimates by the International Monetary Fund.

In Figure 4, the economic cycle is quantified as the percentage gap between current local GDP and potential output. For instance, in 2018, economic activity boomed and exceeded potential output by about 4%. In contrast, during the 2009 global financial crisis and the COVID-19 pandemic in 2020, economic activity fell about 4% below potential. The cyclical fiscal balance, represented by the bars in the figure, moves in clear synchrony with these economic cycles. Given the recent global economic slowdown, Hong Kong's cyclical fiscal position has faced considerable pressure, with cyclical deficits reaching high levels from 2000 to 2023.

While structural balances are not directly linked to economic cycles, structural deficits remained elevated from 2000 to 2023, emerging as the primary driver of the past two years' deficit. This suggests Hong Kong's current fiscal challenges won't simply be resolved through natural economic recovery.

Revisiting the international comparison in Figure 2, many countries in 2020-2021 experienced high cyclical deficits due to recessions, often exceeding even their structural deficits. Hong Kong's total deficit ranked in the middle, but if we consider only its structural deficit, Hong Kong's position would be stronger. As economies rebounded in 2022-2023, cyclical deficits diminished globally, with structural balances having a bigger impact on fiscal positions. Although Hong Kong ranks second in total deficits, its structural deficit ranks sixth, comparable to many other developed economies – a somewhat reassuring finding.

The cyclical-structural analysis outlined above is an effective method for assessing fiscal sustainability. We can also use another approach to dissect the sources of change in fiscal balances. Comparing the cyclical and structural balances shown in Figure 4 shows that structural balances are highly volatile. Structural balances can persist at around 5% for several consecutive years at their peak and drop to -5% at their lowest. In contrast, cyclical balances maintain steadier movements, generally within a 2% range. Hong Kong's overall fiscal position shows limited cyclical fluctuations, indicating that its balances over the years were largely driven by structural policy adjustments and reforms.

Using the statistical method of variance decomposition, we can quantify that structural surplus fluctuations account for 80% of Hong Kong's total fiscal surplus. This puts Hong Kong in ninth place globally, which is considered moderately high. This high structural volatility in Hong Kong is partly due to the government's policy evolution in long-term projects related to livelihood, healthcare, pension,



and housing. Since most structural deficits are closely related to policy choices, if the government is willing to scale down certain policies, it can quickly restore a structural surplus. Conversely, if an economy's deficit is mainly cyclical, changes in government policy will have little substantive effect.

We can draw the following conclusions by analyzing the cyclical and structural nature of deficits. First, Hong Kong cannot rely solely on accelerated economic growth to resolve its fiscal deficits. Second, Hong Kong has considerable control over fluctuations in its deficits. Lastly, in the post-pandemic era, global fiscal policies have undergone structural changes, with structural deficits becoming a common challenge around the world. Hong Kong's structural deficit is at a moderately high level.

### 3. Land-Based Fiscal Revenue

This section further explores the roots of structural deficits. Land income is a significant revenue stream in Hong Kong's fiscal structure. Land-related income primarily comes from land premium, stamp duties, rates, government rent, and other forms. As the real estate market cooled in recent years, inactivity in land auctions and property transactions has led to a decline in land income. On average, over the last 25 years, stamp duties and land premium accounted for 19.0% of total revenue, while general rates, properties and investments (mainly government rents), and property taxes accounted for 8.3%, bringing their combined total to 27.3%. However, this figure dropped to 16.3% in 2023. The decline does not indicate falling reliance on land, but rather highlights the city's vulnerability to fiscal shocks when the real estate market declines.

When analyzing fiscal stability, it is essential to consider not only revenue proportions but also risk attributes. Land income, though a small part of total revenue, is highly volatile. We can decompose the changes in government revenue into variations in land and non-land income. As illustrated in Figure 5, fluctuations in stamp duties and land income are the most critical drivers of revenue volatility. Revenue share fell by -2.0% and -3.7% in 2021 and 2022, respectively, with stamp duties and land income contributing -3.1% and -2.0% to this decline. Notably, non-land income actually increased in 2022.

Extending the timeframe to the past 25 years, variance decomposition analysis shows stamp duties and land income contributing 60% of revenue volatility. Other land-related income, namely general rates, properties and investments, and property taxes, are relatively stable, contributing just 2% of revenue volatility. Other non-land income accounts for the remaining 38%.

As explained, land income constitutes a small part of total revenue but serves as the main driver of revenue volatility. This dynamic mirrors investment theory: When investors allocate assets between high-risk stocks and risk-free bonds, even a small allocation to stocks can cause most of the portfolio's volatility. Therefore, it is essential to not only consider allocation ratios but also understand how different assets contribute to overall risk. Land income, while accounting for 20% of the revenue, contributes 60% of fiscal risk. Drawing lessons from investment theory, we should focus on the risk factors of

land income, conducting more scenario analyses and simulations to mitigate uncontrollable risks. This approach aims to prevent situations where land revenue amplifies overall deficit.

Similarly, local governments in mainland China are highly dependent on land income. Comparing 2013-2023 data (Figure 6), Hong Kong's revenue share, at 31.9%, comes in tenth place. However, its volatility ranks among the highest in the nation, just behind provinces such as Jiangsu, Zhejiang, Anhui, and Guangdong. Notably, these provinces also have some of the lowest fiscal deficits in the country through relatively prudent fiscal management.

Land income volatility is closely related to housing prices. A rise in housing prices usually boosts the real estate market and land transactions, thereby increasing stamp duties and land income. Since 2021, Hong Kong's housing prices have trended down significantly. To what extent can the decline in housing prices explain the decrease in land income? Indeed, analyzing data from the past 25 years shows a positive correlation between housing prices and land income in Hong Kong. For every 1% increase in housing prices, the land income-to-GDP ratio rises by 0.046%. A panel data regression analysis we conducted using data from local governments in mainland China from 2013 to 2023 reveals a coefficient of 0.03 between housing prices and their impact on land income. This is lower than the coefficient for Hong Kong, indicating that Hong Kong's land income is more sensitive to changes in housing prices.

From 2021 to March 2024, housing prices fell 21%, corresponding to a roughly 1% drop in land income ratio, according to the Rating and Valuation Department's Private Domestic Price Indices. However, the share of land income plunged from 6.1% in 2021 to 1.1% in 2023, which suggests that multiple factors, not only the drop in housing prices, are driving Hong Kong's land-based revenue decline.

## 4. Fiscal Forecasting

According to its latest budget, the government has implemented fiscal consolidation measures aimed at increasing revenue and reducing expenditure. Its fiscal deficit is expected to gradually decrease over the next few years, with a return to surplus by 2027. While this projection suggests the current deficit is short-term and manageable, it's common to see overly optimistic estimates globally due to the complexities of fiscal forecasting.

Analysis of historical budgets and the accuracy of forecasts shows a consistently prudent and conservative approach in Hong Kong's fiscal management. Figure 7 depicts the discrepancies between Hong Kong's fiscal budget and actual revenue and expenditure. Over the 15-year period from 2004 to 2019, the government generally underestimated revenue, showing instances of overestimation only in the past five years – though it still underestimated the pace of economic recovery in 2021. On the expenditure side, while the government significantly overestimated expenditure in 2020, its spending forecasts have generally proven more accurate than revenue predictions. This pattern of forecasting





has led to long-term underestimation of fiscal surpluses, ultimately vindicating the government's prudent fiscal strategy.

Long-term fiscal forecasting is challenging due to the many uncertainties surrounding future expenditures and revenues. But Hong Kong has shown remarkable consistency – its five-year forecast error margins closely track those of one year. This suggests a high degree of control over future fiscal conditions and demonstrates the government's ability to execute planned strategies effectively, keeping long-term fiscal policy risks relatively contained.

## 5. Fiscal Reserves

Public concern over Hong Kong's fiscal condition often focuses on the government's reserves. The government maintains both an extremely low level of debt and substantial reserves, with the latter currently accounting for 25% of GDP – among the highest in developed economies worldwide (Figure 8).

Some commentators focus on how many months of government expenditure current fiscal reserves can support. Now at 12 months, this figure has fanned concerns about fiscal reserves running low. Such worries, however, are largely unfounded: this metric completely overlooks revenue streams that typically cover expenditures. Even if current high deficit levels persisted – which are historically rare and not likely to last – it would take five years to exhaust the reserves, well beyond the 12-month mark.

Still, the optimal level of fiscal reserves merits discussion. Ideally, the government should maintain a balanced budget, but this does not mean the fiscal situation should be balanced at all times. Considering economic fluctuations and structural factors, the government can build up reserves through fiscal surpluses during economic upswings and lower structural expenditures. These buffers serve multiple purposes: cushion potential economic downturns, alleviate public hardship, stabilize the economy, and address structural needs such as aging populations, social welfare, education, and infrastructure. The Hong Kong government has adopted this strategy over the past decade, causing fiscal reserves to grow from 22% in 2004 to 42% in 2019 (Figure 7). Hong Kong has been making full use of its accumulated reserves, which are enough to cover the deficits in recent years. While these deficits have drawn down resources, current reserves still exceed 2004 levels.

A certain level of fiscal reserves provides benefits, but excessive reserves may also prove counterproductive. Economic theory suggests it's more efficient for private citizens than the government to hold the same wealth, as it helps lower transaction, information, and agency costs. This concept also aligns with the traditional Chinese philosophy of "storing wealth among the people." The government's role is to make good use of its fiscal reserves. If the economy has not experienced a downturn in five years and reserves continue to reach new highs, the government could consider moderately reducing reserve levels by increasing spending, providing subsidies, and offering tax relief.

When discussing fiscal reserves, a clear distinction must be made between fiscal reserves and foreign exchange reserves. Traditional views hold that emerging market economies, due to their weaker borrowing capacity, may not be able to raise sufficient funds during a crisis and may need to rely on their fiscal reserves. However, foreign exchange reserves, rather than fiscal reserves, are often what's needed to respond to international crises. An economy can maintain debt while holding significant foreign exchange reserves to manage balance of payments crises and exchange rate interventions. Given Hong Kong's stage of development with ready access to low-cost financing, the case for maintaining high fiscal reserves is weaker. Meanwhile, Hong Kong's Exchange Fund holds substantial assets and equities, providing ample support for its linked exchange rate system, as detailed in our economic policy green paper last year.

## 6. Issuing Debt

Unlike Hong Kong, other major economies do not hold substantial fiscal reserves. Before the COVID-19 pandemic, major developed countries were already burdened with high levels of debt. The United States' frequent encounters with its statutory debt ceiling have resulted in "fiscal cliffs" and government shutdowns, while the Eurozone debt crisis is affecting half of its member states. Despite relative economic stability following the Eurozone crisis, many countries did not follow prudent fiscal principles to reduce deficits and debt levels, leaving them particularly vulnerable when a global crisis struck in 2020. Nevertheless, these countries introduced extensive stimulus measures, further increasing their debt burdens. By the end of 2023, the debt levels of many countries had reached historic highs, approaching 100% of their GDP.

This global response highlights the need for counter-cyclical fiscal stimulus, where expanding fiscal spending is imperative even when debt levels are high. While the Hong Kong government can tap ample reserves to address crises, other high-debt countries have also managed to secure sufficient funds to cover their deficits. The need for fiscal reserves to respond to crises is indeed debatable.

Traditional views advocate accumulating reserves through surpluses during economic booms and addressing deficits through borrowing during downturns, aiming for long-term balance. The optimal level of reserves or debt in theory warrants further study, but this balance point need not be zero. A debt level of 30% of GDP during normal periods – rising to 50% during recessions or falling to 10% during booms – may be considered healthy and sustainable.

Hong Kong started issuing bonds under the Government Bond Programme in 2009, with the borrowing limit gradually increasing from the initial HKD 100 billion to the current HKD 300 billion. Subsequently, reflecting its support for sustainable development, Hong Kong introduced the Infrastructure Bond Programme and the Government Sustainable Bond Programme, raising the combined limit to HKD 500 billion. As of April 2024, government bonds accounted for approximately 14.7% of local GDP.



This is lower than the fiscal reserves and significantly below the bond issuance levels seen in most developed economies.

Issuing bonds has multiple benefits. For the government, bonds can alleviate short-term fiscal pressure and provide a stable source of funding for long-term infrastructure projects. The debt servicing costs for the Hong Kong government are very low, even lower than that of U.S. Treasury bonds, which are considered global safe assets. For instance, the yield on a 20-year reopening bond issued on March 14, 2024, was 4.392%, while the yield on U.S. Treasury bonds of the same maturity on the same day was 4.492%. Similarly, the yield on a 3-year bond issued on October 23, 2024, was 2.952%, compared to 4.041% for the corresponding U.S. Treasury bond. These low interest rates are not only due to the Hong Kong government's exceptional creditworthiness but also reflect the supply-demand imbalance in the bond market and other structural factors.

Government-issued risk-free bonds are a cornerstone of capital markets. An adequate supply meets investor demand for safe assets denominated in Hong Kong dollars, thereby enhancing market liquidity. A risk-free yield curve serves as a vital benchmark for pricing other risk assets. In economic theory, "incomplete markets" may lead to suboptimal resource allocation, unhedgeable risks, and societal welfare losses. Government bonds can address these gaps, contributing to market "completeness" and acting as a supplier of safe assets to tackle market failures, even when the government does not have financing needs.

As a center for offshore RMB, Hong Kong can expand the currency's investor base by issuing RMB-denominated government bonds – an effective way of promoting RMB internationalization. Currently, RMB assets account for only 8% of Hong Kong's relatively small outstanding debt. Expanding RMB-denominated bond issuance can help build a more mature market and broaden the scope for global investment in RMB assets. As Hong Kong cultivates this market with more investable assets and better liquidity, global investors will be more willing to hold and use RMB in a wider range of investment, trade, and other scenarios.

In the current economic climate, many may be apprehensive about debt, especially given recent hikes in interest rates. However, it is important to recognize that these rate increases are primarily nominal, driven by global inflation. When adjusted for inflation, real interest rates are not high and have been trending down over the past few decades.

Furthermore, the ongoing issue of local government debt in mainland China has made debt resolution a shared priority from top to bottom. New debt issuance is now tightly controlled, driven by the economic downturn and debt risk management. Should Hong Kong go against the trend? Local debts have been accumulating for over a decade. The starting point is the mismatch between policy goals and financial resources, with economic downturns and debt risk management amplifying the challenge. Hong Kong shares a similar starting point to mainland China, but their underlying conditions are different. It's difficult to achieve policy goals without the necessary resources.

The Hong Kong government currently has multiple expenditure projects aimed at benefiting public welfare and promoting long-term social development. Providing “big government” social services with a “small government” revenue model, characterized by low taxes, will inevitably lead to short-term fiscal imbalances. Hong Kong has ample fiscal reserves and no net debt concerns. Aligning policy goals with financial resources, strategically utilizing existing fiscal reserves, and issuing debt within the bond program limits can be wise moves.

It is essential to be bold yet cautious, conducting prudent risk assessments and management throughout the process to ensure debt risks are controllable. The market serves as a barometer for debt conditions. A significant rise in bond yields serves as a warning, signaling the need for increased preventive measures to nip any potential debt crisis in the bud.

## 7. Conclusion

In recent years, Hong Kong has faced relatively high deficit levels, ranking among the top in developed economies. A significant portion of this deficit stems from structural deficits, which cannot be passively alleviated by economic growth alone but require proactive fiscal policy adjustments. Land revenue contributes a substantial proportion of fiscal income, but its volatility also poses high risks, having driven most revenue fluctuations. Consequently, more prudent risk management is necessary. The decline in land revenue is influenced by factors beyond just falling property prices.

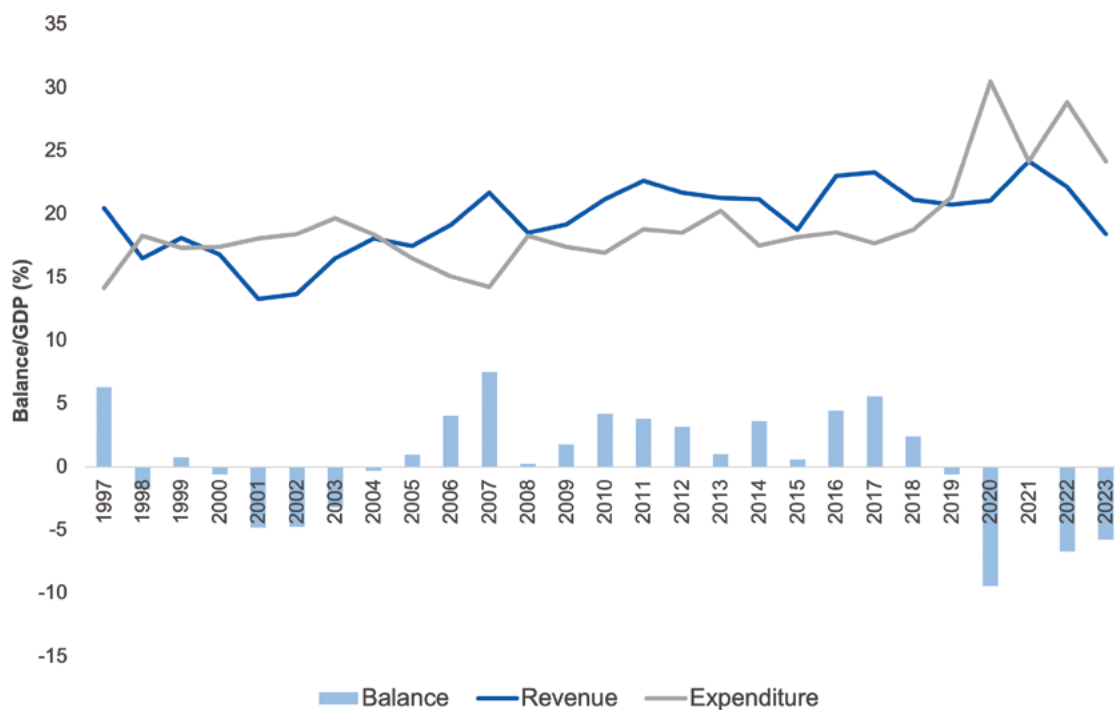
Looking ahead, the government must strike a balance between reducing deficits and implementing fiscal policies. The government has actively adjusted fiscal policies, with current forecasts suggesting a return to surplus within a few years. The government’s fiscal forecasting has historically been cautious and accurate, lending credibility to these projections.

Hong Kong has accumulated substantial fiscal reserves over the years. Despite a decline in recent years, these reserves remain among the highest globally, with limited downside risks. The government does not need to aim for continuous accumulation of reserves. The recent decline in reserves is not a cause for concern; rather, it can be seen as an example of the efficient utilization of fiscal reserves.

The Hong Kong government should make full use of the government bond program’s capacity to raise funds for infrastructure investment. This approach would not compromise long-term fiscal sustainability and would foster the development of capital markets and the internationalization of the renminbi.

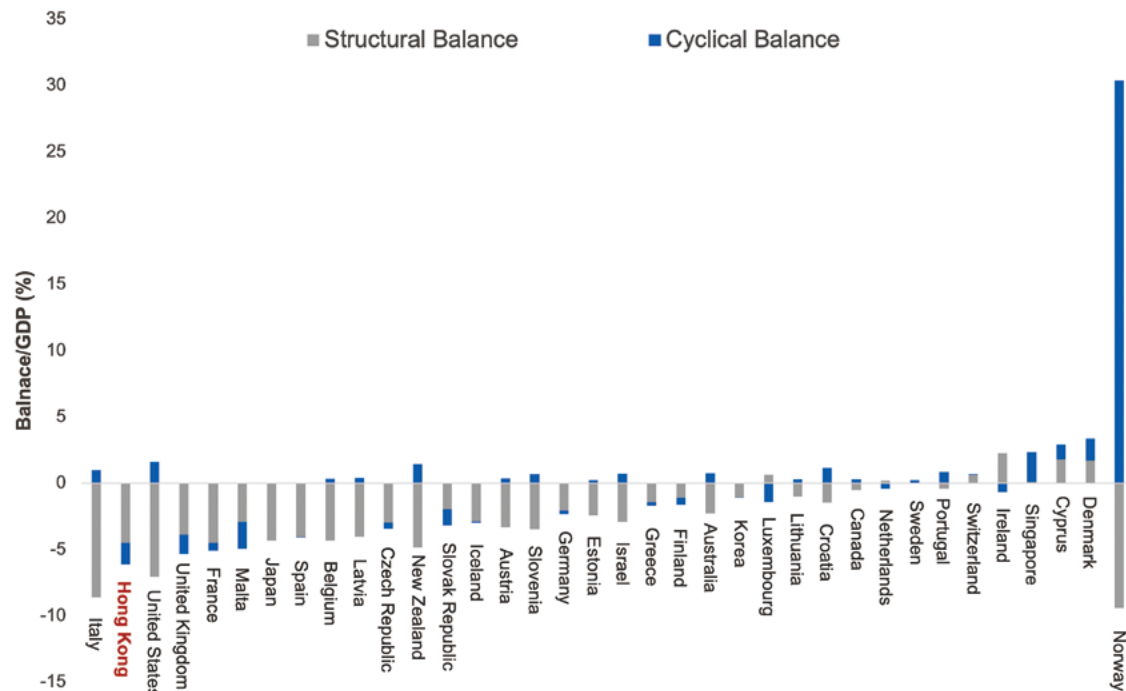


**Figure 1. Hong Kong Fiscal Balance, Revenue, and Expenditure**



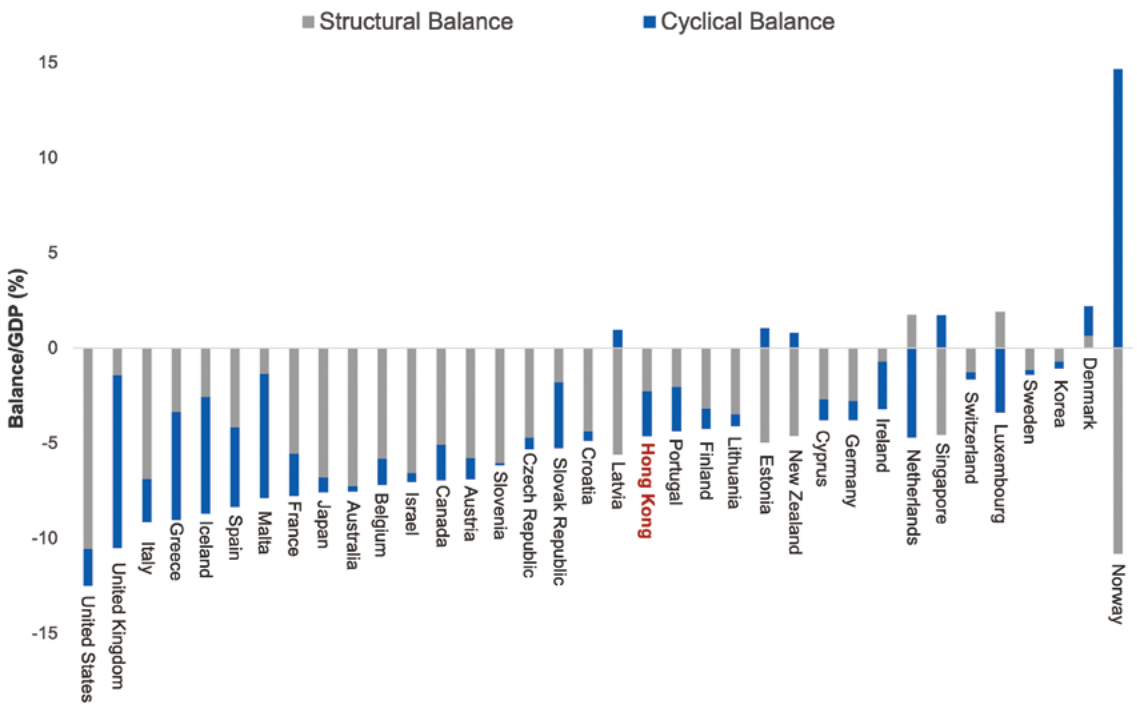
Source: Census and Statistics Department

**Figure 2A. Cyclical and Structural Balance of Advanced Economies (2022 and 2023 fiscal year)**



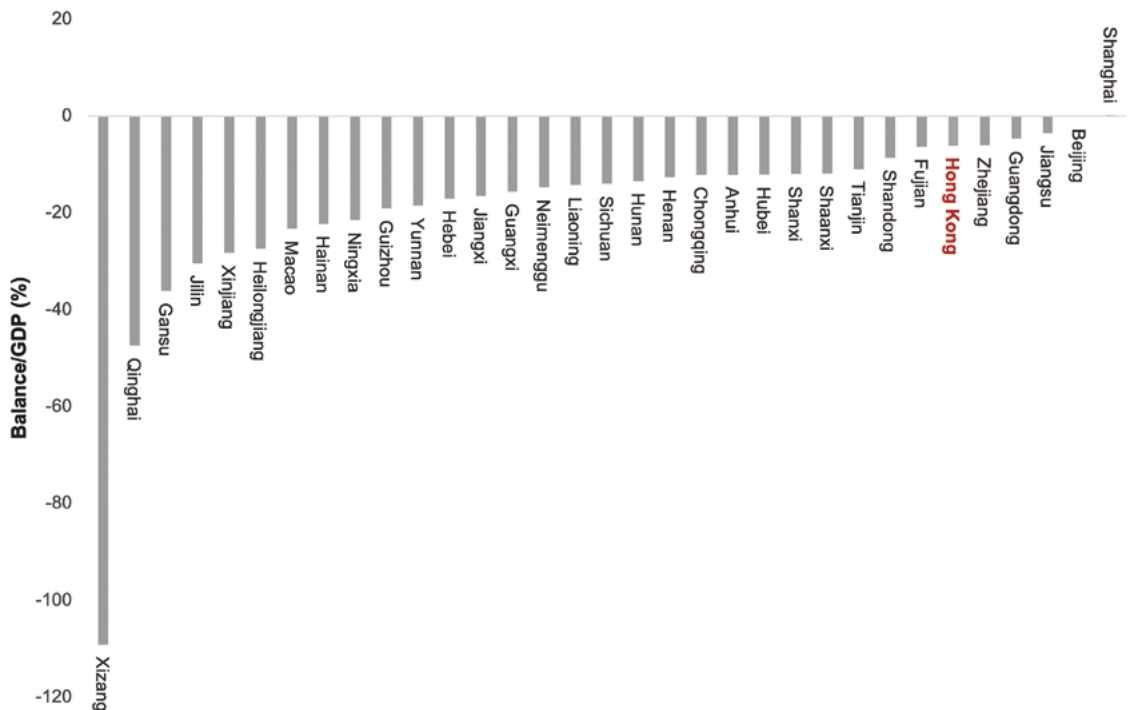
Source: International Monetary Fund

Figure 2B. Cyclical and Structural Balance of Advanced Economies (2020 and 2021 fiscal year)



Source: International Monetary Fund

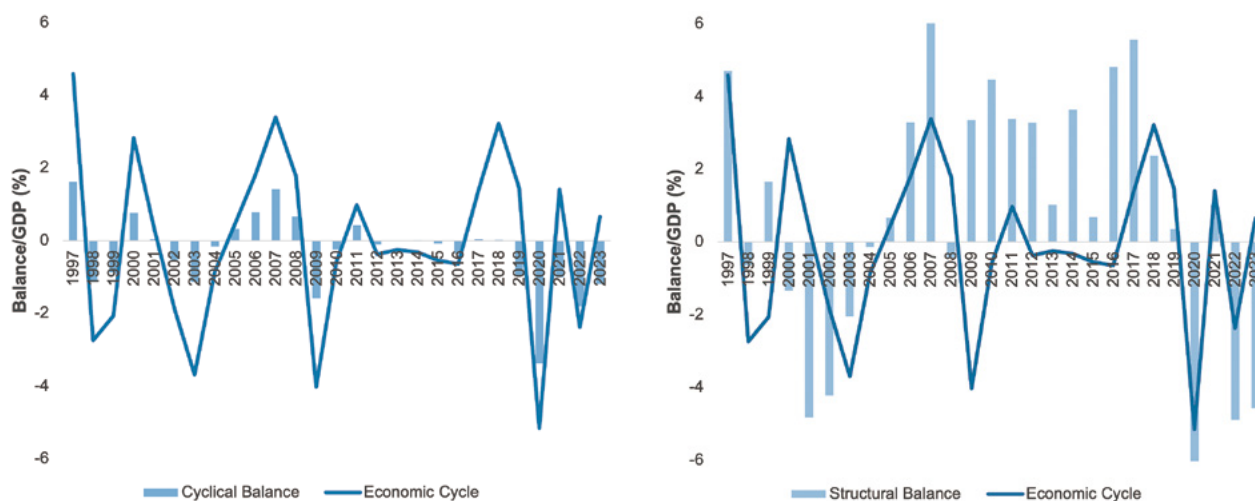
Figure 3. Fiscal Balance of Mainland Local Governments and Hong Kong



Source: National Bureau of Statistics, CSMAR

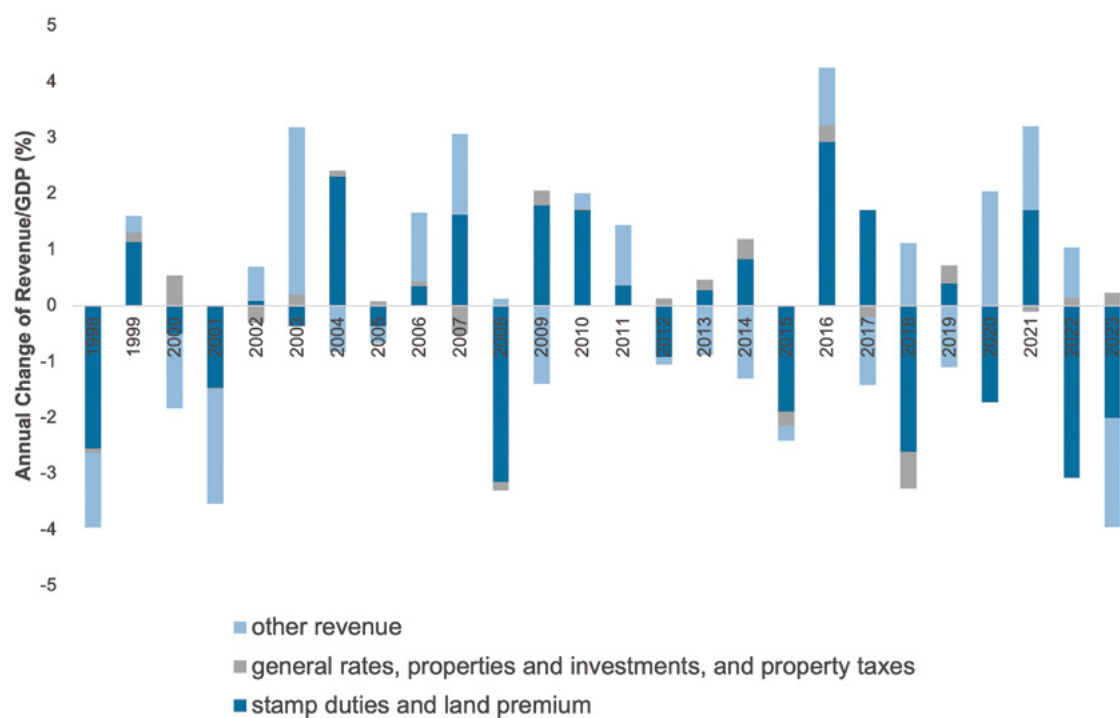


**Figure 4. Economic Cycle, Cyclical Balance, and Structural Balance**



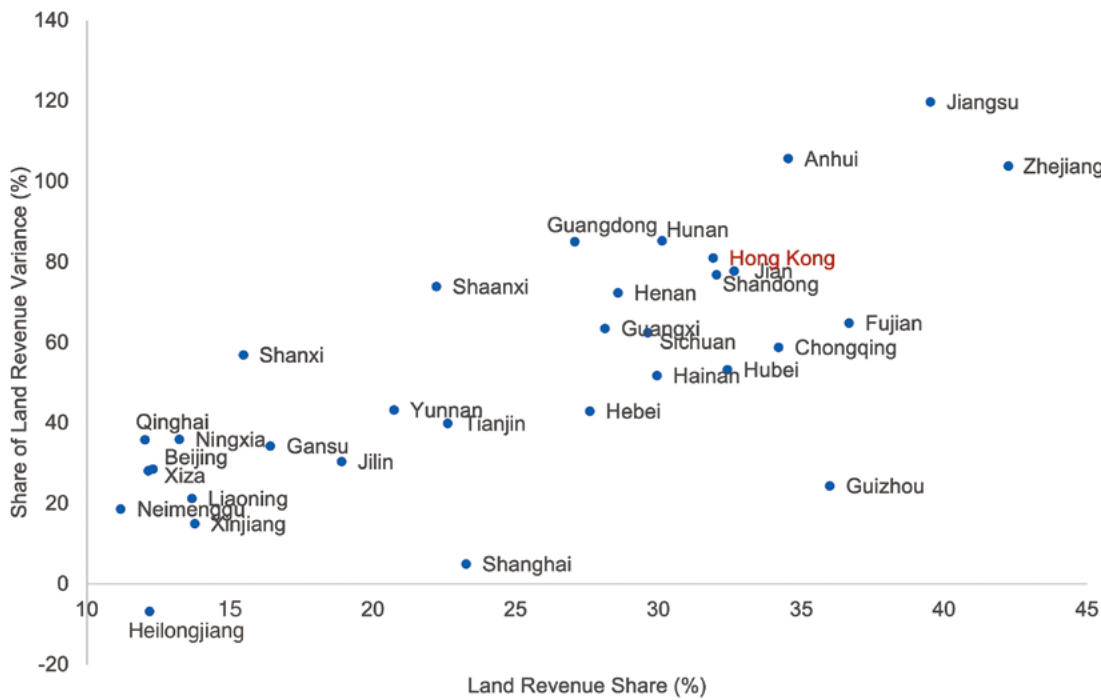
Source: International Monetary Fund

**Figure 5. Annual Change of Revenue/GDP by Sources**



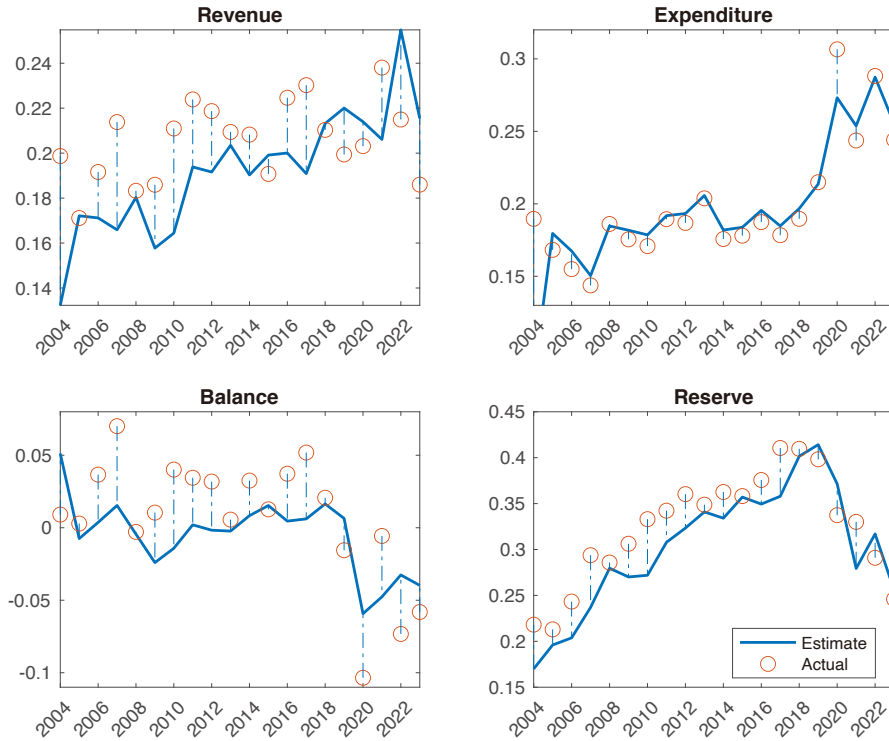
Source: Census and Statistics Department, Inland Revenue Department

**Figure 6. Land Revenue Share and Share of Variance of Mainland Local Governments and Hong Kong**



Source: National Bureau of Statistics, CSMAR, Provincial Department of Finance

**Figure 7. Fiscal Forecasting**

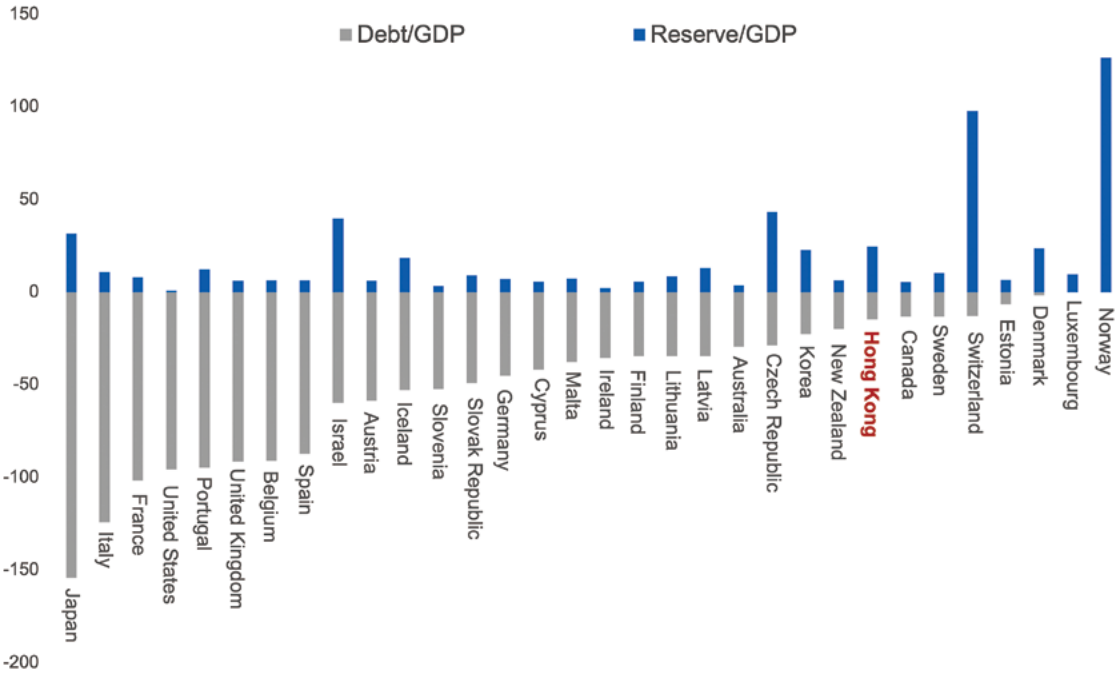


Source: Government budget





Figure 8. Debt and Reserve of Advanced Economies



Source: International Monetary Fund





# Reviving Hong Kong's Stock Market: Key Challenges and Strategic Solutions

HK  
香港

# Reviving Hong Kong's Stock Market: Key Challenges and Strategic Solutions

**Chen Lin**     **Shihua Qin**  
HKU              LU

As an international financial center, Hong Kong has long played a significant role in global capital markets. However, in recent years, its stock market has faced a series of challenges, including declining market liquidity, a slowdown in the IPO market, and an outflow of foreign capital. Drawing on the latest data and academic research, we examine the current state of Hong Kong's stock market, identify key challenges, and explore potential solutions for policymakers and investors.

## 1. Current state of the Hong Kong stock market

The Hong Kong stock market, dating back to 1891, has long been one of the world's premier destinations for capital-raising. Its robust legal system, deep pool of financial and professional talent, transparent and efficient regulatory framework, and business-friendly environment have laid a solid foundation for its status as a leading international financial center. More importantly, Hong Kong's political and geographical proximity to mainland China has positioned it as a unique bridge for capital flows and investments between China and global markets, reinforcing its strategic importance.

However, in recent years, the Hong Kong stock market has faced mounting challenges. Market performance has remained sluggish, eroding investor confidence. The IPO market has experienced a concerning downturn, significantly reducing market activity. Liquidity issues have become increasingly pronounced, driven by an outflow of foreign capital and a decline in local trading activity that together undermine market stability.

### 1.1 *Sluggish market performance*

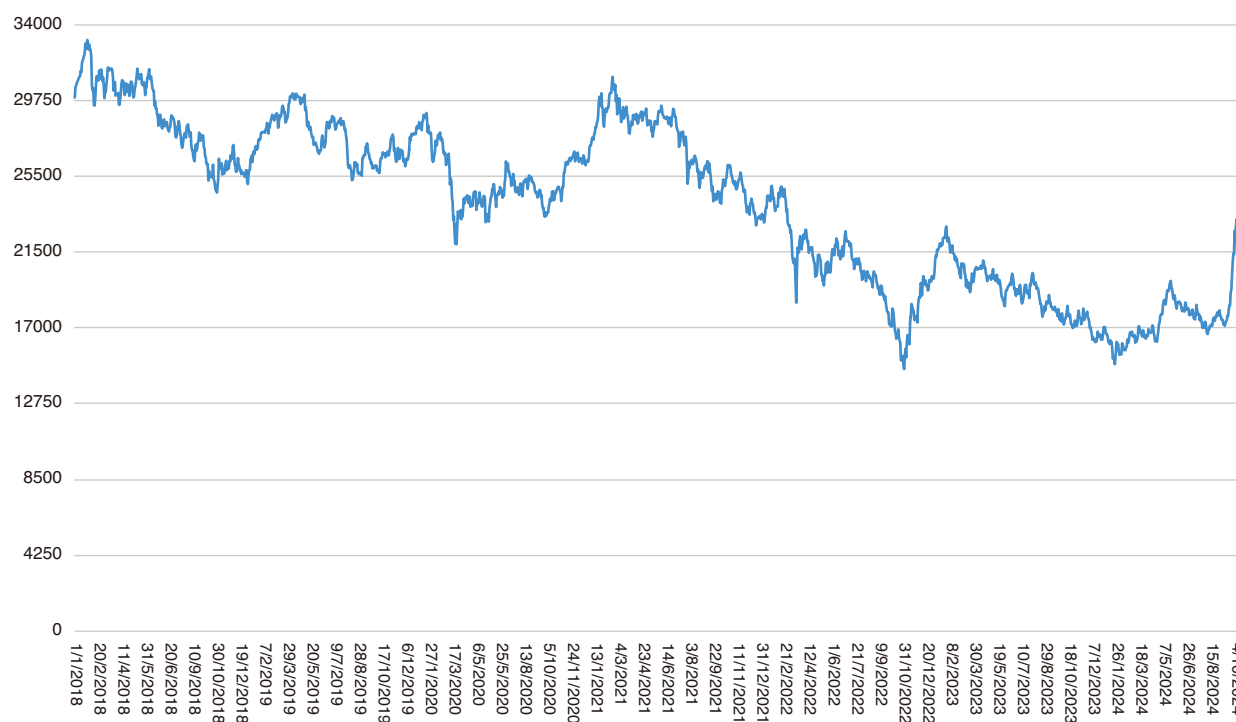
As shown in Figure 1, the Hang Seng Index (HSI) has been on a downward trend since 2018. By September 2024, it had declined by over 40% from its recent peak in 2021. Although the index saw a recovery in October 2024 following stock market stimulus measures introduced in mainland China, it remained at historically low levels. This brief rally did not fundamentally alter the overall market trajectory, reflecting persistent market challenges and the cautious sentiment prevailing among investors.



A key driver of this sluggish market trend has been the underperformance of technology firms. As shown in Figure 2, the Hang Seng Tech Index began its decline after peaking in 2021, losing nearly two-thirds of its value by September 2024. In an era where technological innovation is a core driver of global economic growth, the ability of tech companies to raise capital and thrive becomes particularly crucial. This trend highlights the deeper challenges facing the economic development of Hong Kong and China as a whole.

Meanwhile, other major Asian markets, such as Japan and India, demonstrated strong growth. A comparison of Hong Kong’s stock market with those of Japan and India since 2019, as shown in Figure 3, highlights a stark divergence in performance. While the Hang Seng Index has faced significant struggles, with returns well below the baseline, both the Nikkei 225 and the Nifty 50 have shown steady growth. The Nifty 50, a benchmark for the Indian market, showed the most pronounced increase, achieving returns exceeding 100% by late 2024. The Nikkei 225 also recorded consistent gains, showcasing Japan’s economic resilience. This sharp contrast underscores Hong Kong’s ongoing difficulties in maintaining its competitiveness and appeal in the global financial landscape.

**Figure 1. Hang Seng Index**



Data source: Compustat

**Figure 2. Hang Seng Tech Index**



Source: Hang Seng Indexes Company Limited

**Figure 3. Cumulative return of Hang Seng Index, Nifty 50, and Nikkei 225**



Data source: Compustat



## 1.2 Frozen IPO market

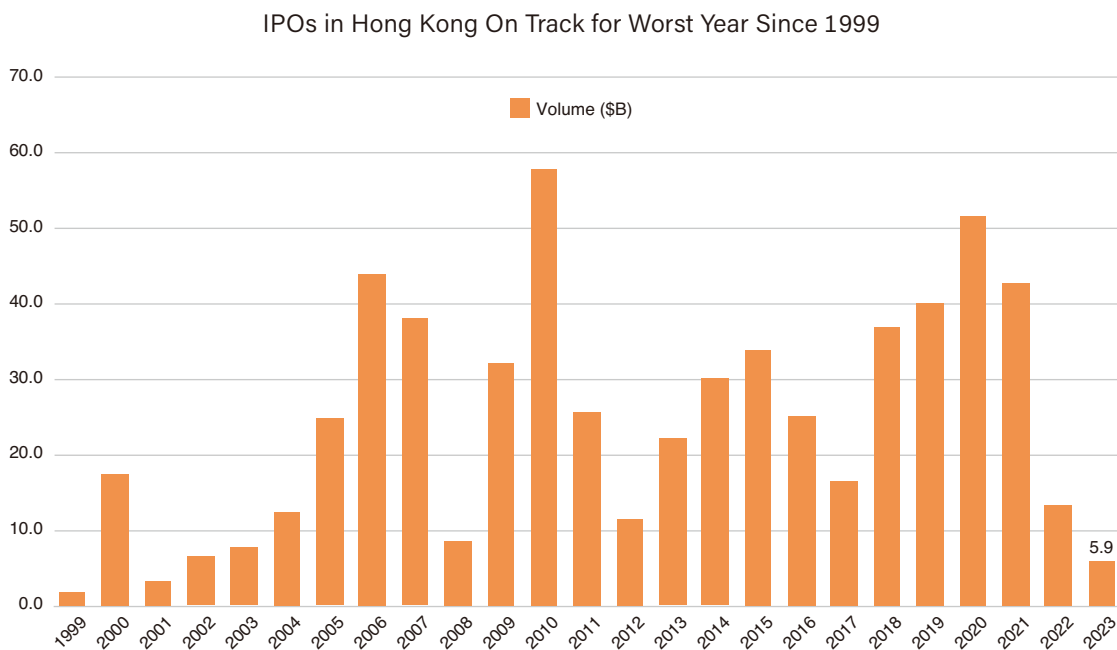
The underperformance of the Hang Seng Index, coupled with the comparative strength of other Asian markets like Japan and India, reflects deeper structural issues within Hong Kong's financial ecosystem. One of the most significant challenges is the sharp decline in IPO activity, signaling a troubling shift from Hong Kong's historic role as a top fundraising hub.

For much of the past decade, the Hong Kong Stock Exchange (HKEX) has been a dominant force in the global IPO landscape. Ranked among the world's most active venues for initial public offerings, HKEX frequently outpaced competitors like the New York Stock Exchange (NYSE) and Nasdaq. For example, in 2019, HKEX led global IPO fundraising with approximately USD 40 billion in proceeds, bolstered by high-profile listings such as Alibaba's secondary listing, which alone raised USD 13 billion. This marked the seventh time in 11 years that Hong Kong secured the top spot globally for IPO activity.

However, Hong Kong's leading position in IPO markets has diminished in recent years. As shown in Figure 4, IPO activity has fluctuated over the years but recently plummeted to historic lows. The figure shows the total volume of IPOs from 1999 to 2023. In 2023, only USD 5.9 billion was raised through IPOs, marking the weakest performance since 1999. This contrasts sharply with past peaks, such as in 2010 when the market raised an impressive USD 57.9 billion. The decline reflects a confluence of factors, including global economic uncertainties, geopolitical tensions, and weakened investor confidence, all of which have contributed to a notable reduction in IPO activity and liquidity in the Hong Kong market.

The weakening IPO market is further evidenced by a decline in "Star IPOs." In 2020 and 2021, several high-profile listings—including JD, NetEase, Kuaishou, Baidu, Bilibili, and XPeng—drew significant investor interest and global attention. These deals not only raised substantial capital but also spurred regional interest in tech investments, boosting market activity and economic development in a broader sense. In 2022 and 2023, the frequency of such marquee listings dropped sharply as market dynamics changed. Few new IPOs garnered comparable attention, while deal sizes shrank considerably. While past major IPOs routinely exceeded billions of dollars, more recent offerings often struggled to reach even a fraction of that amount.

**Figure 4. IPO volume in Hong Kong**



Data source: Bloomberg

### **1.3 Liquidity crisis and geopolitical uncertainties**

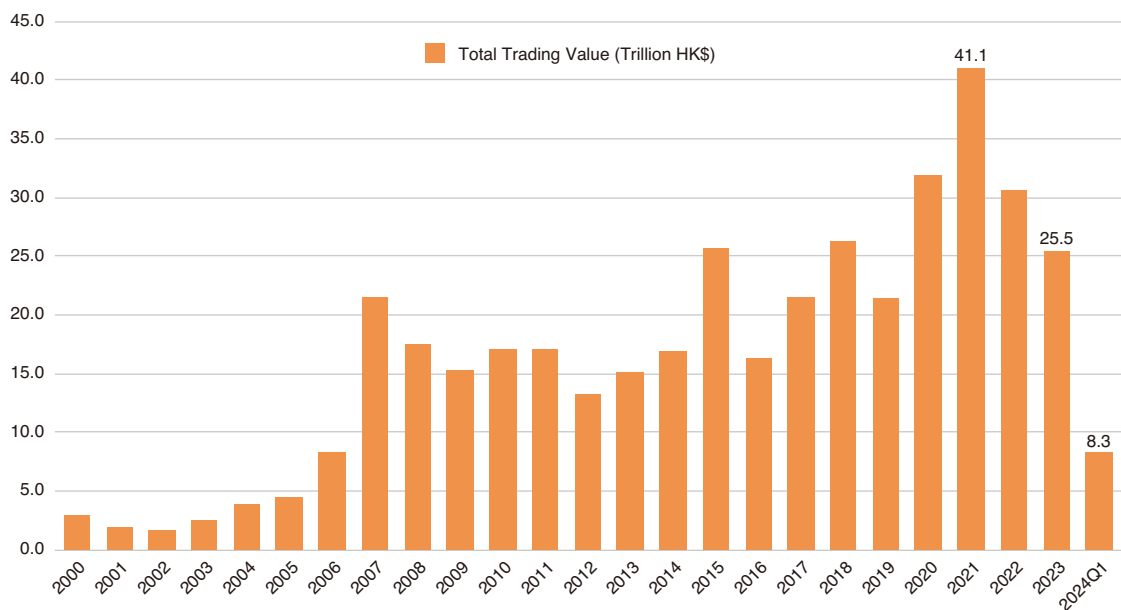
Another pressing challenge for the Hong Kong stock market is the liquidity crisis. While the total market trading volume at HKEX had shown a steady increase since the 2000s, this momentum reversed after 2021, with trading volumes contracting significantly (see Figure 5). This trend not only reflects reduced overall market activity but also signals waning investor interest and confidence.

A closer analysis of stocks with zero daily trading further underscores the severity of the liquidity issue. Figure 6 compares the percentages of daily zero-volume stocks across the Hong Kong, Shanghai, Shenzhen, and Singapore stock markets. That ratio has steadily risen in Hong Kong, reaching nearly 30% by 2023. That means nearly one-third of listed stocks experienced no trading at all each day. Although this figure is lower than that of Singapore, it remains significantly higher than those in mainland Chinese stock markets and other major international financial centers. The high proportion of inactive stocks highlights a critical liquidity problem that hampers market vibrancy and investor engagement. Addressing this issue is crucial for enhancing the overall attractiveness and efficiency of the Hong Kong stock market.



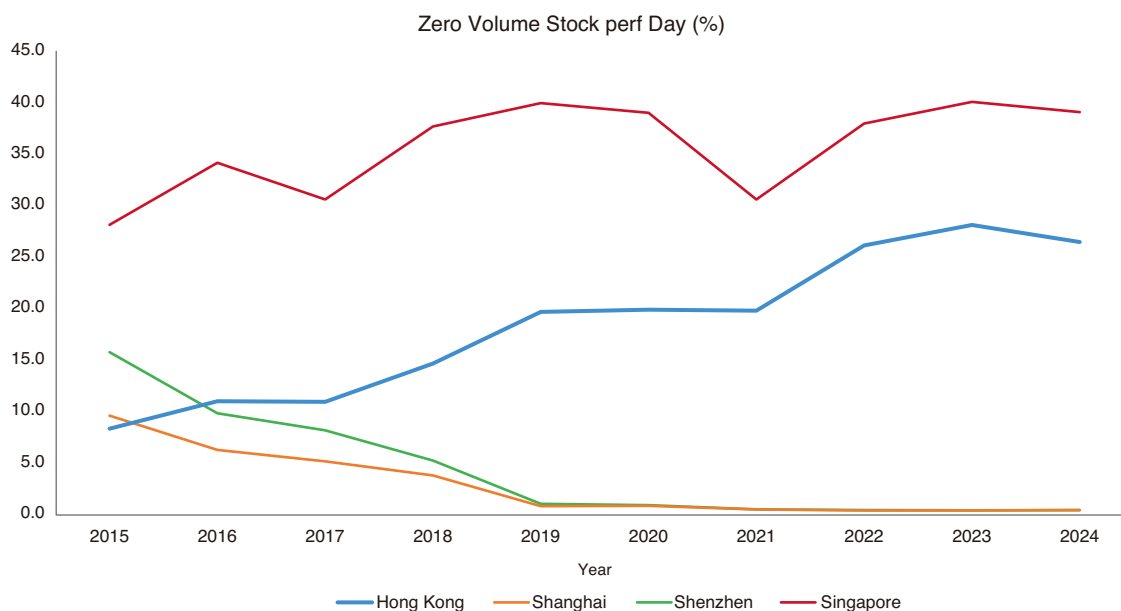


**Figure 5. Trading value of Hong Kong stock market**



Data source: HKEX

**Figure 6. Zero volume stock ratio**



Data source: Compustat

While metrics such as trading volume or the value and proportion of zero-trade stocks provide some insight into market liquidity, they do not capture an essential aspect of liquidity analysis: price impact. To address this gap, we employ the Amihud Illiquidity Ratio (Amihud, 2002), which quantifies the price impact of trading volume. The Amihud Illiquidity of a single stock and the whole market is calculated using the following formula:

$$StockAmihud_{i,t} = \frac{1}{n} \sum_{j=1}^n \frac{|R_{i,j}|}{DVOL_{i,j}}$$

$$MarketAmihud = \frac{\sum MCap * StockAmihud}{\sum MCap}$$

Where  $StockAmihud_{i,t}$  is the Amihud ratio of stock  $i$  during period  $t$ ,  $n$  is the number of trading days during period  $t$ .  $R_{i,j}$  stands for the daily stock return (in percentage) of stock  $i$  on day  $j$ .  $DVOL_{i,j}$  is the daily trading volume (in million HKD) of stock  $i$  on day  $j$ .  $MarketAmihud$  is the Amihud ratio of the whole market, which is the weighted average of individual stocks' Amihud ratio (StockAmihud) with market capitalization being the weighting factor.

The Amihud Illiquidity Ratio measures the percentage change in stock prices for every million Hong Kong dollars traded. The higher the ratio, the worse the liquidity condition, indicating that even small trading volumes can trigger significant price movements.

Figure 7 presents the monthly Amihud ratio for the Hong Kong, Shanghai, and Shenzhen stock markets since 2015. The data shows that Hong Kong consistently has a higher Amihud ratio compared to its mainland counterparts, with a clear upward trend and significant volatility in recent years.

Notably, there is a strong correlation between changes in Hong Kong's Amihud ratio and major events in China-U.S. tensions (see Figure 7). Market liquidity noticeably worsened following the start of the China-U.S. trade war in 2018. Specifically, after then-U.S. President Donald Trump announced a 25% tariff on \$50 billion of Chinese goods in June 2018, Hong Kong's Amihud ratio surged by 105% within five months. Another sharp increase in the ratio occurred during tense U.S.-China talks in Alaska in March 2021, after which President Joe Biden warned businesses about operating in Hong Kong. These events triggered substantial rises in the Amihud ratio, peaking when then-U.S. House Speaker Nancy Pelosi visited Taiwan on August 2, 2022. In 2023, rumors of a potential U.S. ban on investments in China's tech sector—later formalized in August—set off another substantial deterioration in market liquidity.



Further analysis of the Amihud ratio across different sectors (see Figure 8) and different firm sizes (see Figure 9) suggests that 1) the manufacturing and real estate industries have been most affected by the liquidity drain, and 2) the decline in market liquidity since 2018 was largely driven by the liquidity issue of small firms.

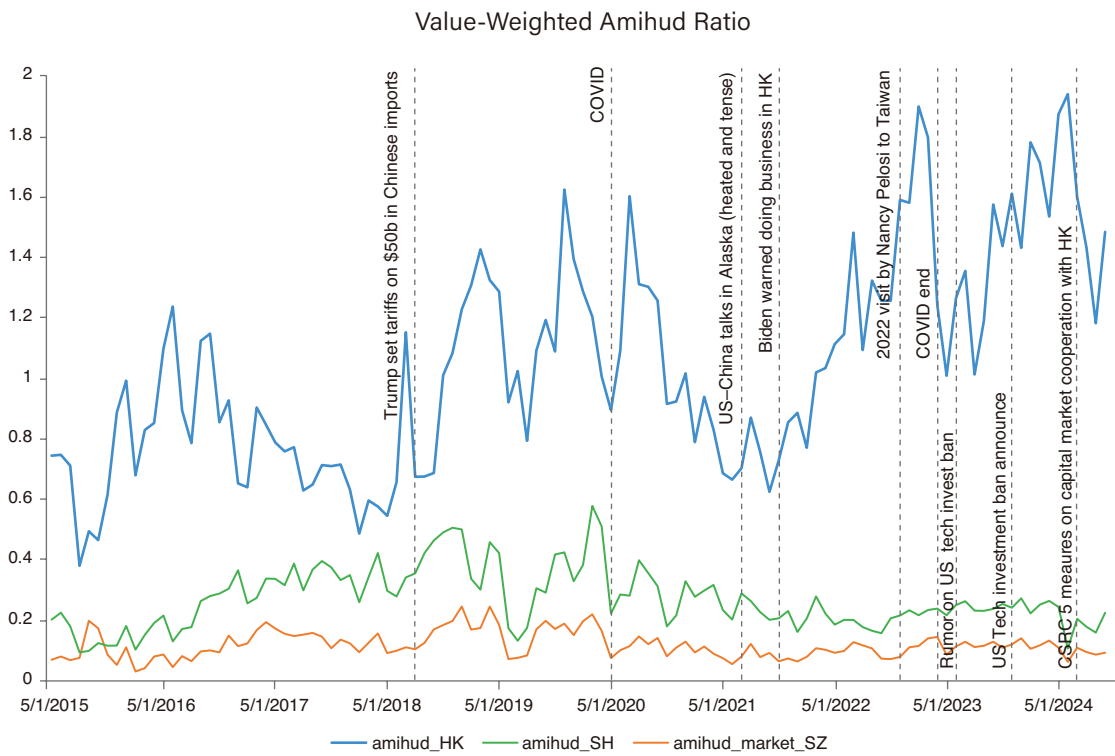
This correlation suggests that geopolitical risk is a major factor influencing the Hong Kong stock market, with China-U.S. tension emerging as one of the key drivers of the market's downturn in recent years.

Another critical observation supports this argument: the "Trump effect" on the Hong Kong stock market. As shown in Figure 10, Hong Kong's stock market reacted negatively to developments in Donald Trump's 2024 presidential campaign. In January 2024, when Trump won the Iowa caucus, signaling his strong position in the Republican primary race, the market dipped. A similar reaction followed when Ron DeSantis suspended his campaign and endorsed Trump during the New Hampshire primary. The market experienced further declines mid-2024 (the bottom three sub-figures of Figure 10), coinciding with Trump and President Biden's first debate—where Biden's performance was widely perceived as weak—and an incident in which Trump sustained a minor injury to his ear in a shooting. Each of these events pointed to an increased likelihood of Trump's electoral victory, eliciting negative responses from the Hong Kong stock market. These market responses suggest that Hong Kong's stock market, along with the broader Chinese market, have negative expectations of Trump's potential return to office. The underlying reason lies in the harsh policies toward China that Trump and the Republican Party have indicated they would adopt.

The 2024 Republican Party Platform, released in July, underscores the aggressive stance that Trump and his party intend to pursue. The platform advocates for strict measures against China, emphasizing "America First" policies and trade protectionism. Plans include significantly raising tariffs, such as imposing a 60% base tariff on Chinese imports, and revoking China's Most Favored Nation status. It also aims to curb Chinese imports of electric vehicles and restrict investments in the United States, promoting a "de-Chinaization" of global supply chains. Moreover, the platform prioritizes bolstering the U.S. economy by focusing on key technological sectors like cryptocurrency, artificial intelligence, and space technology.

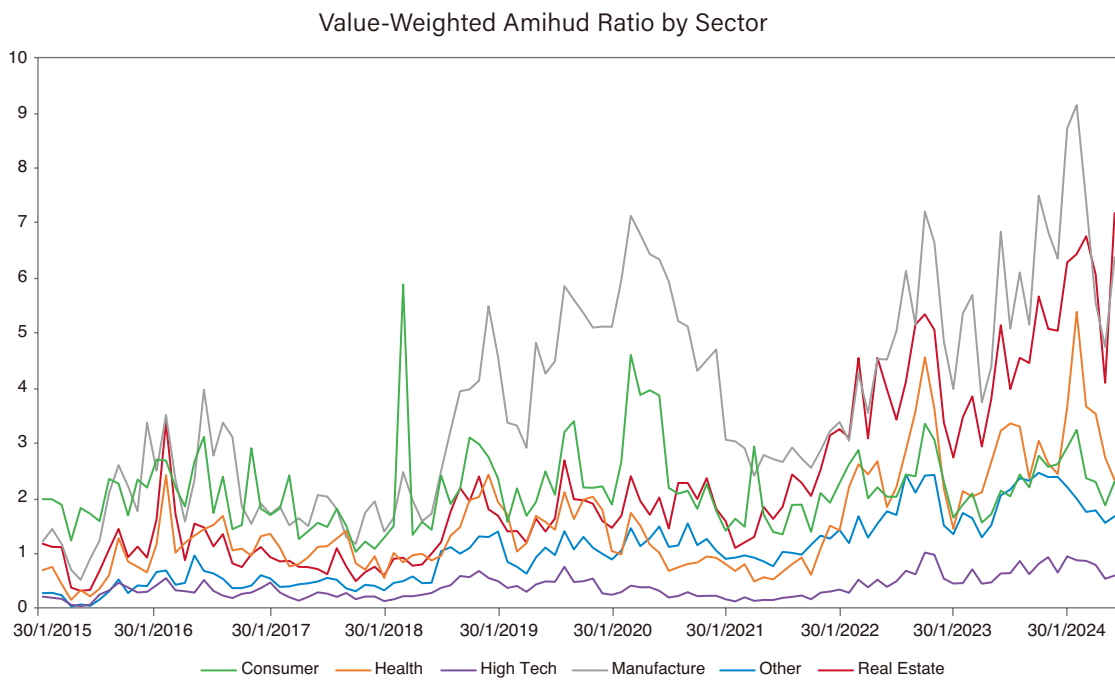
These proposed policies are expected to escalate China-U.S. tensions, amplify uncertainties and further spread concern across the Hong Kong stock market and the broader Chinese economy. The "Trump effect" highlights how geopolitical uncertainties, particularly those from strained China-U.S. relations, are a key driver of Hong Kong's liquidity crisis and overall market underperformance.

**Figure 7. Amihud Illiquidity ratio of Hong Kong and mainland China stock markets**



Data source: Compustat

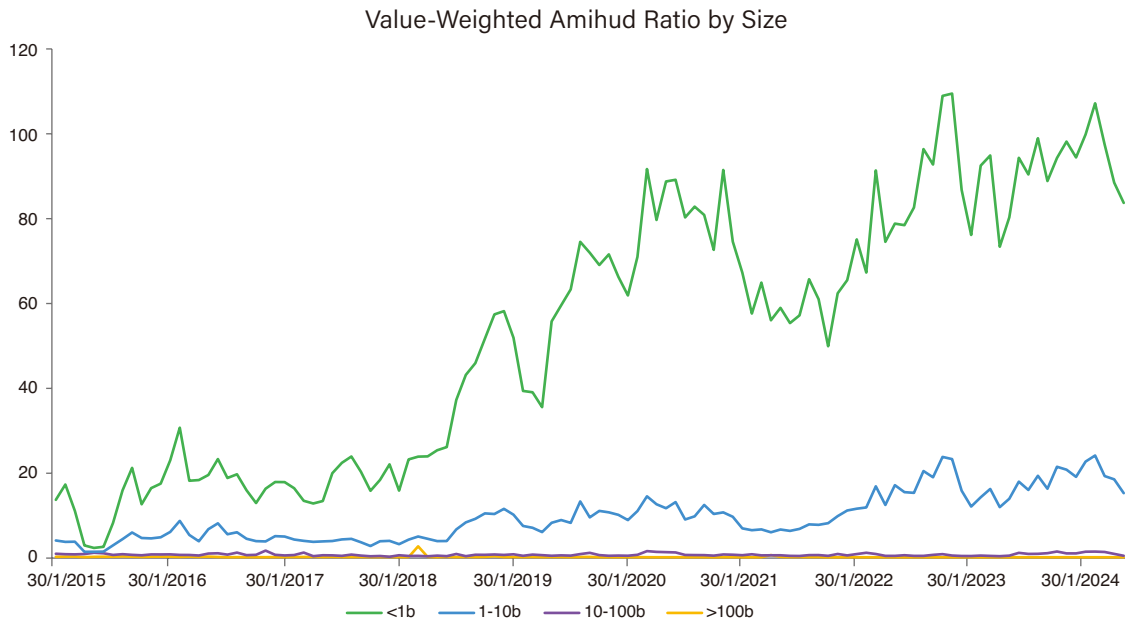
**Figure 8. Amihud ratio of Hong Kong stock market by sector**



Data source: Compustat

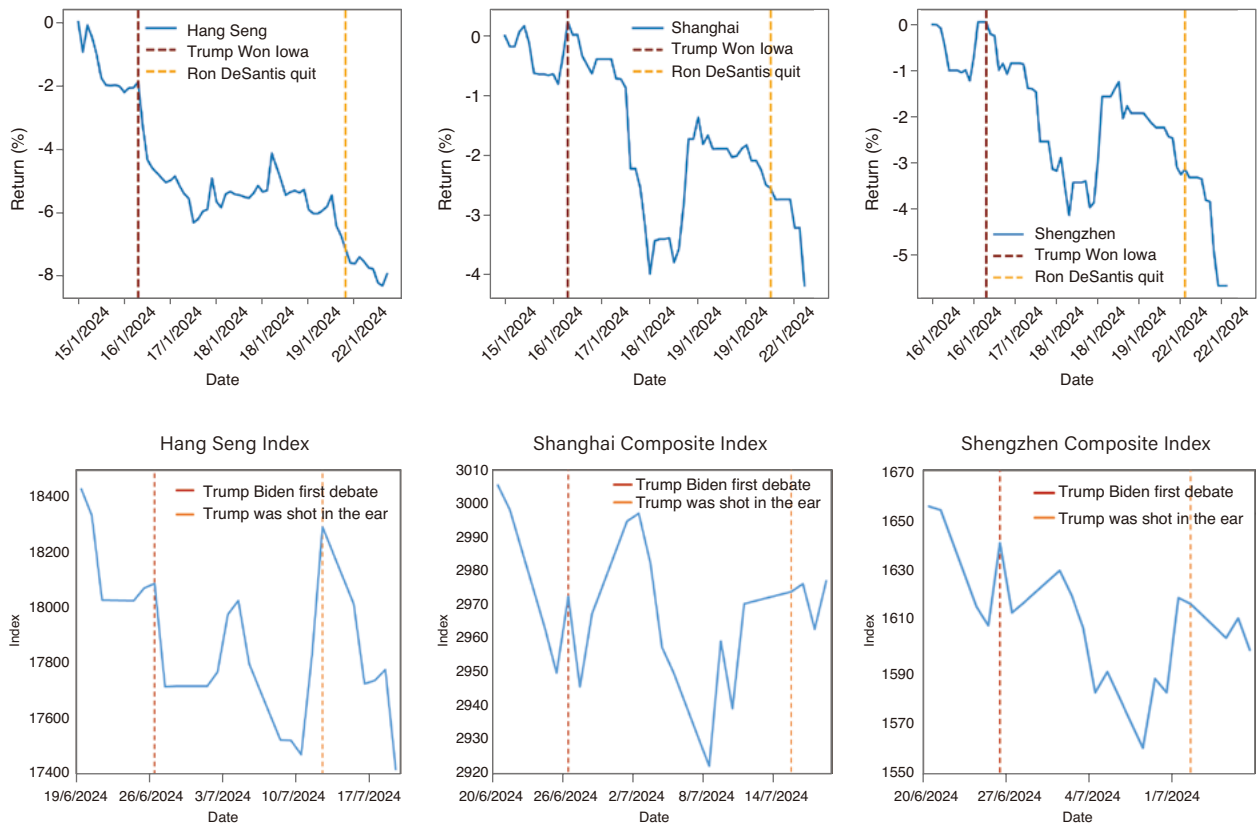


**Figure 9. Amihud ratio of Hong Kong stock market by firm size**



Data source: Compustat

**Figure 10. Trump effect**



Data source: Compustat

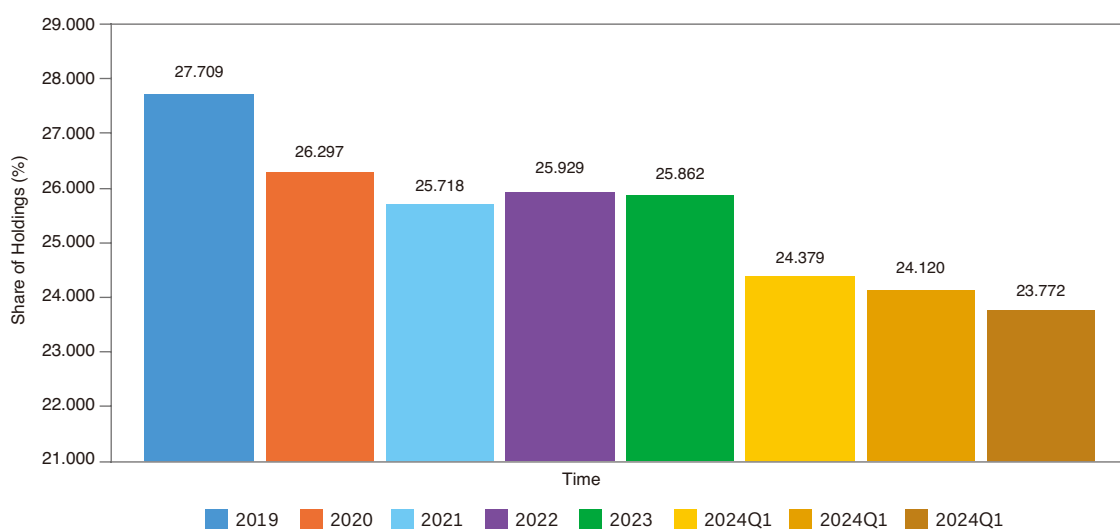
## 2. Foreign capital drain

Another significant factor compounding the challenges faced by the Hong Kong stock market is the foreign capital drain, which reflects deeper concerns over geopolitical instability, economic policies, and market confidence.

A detailed analysis of individual stock ownership data of all stocks on the HKEX main board, sourced from Refinitiv, reveals a consistent decline in foreign investor shareholdings since 2019. As shown in Figure 11, foreign ownership decreased by 4 percentage points by the end of the third quarter of 2024, representing a 14% reduction from its 2019 peak. The largest drop occurred in early 2024, coinciding with an escalation in U.S.-China tensions in 2023. Key incidents contributing to these frictions included the spy balloon crisis, battles over semiconductor supply chain control, intensified military competition, and U.S. restrictions on investments in China's tech sector. At the same time, China's economic challenges deepened, fueled by the ongoing real estate crisis that began in 2021. These developments collectively heightened the perceived risks among overseas investors regarding Hong Kong and broader Chinese markets, prompting capital outflows.

A breakdown by investor type (see Figure 12) shows that corporate investors accounted for the largest withdrawals with a net reduction of 3.0%, while mutual funds contributed a 1.4% decline. Sector-specific analysis (see Figure 13) shows that the consumer sector experienced a notable outflow following the outbreak of the pandemic, with an additional drop in Q3 2024. The healthcare and technology sectors have seen the largest foreign capital withdrawals since 2021, reflecting their status as primary targets of U.S. restrictions on China. The real estate sector suffered capital outflows post-2021, coinciding with China's property crisis triggered by Evergrande's default. The financial sector has also faced sustained outflows since 2019, underscoring long-term concerns about the industry's stability and resilience.

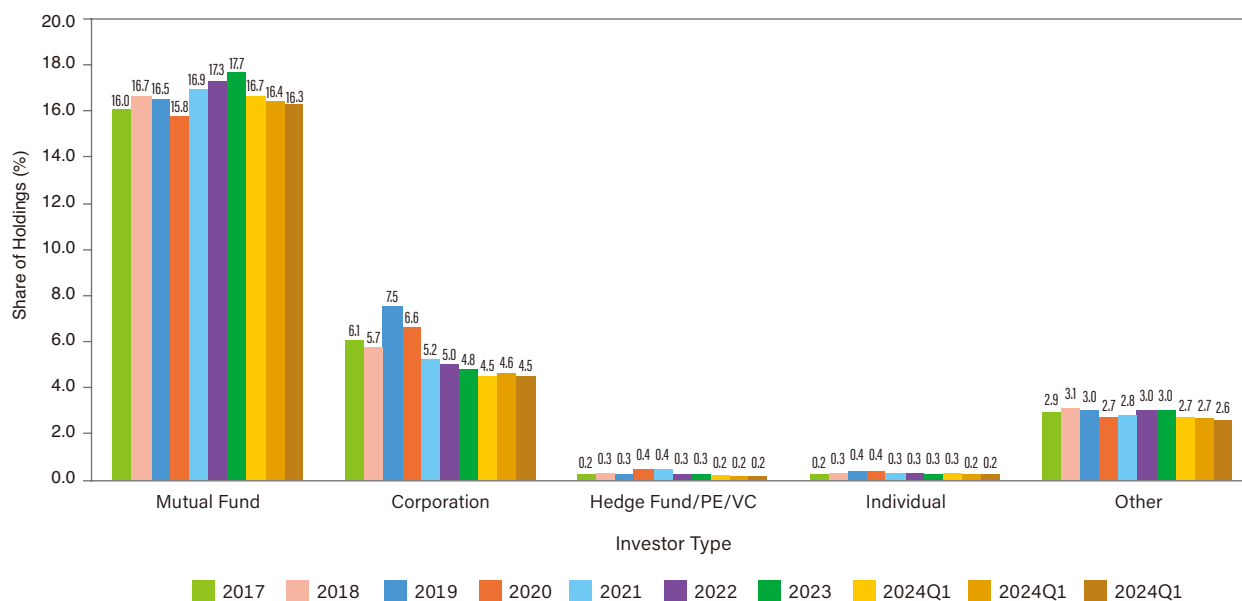
**Figure 11. Shareholding of foreign investors in Hong Kong stock market**



Data source: Refinitiv

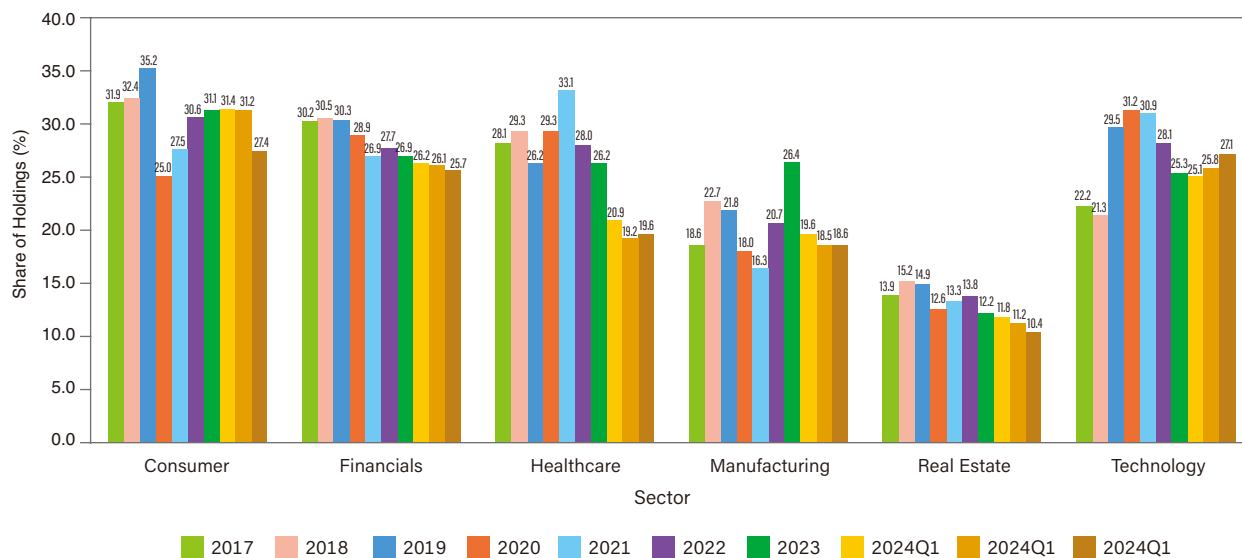


**Figure 12. Shareholding of foreign investors in Hong Kong stock market by investor type**



Data source: Refinitiv

**Figure 13. Shareholding of foreign investors in Hong Kong stock market by sector**



Data source: Refinitiv

### 3. Potential solutions

The trend of foreign capital outflows not only indicates external investors' negative expectations of the market but also reflects the challenges posed by geopolitical and economic conditions to Hong Kong's status as a global financial hub. Addressing these challenges requires proactive solutions to revitalize Hong Kong's stock market and restore investor confidence. We propose potential solutions in various aspects below.

#### **3.1 *Attract more investors and leading companies from the Middle East and Southeast Asia***

In light of the geopolitical tensions mainly driven by U.S.-China relations, Hong Kong can emphasize its strategic advantages, particularly its role as a bridge between mainland China and global markets, to attract more investors from the Middle East and Southeast Asia. Currently, Middle Eastern investors hold only about 0.3% of total shareholdings in the Hong Kong stock market (see Figure 14), significantly lower than their American and European counterparts. However, this low level also indicates significant growth potential.

Before 2023, there were clear signs of growing interest from Middle Eastern investors in Hong Kong stocks. Although this momentum was disrupted by rising geopolitical risks, it highlights the potential to attract more Middle Eastern investment as a means to offset capital outflows from other regions, primarily the U.S. and Europe. To capitalize on this potential, Hong Kong could consider measures such as: introducing tax incentives and investment benefits targeted at Middle Eastern investors, such as reducing capital gains tax and offering a wider range of financial instruments; strengthening bilateral investment and trade agreements with Middle Eastern countries to facilitate cross-border capital flows; and promoting cultural awareness and exchanges to foster mutual trust. These strategies could enhance Hong Kong's attractiveness to Middle Eastern investors, expand its position in the global capital market, mitigate the issue of capital outflows, and increase the market's diversity and stability.

A promising step in this direction is the recent listing of the first Saudi Arabia-based exchange-traded fund (ETF) focused on the Hong Kong stock market, enabling Saudi investors to access Hong Kong's market directly from their home country. Hong Kong should expedite similar initiatives, such as creating region-specific ETFs for Middle Eastern and Southeast Asian investors, offering them convenient and diversified access to both Hong Kong and global markets. Even indirect participation through ETF products can enhance market connectivity.

Hong Kong should also focus on attracting prominent companies and growing tech firms from these regions. With Southeast Asia's rapid economic growth and many innovative companies seeking international expansion, Hong Kong can position itself as an attractive listing destination for the region's top firms by proactively adjust listing policies and investment thresholds. For example, simplifying

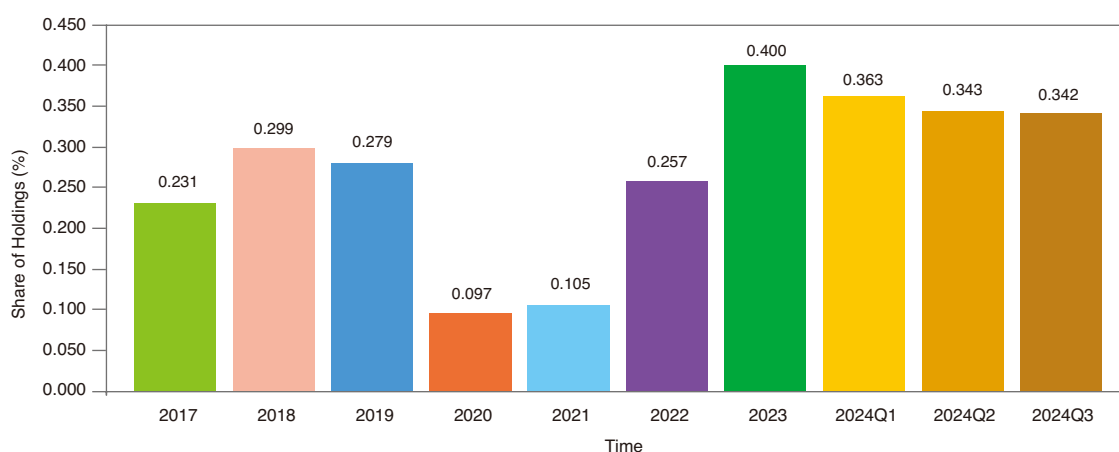




compliance requirements and streamlining the IPO approval process can reduce the listing costs for these companies.

The Hong Kong government can also organize promotional roadshows targeting local companies across key capital markets in Southeast Asia, the Middle East, and other regions. These events would showcase Hong Kong’s strengths and investment opportunities, thereby attracting more capital inflow and encouraging emerging enterprises to list in the city.

**Figure 14. Shareholding of Middle Eastern investors in Hong Kong stock market**



Data source: Refinitiv

### **3.2 Lower the threshold for the Shanghai-Hong Kong Stock Connect to enhance liquidity**

Mainland capital is a crucial source of liquidity for the Hong Kong stock market, particularly amid ongoing foreign capital outflows. Increasing the flow of mainland investments could revitalize Hong Kong’s market activity. The Shanghai-Hong Kong Stock Connect is the main channel for mainland funds to invest in Hong Kong, but it still faces many restrictions. Lowering the entry barriers for this program could enable more individual and institutional investors from mainland China to participate in the Hong Kong market.

Several threshold adjustments could support this goal. First, the criteria for Hong Kong stocks included in the Stock Connect could be further relaxed—potentially allowing investment in stock index futures and easing ETF inclusion requirements to expand the range of investable assets. Second, lowering investment eligibility requirements would help; currently, individual mainland investors must have combined securities and cash account assets of at least RMB 500,000 to trade via the Stock Connect, which excludes most retail investors. Reducing this threshold could significantly boost liquidity in the Hong Kong stock market.

Encouraging more mainland capital inflows would not only address Hong Kong's liquidity shortages caused by foreign capital outflows but also provide the market with greater stability. Mainland investments, characterized by long-term perspectives, can serve as a reliable source of support for the market.

### ***3.3 Launch government-guided funds and optimize the Mutual Recognition of Funds between mainland China and Hong Kong***

Hong Kong could consider establishing government-guided investment funds focused on strategic sectors, such as green energy, innovative technology, and biomedicine. These funds would not only support local companies in raising capital through listings but also provide liquidity support after listing. The involvement of government-guided funds would help alleviate liquidity pressures caused by foreign capital outflows, stabilize market expectations, and restore investor confidence. This, in turn, would attract more private and external capital to participate in the market, further alleviating the liquidity issue.

Meanwhile, Hong Kong should expedite efforts to optimize the Mutual Recognition of Funds (MRF) between mainland China and Hong Kong. This could include further loosening restrictions on cross-border fund sales quotas and inclusion criteria, granting investors in both markets easier access to one another's fund products. This would attract more mainland capital to the Hong Kong market, creating a stable, long-term funding source.

### ***3.4 Promote High-Frequency Trading***

High-Frequency Trading (HFT) offers significant potential to enhance market liquidity and efficiency. According to Goldman Sachs Global Investment Research, Algorithmic Trading (AT) accounted for about 65% of global equity market turnover in 2017, with regional variations. In the U.S., AT represented nearly 60% of equity market trading in 2017, while AT/HFT accounted for only around 10% of trading activity in Hong Kong from 2018 to 2020 (HKIMR report 2021). This low level of HFT is somewhat at odds with Hong Kong's status as a major international financial center, highlighting an opportunity to leverage HFT to revitalize the market. HFT cannot only significantly boost trading volume but also enhance the price discovery process and improve overall market efficiency.

A key obstacle to the expansion of HFT in Hong Kong is the high transaction costs and complex fee structures. Transaction costs in the Hong Kong stock market include broker fees, transaction fees, clearing fees, government fees, stamp duty tax, and platform fees, resulting in a more complex and expensive structure compared to markets like the U.S. or mainland China. While the U.S. generally employs fixed fees for many services, most fees in Hong Kong are proportional. This fee structure is particularly unfavorable to high-frequency traders, especially when dealing with high-priced stocks (e.g. most technology stocks). This discourages HFT participants from entering the market.



To address this issue and attract more HFT participation, Hong Kong could consider the following measures:

1. **Reducing Transaction Costs:** Lower or exempt certain transaction fees, such as stamp duty or clearing fees, especially for bulk trades and high-frequency traders. This would lower operating costs, making HFT more viable and appealing.
2. **Setting Fee Caps:** Introduce fee caps, such as setting maximum transaction fees within specific timeframes (e.g., monthly or annually). Such policies could incentivize more HFT firms and participants to trade in the market, thereby boosting overall trading volume.
3. **Optimizing Market Infrastructure:** Upgrade the technology and communication infrastructure of the stock exchange to enhance trading speed and data processing, creating a more favorable environment for HFT participants.
4. **Introducing Market Incentives:** Offer fee discounts or rewards for HFT firms that contribute significantly to market liquidity. These incentives could encourage HFT companies to become more active in Hong Kong.
5. **Adaptive Regulation:** Maintain flexible and transparent regulatory policies that accommodate new trading technologies and strategies while ensuring market stability and fairness.

By adopting these measures, Hong Kong can increase market activity, promote HFT development, and enhance market liquidity and efficiency in a sustainable way.

### ***3.5 Facilitate tech firm listings***

Attracting innovative technology firms to list on the Hong Kong Stock Exchange is crucial for the market's growth and resilience. Hong Kong has already taken steps in this direction with regulatory reforms. For example, in March 2024, the HKEX introduced Chapter 18C of the Listing Rules, designed to attract and encourage listings of specialist technology companies. This rule was implemented in response to the global demand among tech companies for more flexible listing rules and a favorable funding environment.

Chapter 18C creates a fast track for innovative technology companies, easing profitability requirements at the time of listing and thus allowing more high-growth companies that have yet to achieve stable profitability to access the capital market. This rule is particularly significant for R&D-intensive enterprises, such as biotech, AI, and chip design companies, which may not generate steady profits in their early stages but possess tremendous growth potential in technology and innovation. By targeting firms with disruptive technologies, these measures aim to enhance market vitality and diversity while offering investors a wider range of opportunities, enabling the stock exchange to better compete in global capital markets.

In 2021, the Hong Kong Stock Exchange launched the special purpose acquisition company (SPAC) listing mechanism to attract more startups and growth-oriented companies. A SPAC is a shell company formed solely to raise funds and merge with a private company in two years, facilitating the latter's entry into public markets. The advantage of SPACs lies in their accelerated timelines for going public and circumvention of some traditional IPO requirements.

These initiatives have already begun to yield results, particularly among technology firms in the Asia-Pacific region. This year, AI-powered medical company QuantumPharm Inc. and autonomous driving chip firm Black Sesame Technologies both listed under Chapter 18C. Synagistics, a leading e-commerce agency in Southeast Asia went public via SPAC in Hong Kong with a valuation of HKD 3.5 billion. While these reforms have shown initial success in attracting high-tech companies, significant efforts are still needed to achieve broader goals, particularly in invigorating Hong Kong's capital market as a whole and meaningfully supporting the real economy.

### ***3.6 Lower investment thresholds to broaden the investor base***

To address the issue of low liquidity in the Hong Kong stock market, moderate easing of account opening restrictions could be a viable strategy to expand its investor base. In addition to Hong Kong permanent residents and locally based investors, allowing qualified mainland residents to open accounts and invest in Hong Kong stocks could help inject much-needed liquidity into the market.

High investment thresholds for certain Hong Kong stock products also present a barrier to broader participation. For example, Hong Kong's Bitcoin ETF products are not on the whitelist of many institutional investors and remain inaccessible to mainland investors. Similarly, SPAC investments are currently confined to professional investors. These limitations directly affect the liquidity and fundraising potential of these products. Lowering these investment thresholds would allow a wider range of investors to participate.

Concerns about investor protection associated with broader participation can be addressed through enhanced disclosure requirements. For instance, the Securities and Futures Commission (SFC) could impose stricter disclosure standards for SPACs rather than limiting access for retail investors. Such measures could invigorate the market while upholding investor protections.

### ***3.7 Strengthen regulatory oversight and corporate governance for better investor protection***

To enhance the transparency, stability, and international appeal of the Hong Kong stock market, it is crucial to improve regulatory frameworks and corporate governance oversight. Hong Kong can draw on best practices from mature markets such as the U.S. to raise governance standards for listed companies, strengthen information disclosure requirements, and improve post-listing supervision. Between 2022 and 2023, the U.S. stock market saw 335 new listings and 838 delistings, resulting in a



delisting rate of 250%. This “high turnover” model keeps the market vibrant and healthy, and protects investor interests from the ground up. Hong Kong should also improve its delisting system, ensuring that non-compliant companies exit promptly to foster a healthier market environment. By optimizing regulatory oversight and corporate governance standards, Hong Kong can better safeguard investor interests, elevate market quality, and enhance its attractiveness and competitiveness as a global financial center.

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## Oh, My Poor Funds – A Timely Revisit of Hong Kong’s MPF System

# Oh, My Poor Funds - A Timely Revisit of Hong Kong's MPF System

Alan Kwan, Thomas Maurer, Mingzhu Tai<sup>1</sup>

## ChatGPT Picture Abstract



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1 We thank Elvin Yu of Goji Consulting for many discussions. However, all opinions and mistakes are our own.





## Completely Human-Written Abstract

The Mandatory Provident Fund has served Hong Kong citizens for nearly 25 years. Soon, Hong Kong will launch the e-MPF, integrating disparate savings schemes into a single digital system. This presents a well-timed opportunity to drastically improve Hong Kong's primary retirement savings system. This paper provides empirical examination of the MPF's performance and fee structure, addressing longstanding criticisms. Our evidence shows that suboptimal asset allocation is the primary problem, followed by excessive fees. MPF assets have grown faster than fees have been reduced, making the system substantially more expensive over time, with total costs reaching about \$15 billion HKD annually. Finally, drawing on empirical evidence and considering the transformative potential of the upcoming digital platform, we make several policy recommendations to enhance the MPF's efficiency and investment outcomes.

### 1. Introduction

Ensuring that households accumulate sufficient financial assets to support their retirement is a major challenge for policymakers, particularly as populations age globally. While some countries initially adopted defined benefit schemes, which placed citizens' retirement savings under direct government management, concerns over their long-term fiscal viability prompted many governments to shift toward defined contribution schemes. The Hong Kong Mandatory Provident Fund was one of the first such government-established schemes, following Chile's program in 1981 and Australia's Superannuation Fund in 1992. By exposing participants to market-based returns, the MPF sought to compel individuals to save for retirement while minimizing balance sheet risks for the Hong Kong government.

The MPF has succeeded wonderfully in encouraging household participation in securities markets. As of September 2024, it has grown to about \$165 billion USD, representing a substantial portion of Hong Kong's total net wealth of about \$3.5 trillion, according to UBS estimates. This roughly 3-4% share of aggregate wealth likely understates the MPF's importance to less wealthy households, given the large disparity between average and median net wealth in Hong Kong.<sup>2</sup> The MPF represents a clear success in advancing financial inclusion – an accomplishment policymakers can take pride in.

However, despite its sizeable role in improving financial inclusion, the MPF has come under fire for its high fees and performance. Meanwhile, the launch of the e-MPF and Beijing's plan to promote Hong Kong as a wealth management hub present an opportune moment to reassess the MPF as it reaches a critical juncture in its history. In this green paper, we analyze the fees, performance, and design of the

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2 According to the 2024 UBS Wealth Report, the average wealth per adult in Hong Kong was \$582,000, while the median stood at \$206,859. Based on Census data, the number of adults in Hong Kong, excluding those aged 15-19 and younger, was approximately 6.47 million.

MPF. Our findings uncover three primary drivers of its underperformance: (1) overly conservative asset allocation, (2) inferior products, even after accounting for asset allocation, and (3) elevated fees. To our surprise, among the three, fees are not the greatest factor in its underperformance. Finally, we provide several policy recommendations to help guide the MPF toward a more effective and sustainable future.

## 2. Data sources

For this study, we use several data sources. We hand-collect data on the MPF and aggregate fund expense ratios and asset allocations over time from annual reports by the Mandatory Provident Fund Schemes Authority (MPFA). Second, we collect returns data from Morningstar, which covers the majority of MPF funds. We compare these returns to those of exchange-traded funds and mutual funds in the United States, which come from CRSP, a commonly used academic database. We have snapshots of fund assets over time, but they are incomplete, so we refrain from conducting any fund-flow analysis.<sup>3</sup>

## 3. Assessing the MPF's Performance

The MPF has faced criticisms over the years for its low annualized rate of return, averaging about 2.9% since its inception as of its most recent annual report. This performance could be attributed to several factors, not all of which warrant criticism. We perform a systematic analysis of three key drivers behind the MPF's low returns.

- 1. Asset Allocation:** Asset allocation may explain the MPF's performance in two ways. First, allocation toward lower-risk investments could drive returns lower, reflecting the fundamental risk-return tradeoff. Second, a heavier allocation to underperforming markets, such as Hong Kong relative to the United States, could also play a role. This does not necessarily indicate an error in investment choices. In theory, in an efficient market, assets are bought and sold until they offer a similar *expected* risk-return tradeoff. Under this assumption, investors who allocated to Hong Kong disproportionately may have simply had bad luck over the past 15 years as Hong Kong's stock market lagged behind global peers. Of course, one can debate whether markets are truly efficient and whether the underperformance of Hong Kong's equity market was predictable.
- 2. High Fees:** MPF fees are notoriously high, with fund expense ratios among the highest in the world and often criticized in the media. As of 2008, fees stood at around 2%, and remain above 1% in 2024. In comparison, low-cost ETFs and index funds in the United States charge

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<sup>3</sup> Although the data had been retained before and retrieved for prior studies (e.g. Hong (2017)), the MPFA, when asked, indicated the data on fund assets historically may have unfortunately been deleted.



between 0.03-0.15%. These high fees significantly erode returns over time, particularly given the compounding effect.

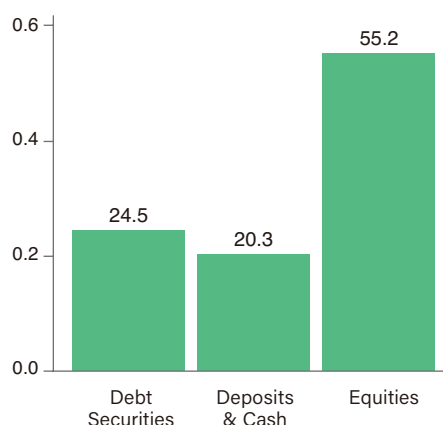
- 3. After accounting for asset allocation and fees, MPF funds underperform:** MPF managers often emphasize their “active” management approach. However, some active managers may further underperform despite their best efforts, due to factors such as poor stock selection or poor market timing.

### 3.1 Asset Allocation

We first investigate asset allocation. As shown in Figure 1, the MPF’s Hong Kong asset allocation has consistently skewed toward lower-risk assets over the years. Figure 2 shows assets being largely overweight on Hong Kong, a phenomenon economists often call “home bias”. The graph shows that the MPF’s allocation to Hong Kong stocks is about 10 times greater than expected based on global equity market capitalization.

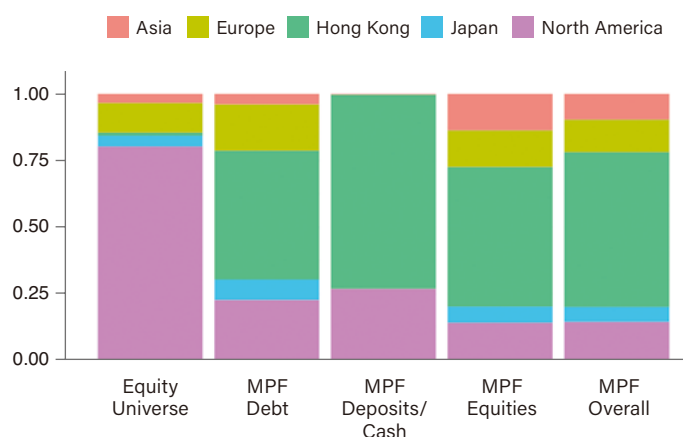
**Figure 1: Hong Kong Asset**

Allocation in the MPF (2008-2023)



**Figure 2: Country-level Allocation**

Against Market Cap Weighted (2008-2023)

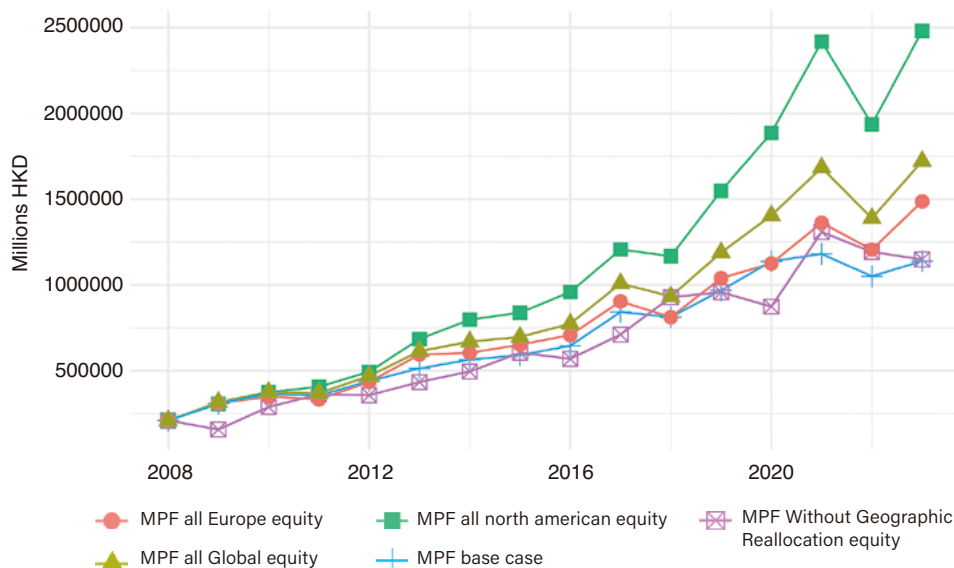


The optimal asset allocation is arguably subjective. It may vary based on individual investor preferences and the range of products available in the market. However, mainstream financial economists offer two key critiques of this asset allocation. First, Hong Kong’s realized asset allocation is conservative, with 20% in bonds, 20% in cash, and the remainder in equities. A popular model for asset allocation is the lifecycle model, which recommends that households invest in riskier assets (equities) during earlier stages and shift to less risky assets (bonds) as retirement approaches. TIAA-CREF, a prominent financial organization in the United States that specializes in retirement planning solutions, advocates a “glide path” from risky to less risky assets. Under this approach, individuals start with a portfolio of 90% equities and 10% bonds at age 20 (assuming retirement at 65), gradually transitioning to 45%

equities at retirement. For Hong Kong, adjusting for its target allocation over this period, an optimal equity allocation would be 80% in equities and 12.7% in fixed income (with the rest in cash and real estate).<sup>4</sup> By comparison, the MPF’s current asset allocation holds far too little in equities and far too much in cash and bonds.<sup>5</sup>

Second, given that Hong Kongers are already disproportionately exposed to the local market through their *labor income*, it does not make sense to overinvest in Hong Kong via their *investment income*. Deviating from the global market capitalization-weighted portfolio constitutes an active bet on the prospects of Hong Kong. Economists often describe this as “home bias”, criticizing investors for improper diversification of risk and calling this among the most basic cardinal sins in investing. If anything, it makes sense to underinvest in Hong Kong to diversify away from local economic shocks, given the MPF provides such access. The benefits of international diversification are well-documented in financial literature, as a broader pool of assets generally offers superior risk-adjusted returns.<sup>6</sup>

**Figure 3: Hypothetical AUM of MPF Under Different Asset Allocations**



4 We collect data from here: [https://www.tiaa.org/public/pdf/lifecycle\\_funds\\_at\\_a\\_glance.pdf](https://www.tiaa.org/public/pdf/lifecycle_funds_at_a_glance.pdf). We also collect data from the Hong Kong Census.

5 Some might argue that even TIAA-CREF’s glide path recommendation is too conservative. The MPF is not withdrawable until age 65 unless one faces terminal illness or leaves the system, resulting in less need for cash on hand. Moreover, labor income is more stable than investment income. Hong Kong boasts one of the lowest unemployment rates in the world. With stable, fixed labor income, one should take up a stronger equity allocation, perhaps up to 100% (see Cocco, Gomes and Maenhout (2005)), or even larger than 100% when young (e.g. Ayres and Nalebuff (2000), Campbell and Viceria (2002)).

6 According to data from AQR, during the period from 1986 to 2004—when Hong Kong markets performed relatively well—the Sharpe ratio for Hong Kong markets was 0.41, compared to the global Sharpe ratio of 0.405. However, since 2005, the global portfolio has reached a Sharpe ratio of 0.465 while Hong Kong markets delivered a Sharpe ratio of just 0.292.



What is the impact of imbalanced asset allocation? We simulate the growth of the MPF over time to calculate how much returns would have increased. We hand-collect contributions made to the MPF as well as the returns reported by the MPF, and simply ask: assuming the MPF behaved the exact same way *except for asset allocation*, how much would its performance have improved? To do so, we simulate the growth of the MPF in dollar terms. We pull annual contributions and annual returns by risk class (i.e. the five risk classes into which funds are categorized) from MPFA reports and fund-level returns from Morningstar. We then ask, if participants invested in the equity funds of the MPF instead of a mix of stocks and bonds, how would the MPF's growth be different? Or what if the MPF had only invested in U.S., Chinese or global equities?<sup>7</sup>

This analysis has the advantage of being simple and transparent, requiring limited technical knowledge. However, there are several important caveats. First, we compare only total returns without accounting for differences in risk. For instance, the MPF targeting North America might operate at a lower risk level than an all-North American equity fund such as SPY. We address this issue later with more formal regression analysis. Second, we are aiming to decompose historical underperformance only. Past underperformance of a particular asset does not mean it will persist in the future, as even the 25 years we study may represent a relatively short observation period.

Figure 3 presents our results since 2008, the first year we have complete data on fund expense ratios, returns, and investment allocations by risk class, as reported by the MPFA annual reports. This allows us to simulate what would happen if the specifically chosen MPF funds remained the same except for changes in asset allocation. Appendix Figure A shows how MPF funds performed over a longer period of time, but assumes equal weighting of returns within Morningstar categories since we do not know how participants allocated across different types of funds.

The overall takeaway of these graphs is that asset allocation matters. Any sort of allocation away from Hong Kong equities toward a more balanced global equity allocation would have led to an MPF 1.5 times larger. Allocating to U.S. equities, which have delivered exceptional performance, would have resulted in an MPF 2.5 times larger, with an annualized return of 5.1%. Since 2008, a significant driver of underperformance in the MPF is clearly the overweight allocation to Hong Kong stocks. While fixed income allocation made little difference over the same period, Figure A1 show that over longer periods, fixed income significantly lags behind equity. This is sensible, because equities – being riskier than bonds since bondholders are paid first – demand a higher premium.

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7 We make a number of assumptions. First, in effect, this assumes no market impact nor fee reduction. Given the size of the MPF relative to other pensions, and the large liquidity of the markets in which MPF funds tend to participate, we think this assumption is plausible. Second, we assume that participants do not change their contribution amounts in response to higher or lower returns.

In short, the recent underperformance of Chinese equities, coupled with an over-allocation to bonds and cash-like instruments, likely accounts for much of the MPF's lagging performance. At the same time, the Hong Kong and Chinese economies have experienced slower growth in the last few years. Rather than diversifying away from local economic risks, the MPF's allocation compounds Hong Kongers' exposure to domestic conditions through the stock market.<sup>8</sup>

### 3.2 High Fees

Next, we examine the impact of fees by removing them, i.e. assuming they are zero. Our findings suggest that while fees are a significant factor, asset allocation likely plays a more dominant role in explaining the MPF's underperformance. Adjusting asset allocation would have been roughly 3-4 times more effective in generating profit than eliminating fees alone. Currently, total MPF assets stand at 1.14 trillion HKD. The terminal value of the MPF with fees added back in would be 1.31 trillion HKD. This is an extra 15% *risk-free*. While significant, a more balanced global equity allocation would have delivered a terminal MPF value of \$1.75 trillion HKD by 2023, which suggests asset allocation has had a greater impact. Assuming the fees were similar to those in 2008, the cumulative impact of fees on the MPF has been about 21%.<sup>9</sup>

One caveat about this analysis is that the fund expense ratio does not account for trading costs borne by investors. If transaction costs paid to brokers are high or if MPF managers excessively churn, additional implicit fees might have been charged, which we will count as excess underperformance in Section 3.3. However, without knowing more about the trading behaviors of MPF managers and the prices at which transactions occur, it is difficult to draw definitive conclusions.

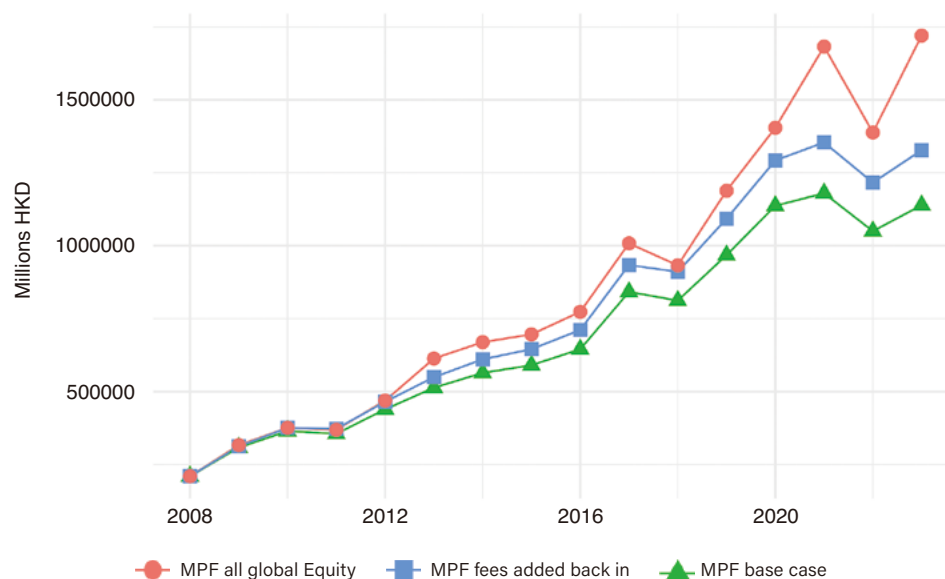
8 One can of course argue that given the recent performance of the Chinese market, now is the time to buy Chinese stocks. However, this constitutes a market timing bet on the assumption the market is not efficient. All else equal, if markets are efficient, assets are bought and sold until their prices reflect market expectations, making the capitalization-weighted portfolio is the optimal choice. Under an efficient markets view, a broader set of options (i.e. global equities) provide more diversification benefits. Market timing is a difficult thing to do – while fund managers with a timing mandate, market-timing is difficult and is not an advisable strategy for fund participants.

9 This impact, while significant, may appear smaller than some would expect at first sight. This is because the MPF receives contributions over time, which grow nominally due to inflation and population growth, so later cash flows have lower cumulative loss from fees. However, the cumulative effect of fees over a 25-year period is approximately equivalent to fees multiplied by the number of years. For contributions made in 2000, this would have translated to a cumulative impact of 45%

(i.e.  $\prod_t^{\forall \text{years}} 1 + FER_t$ ).



**Figure 4: No fees**



### 3.3 Excess Underperformance / Performance Drag

The final possibility is that MPF products underperform their respective benchmarks, even after accounting for fees and asset allocation. To evaluate this, we must compare performance against benchmarks that investors could have plausibly accessed as alternatives. This nets out the effect of asset allocation by enabling apples-to-apples comparisons in terms of risk and asset class. To account for fees, we ask whether the underperformance relative to the benchmark was in the ballpark of fees. We do not find overwhelming support for the notion that MPF funds dramatically underperform their benchmark for any reason other than fees, although our tests are inconclusive because we benchmark the MPF conservatively.

We use linear regression, a statistical tool designed to correlate the returns of funds like the MPF against benchmarks, to see (1) how similar the fund is to the benchmark, and (2) how much extra return (or underperformance) there is left over, after accounting for the benchmark. There are two complicating factors to note. The first complication is benchmark selection, so we will present results from multiple benchmarking exercises. The other complication is accounting for taxes. MPF returns are post-tax, but returns quoted in databases often assume tax-free status. For example, in the United States, a foreign investor pays no capital gains tax but faces a 30% dividend tax. Given the U.S. dividend yield of about 2%, this translates to 0.66% per year that could not be reinvested. This number varies across countries, complicating cross-border comparisons because a proper comparison must account for the total returns after taxes in various jurisdictions. Tax rates in the U.S. are high. China's are roughly 10% or less. Rates are often zero or lower in jurisdictions with which Hong Kong has a tax treaty. To simplify this analysis and make our conclusions very conservative, we restrict ourselves to the U.S. equity index fund and ETF universe, and subtract 30% from dividends.

Linear regression models the relationship between a dependent variable (MPF returns) and explanatory variables (in this case, benchmark fund returns). Specifically, we estimate the following relationships.

$$r_{st} - r_{ft} = \alpha + \beta_1(r_t^{\text{benchmark1}} - r_{ft}) + \beta_2(r_t^{\text{benchmark2}} - r_{ft}) + \dots \epsilon_{st}$$

$r_{ft}$  is the global money market rate, and  $r_t^{\text{benchmark1}}$  is the return of a benchmark asset.  $\beta_1$  is what's sometimes called the "beta" of an asset, or its covariance with the asset. The term  $\alpha$  refers to the average outperformance above the benchmark (negative alpha indicates underperformance). As stated before, MPF funds may target lower-risk assets than the market, thus earning lower returns. For example, MPF managers may shift to cash or bonds to preserve investor capital over time, resulting in smaller fund movements relative to market swings. Suppose we want to estimate the relationship between an MPF fund and the S&P 500. For example,  $\beta_1=0.5$  implies that for every 1% movement in the S&P 500, the asset moves by 0.5%. If the asset performs exactly like an asset half invested in the market, its  $\alpha$  should be zero. If its  $\alpha$  is less than zero, it means it underperforms the S&P 500 after accounting for its similarity to the S&P 500. Finally,  $\epsilon_{st}$  are returns explained neither by the average nor the benchmark. A large absolute value of  $\epsilon_{st}$  may indicate tracking error relative to the benchmark.

Table 1 presents our results across four benchmarks, each using a slightly different set of assumptions to help sharpen our interpretation of whether the MPF is underperforming or not. First, we obtain all mutual funds in CRSP by objective code, using average returns *after fees*. Since 2008, the average mutual fund has charged around 0.9%, which is similar to MPF fund management fees. Index funds and ETFs have driven this cost lower. In Panel B, we benchmark post-fee returns against ETFs. Both exercises assume a Hong Kong investor went to the United States and was taxed 30% for distributions (a conservative assumption). In Panel C, we hand-select ETFs for corresponding markets (VOO for the U.S., VGK for Europe, EWJ for Japan, VT for global, LQD for corporate bonds, and the Hong Kong tracker for China funds).

**Table 1: The MPF Against Benchmarks**

In Panels A-C, we run univariate regressions and report the alpha of the chosen benchmark, where each alpha is the alpha of a single time series regression of the following form:

$$r_{st} - r_{ft} = \alpha + \beta_1(r_t^{\text{benchmark1}} - r_{ft}) + \epsilon_{st}$$

In Panel D, we report the average Morningstar alpha, if available, using their MPT Index, which finds the index that fits the asset well.





Benchmark name	MPF Fund Category	Average
<b>Panel A</b>		
Lipper Objective Code, Category Average	Equity	-0.73%
	Fixed Income	-0.88%
	Money Market	-0.40%
	China Equity Subset	-0.93%
	US Equity Subset	-1.84%
<b>Panel B</b>		
Lipper Objective Code, Three Cheapest	Equity	-0.89%
	Fixed Income	-0.79%
	Money Market	-0.35%
	China Equity Subset	-1.90%
	US Equity Subset	-1.74%
<b>Panel C</b>		
Single Well-Known ETF Benchmark	Equity	-0.91%
	Fixed Income	-1.11%
	Money Market	-0.48%
	China Equity Subset	-0.81%
	US Equity Subset	-1.99%
<b>Panel D</b>		
Morningstar Reported Benchmarks	Equity	-1.84%
	Fixed Income	-1.3%
	Money Market	-0.54%
	China Equity Subset	-2.05%
	US Equity Subset	-1.89%

In **Panel A**, where we use the Lipper Objective Code to categorize average returns, we see that MPF funds underperform in every category, with average alphas of -0.73% for Equity, -0.88% for Fixed Income, -0.40% for Money Market, and -0.93% for the China Equity subset. This initial comparison demonstrates a general underperformance across these categories. **Panel B** sharpens this comparison by benchmarking against the three cheapest available ETFs, further illuminating the performance gap. Here, MPF funds show increased underperformance, which is particularly stark in the China Equity subset with an average alpha of -1.90%. Equity funds underperform by -0.89%, Fixed Income by -0.79%, and Money Market by -0.35%. **Panel C** continues this comparison, using the single most competitive ETF in each category as the benchmark. MPF returns here also lag behind, with alphas of -0.91% in Equity, -1.11% in Fixed Income, -0.48% in Money Market, and -0.81% in the China Equity subset. This benchmark shows that a single ETF outperforms MPF funds, reinforcing the competitive advantage of low-cost ETFs in various markets.

These findings lead to a clear conclusion: *net of fees*, the MPF underperforms compared to what investors could achieve by opening a discount brokerage account and managing their own asset allocation. When adding back in the scheme administration costs of roughly 0.73%, MPF funds are

generally in line with, though perhaps a little worse than, the post-fee performance of the average U.S. mutual fund. However, there are pockets of underperformance in both Chinese markets (where Hong Kong investors overbet) and U.S. equities (which represent the largest portion of the global portfolio).

While one might wonder if the authors' calculations are being relatively unfavorable to the MPF, those using industry databases paint a similar picture. In Panel D, we report our Morningstar results, which use the best-fitting index. Morningstar does not benchmark all funds, such as target date funds or allocation funds, instead focusing solely on Equity, Fixed Income and Money Market funds. Also, they do not consider dividend taxes, which is important for U.S. funds. In this case, MPF funds display the largest underperformance across all categories, with an alpha of -1.84% in Equity, -1.3% in Fixed Income, -0.54% in Money Market, and a significant -2.05% in the China Equity subset. These results indicate that funds underperform the Morningstar benchmark by approximately the amount of fees, or slightly more. This suggests that MPF funds are likely no better than – but not blatantly uncompetitive with – retail funds gross of fees, though they clearly underperform low-cost passive index funds after fees. That said, our benchmarking exercise is conservative, and if we made less conservative assumptions perhaps such evidence would emerge.<sup>10</sup>

### 3.4 *An Aside on the High Fees*

While not the sole driver of the MPF's underperformance, fees remain a significant factor. They are also an emotive issue for many MPF participants, based on the tone of numerous media reports we have read on the subject as well as the focus of many policy efforts by the MPFA. Given their importance, we found it particularly interesting to systemically analyze the dynamics of fees over time and their determinants.

The MPFA often emphasizes that fund expense ratios (FERs) have fallen over time. By mandating the disclosure of FERs, which were first published in 2008, the MPFA likely put significant pressure on trustees and fund managers to lower fees and implemented a number of policies that have effectively reduced fees. **However, despite these great efforts, the aggregate and per-capita nominal and inflation-adjusted fees of the MPF system have actually risen over time.** Figure 5 clearly illustrates the increase in the MPF's total fees. This is because fund expense ratios have slowed faster than the asset base has risen. To put this into perspective, the MPF system charges roughly \$2 billion USD per year, or \$500 USD per person, representing around 2-3% of the financial industry's revenue relative to GDP.

A common defense by banks for the MPF's high fees is high operational costs. These include substantial setup expenses and the labor-intensive manual processing of documents. In this context, the e-MPF promises to be a step forward. However, our findings suggest that these two factors alone do not fully explain the persistently high fees of the system.

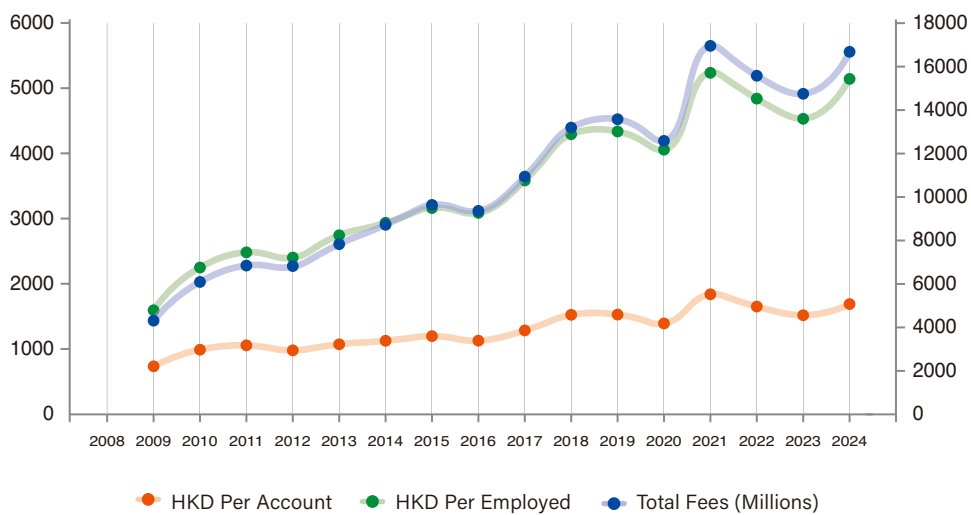
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10 For example, it is commonly assumed in the academic financial literature that a foreign investment manager could sell before the ex-dividend date, incurring a transaction cost but avoiding dividend tax, so we suspect a 30% withholding is a very conservative assumption. See Roesch (2021) for a discussion.



By definition, fixed costs do not explain the rising total fees charged by the MPF system, as they occur at the beginning. However, one could argue that variable costs are behind the rising expenses. Indeed, people change jobs, retire, or leave Hong Kong. To examine this, we hand-collect the number of participants in the system and deflate this number by multiple population denominators. The results are directionally consistent – the per-person cost of the system (or a proxy for the variable cost) has risen over time. From 2008 to 2023, total fees increased by 2.6 times (1.8 inflation adjusted), per-account cost doubled (or increased 1.4 times inflation adjusted), and the HKD cost per employee rose by 2.84 times (1.95 times inflation adjusted). If Hong Kong banks have been implementing the financial technology they trumpet, both fixed and variable costs should have reduced over time, rather than risen. Instead, if fees are any indication, the opposite has happened.

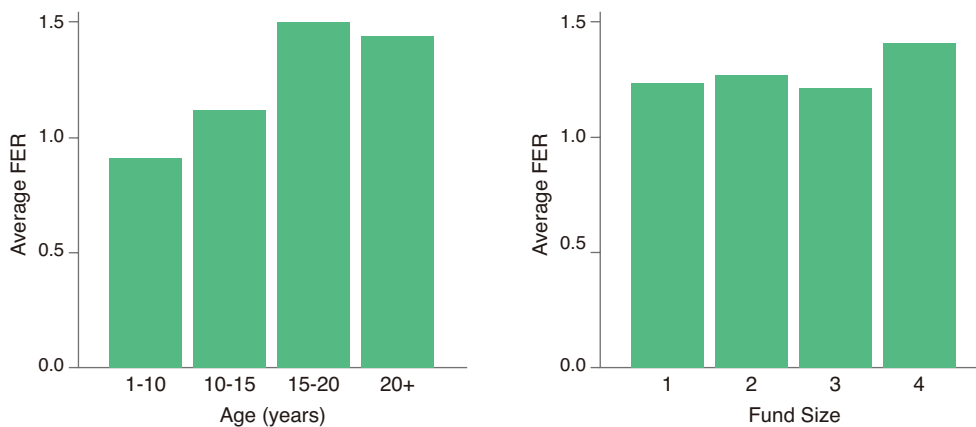
**Figure 5: Expenses of MPF Over Time (Nominal)**



We also conduct fund-level analysis. One hypothesis is that the emergence of new, smaller funds has contributed to rising costs. However, our analysis suggests otherwise: older, bigger funds charge higher fees, likely reflecting their established market positioning. In Figure 6, simple univariate bin plots show that older, larger funds charge more rather than less.

In the Appendix, we perform regression analysis – a statistical model to estimate the relationship between fees and certain variables, while *controlling for* other confounding variables. This approach allows us to test the same relationships while accounting for risk ratings, the types of assets traded, and other relevant factors. The regression results suggest that age, fund size and trustee size are positively correlated with fees. Unless the variable costs of such institutions – which remain unobservable as we do not know the number of scheme participants – increase with the age and size of the funds, schemes or trustees, these results suggest the *opposite* of the cost-based hypothesis. This is after controlling for returns and the type of assets traded.

**Figure 6: Size/Age and Fees**



One remaining explanation for the MPF's high fees is the lack of competition and the presence of market power. Quantifying the cost of this market power is challenging. Former HKUST student Claire Hong's dissertation shows that once participants are allowed to switch MPFs, there appears to be a decline in MPF fees relative to Hong Kong retail funds of about 0.2% per year. However, this is obviously a lower bound. Just because people can switch MPFs, it is not a frictionless process as one has to start a new account at another institution, and scheme operators hold significant market power in defining the investment menu. In addition, the comparison group, Hong Kong retail funds, are among the least fee-competitive in the world. Therefore, Hong's (2019) analysis likely significantly underestimates the true cost of market power.

## 4. Additional discussion, commentary, and policy recommendations

We now turn to policy recommendations. Our previous findings highlight a few problems: (1) the fees of MPF schemes are high, owing partly to low competition, and (2) asset allocations are imbalanced. Some of our recommendations tackle these two problems, while others focus on broader design improvements to the MPF system, including the e-MPF. Scheduled to roll out in the next year and a half, the new system aims to digitize the labor-intensive administrative processes often blamed for driving fund administration costs. The platform will also allow employees to freely switch between schemes, thereby increasing competition by reducing customer stickiness. At launch, the e-MPF will charge a fee of 0.37%, roughly half of the fees currently charged by trustees and scheme operators, with plans to further reduce costs over time as assets grow. Given the system is rolling out soon, we think this is the right time to provide input before its details are set in stone.



The government's approach to the MPF is to use a market-based framework whereby the government merely acts as a facilitator and regulator. However, creating a well-functioning free market is not easy and requires three key elements: (1) diverse and competitive market offerings, (2) sufficiently sophisticated investors to discern these offerings, and (3) regulatory oversight. Under this market-based approach, whereby the government operates within certain self-imposed constraints, we offer four recommendations. We then discuss the additional measures the government may consider, should it choose to take a more proactive and tougher approach.

### ***Recommendation #1: Drive Down Fees***

If the government chooses to maintain its current approach, it has several tools at its disposal. To directly reduce fees, the government's only option is to revise the *default investment strategy*. The DIS allocates assets based on participants' age, starting mostly with equities and following a "glide path" into bonds as retirement nears. Its diversification strategy follows the MSCI All Country World Index allocation, an international standard and a clear improvement over the allocations currently adopted by MPF participants. The DIS should re-adjust its fee cap of 0.75%. Subject to Legislative Council approval, the MPFA can mandate a lower cap. Introduced in 2017, the 0.75% fee cap was high even by 1990s standards. Fund managers and scheme administrators have now had seven years to adapt to this competitive threshold. In aggregate, total fees have kept rising, so it is unclear if the profitability of funds has suffered materially. This suggests it would be appropriate to further drive down fees to even 10 basis points. Further, to elevate the prominence of the DIS in the investment menu and to attract more participants with different preferences, the government could mandate the inclusion of a few alternative glide paths, such as options more aggressively invested in equities even as one gets older.<sup>11</sup>

The MPFA could also invite new service providers that charge lower fees into the market. Once the e-MPF platform is operational, it will handle scheme administration, leaving only marketing, sales or client service and product development to scheme operators. This will make it more viable for new entrants to establish itself or take over a less technologically savvy incumbent. We think Vanguard, State Street, or Ping An would be great candidates. Alternatively, this could be a great opportunity for Hong Kong to attract low-fee fintech service providers to set up operations and offer MPFA services in the city. Such providers could be approved on the basis that they push certain product recommendations such as low-cost index funds.

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11 As discussed before, the glide path prescribed by TIAA-CREF is likely too conservative. The glide path used by the Default Investment Strategy starts at 60/40 equities to bonds, which is even more conservative than TIAA-CREF.

## ***Recommendation #2: Fix Asset Allocations by Being Prescriptive, Promoting Investor Education and Curating Information***

We argue that MPF participants' imbalanced asset allocation is at least partly responsible for the system's historically low returns. While one might contend that asset allocation is the responsibility of individual participants, the market is a highly regulated system that the Hong Kong government had paternalistically imposed in the first place. The government should therefore actively monitor asset allocation.

First, the government should be unafraid to be prescriptive. It should openly endorse a global investment allocation and educate people on its merits. This allocation strategy aligns with asset allocation standards endorsed by international labor and financial organizations and should therefore be politically uncontroversial.<sup>12</sup> Academics have long argued that international diversification offers many benefits to local investors. Further, we argue investors' overconcentration in local markets could lead to unintended consequences.<sup>13</sup> This would simply require the MPFA to double down on its efforts with the DIS and be more prescriptive through public education and marketing.

In particular, the MPFA, in partnership with the Investor Financial Education Council, should consider taking a more proactive role in educating investors and enhancing citizens' financial literacy. Currently, the IFEC is focused on generic financial planning, budgeting, avoiding scams, and producing entertaining gamified content – not on teaching people how to invest. From our personal interactions with the IFEC, we surmise that the IFEC is hesitant to prescribe risk-taking or perhaps even discourages it. However, taking risks on fairly priced or undervalued assets – particularly for assets set aside early in one's career – is a strategy for earning *return-on-risk* and should be encouraged.

Second, the government can curate information to help market participants navigate the complex product space. The e-MPF will allow participants to freely switch between products, which has the benefit of increasing competition. However, the MPF ecosystem currently includes over 450 funds, and participants may struggle to make optimal choices. Many schemes offer virtually identical funds but with varying fee structures. Egan (2019) shows that in the U.S., brokers are incentivized to steer consumers toward 'dominated,' higher-fee products with completely identical pre-fee returns, underscoring how search costs and the complexity inherent in financial products lead consumers to suboptimal decisions.

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12 Even if one were to view the global investment allocation as too U.S.-centric, diversifying away from Hong Kong toward pan-Asia, Europe, and emerging markets would provide a counterbalance to local domestic conditions.

13 For example, one potential catch-22 of investing too much in the local market is that valuations may be too high, meaning future returns will be too low.



The basis of this phenomenon is a well-studied problem called “choice overload.”<sup>14</sup> Specifically, when consumers have too many choices and a limited attention budget, they may choose products with salient attributes. This may explain why the oldest and largest products in the MPF currently have higher fees. As the e-MPF expands the available choice set (now hundreds of funds), participants may face even greater difficulty navigating their options absent an information architecture that reduces search costs and complexity.

How can the government curate information? To begin with, the MPFA can implement a more modern risk-and-performance rating system grounded in academic practice. The existing ratings, which use six risk classes to describe MPFA funds, have not been recalibrated since the system’s launch. Moreover, the MPFA platform’s website is outdated. Academic research has found that the way information is framed significantly impacts investor behavior.<sup>15</sup> Currently, the ratings do not seem particularly useful.<sup>16</sup> Furthermore, many of these products are redundant, further complicating consumers’ decision-making. Basic clustering analysis can identify similar assets to form proper peer group comparisons, simplifying choices from hundreds of funds to a few broad buckets. Metrics like those created for this paper (alphas, betas, etc.) can be easily interpreted and convey to participants more meaningful benchmarks than simply returns displayed on the MPFA platform, while applying pressure on MPF providers to improve their offerings.

The MPFA’s investor education initiatives can benefit from collaboration with Hong Kong’s many business academics. Local finance academics can design dashboards displaying more thorough performance metrics and optional MPF-specific financial literacy tests. Marketing academics at local business schools may contribute insights on how to frame choice sets to encourage more optimal investment behavior, or develop scientifically grounded assessments for participants to judge their own risk tolerance. Many Hong Kong academics would be willing to work pro bono or for modest grants provided by the MPFA, as contributing to public knowledge and winning competitive grants both align with the key performance indicators (KPIs) for their career advancement.

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14 See Bordalo, Gennaioli, Shleifer (2013), Briere, Poterba, Szafarz (2021), Iyengar, Kalmenica (2006).

15 Running a field experiment on a fintech platform, Levi (2021) shows that simply framing past consumption and savings under a “risk frame” in certain ways affected user savings by 15% for over 6 months after the experiment.

16 For example, the so-called risk class guaranteed fund is not guaranteed in the sense of a money market fund. It is principal protected. While we understand there is a specific legal meaning, it is hard already for time-constrained retail investors to understand these subtle differences.

### ***Recommendation #3: Boost the Product Space of the MPF***

We hope the government can enhance the product space of the MPF. The first thing missing in the MPF system is low-cost index funds. Many MPF managers are active, and active managers tend to charge higher fees. However, their net returns clearly underperform low-cost passive index funds, which remain surprisingly few in the MPF schemes. We hope the MPF's current funds can be supplanted with cheaper alternatives, enabling the majority of investors to default into these cost-effective passive funds. We also hope the MPF could consolidate many of its similar or redundant offerings, or at least curate information about them, to reduce the complexity of navigating the space.

Once participants are equipped with sufficient investor education and access to curated information, the MPF could also consider promoting greater product innovation and loosening restrictions to allow for more diversified asset allocations and aggressive investment options that would typically be out of reach for retail investors. For example, the default investment option follows a glide path toward more bonds as one gets older; as mentioned earlier, the government could mandate DIS options with alternative glide paths that invest more heavily in equities even as retirement nears. Alternatively, the MPF has been limited to vanilla products such as developed market equities, fixed income, and money market instruments. While the MPF now allows REITs, which is a step in the right direction, it still excludes gold and commodities, which serve as inflation hedges, and emerging market equities or sector-specific funds. For investors seeking potentially outsized returns, the MPF could explore alternatives such as private equity or performance-sensitive hedge funds, which are difficult to access through discount retail brokers. The MPF could adopt a fee structure similar to the Hong Kong Monetary Authority's (HKMA) pay-for-performance model with external managers currently. Australia's Superannuation Fund allows a broader range of options, including those mentioned above. However, to prevent the product space from becoming too large for consumers to navigate and difficult to govern, the government can decide whether to allow participants to invest in a select number of these alternatives directly, or simply as part of a vehicle with a balanced asset allocation to improve diversification.





## ***Recommendation #4: Harvest Data, the New Oil***

The MPFA should leverage its data better. As an immediate step, the MPFA could publish return series, assets under management (AUM) series, and other key metrics for every fund on the platform, accompanied by standardized identifiers. As noted before, requiring funds to disclose their holdings in a systematic manner would enable better scrutiny and analysis. In the U.S., mutual funds and other institutional investors have been reporting their holdings regularly since 1979, demonstrating that such disclosures are neither onerous nor impractical. Greater transparency would make it easier to replicate and automate analyses like those presented in this paper, benefitting the public. Investor letters and trustee annual reports, as they currently stand, offer limited utility.

The upcoming e-MPF platform represents a wonderful opportunity to digitize the system and harness valuable data on Hong Kong investors' behaviors. For example, this "digital exhaust" could provide insights into the characteristics of individuals who make suboptimal investment allocations, choose poor-performing products, or don't monitor their investments effectively. Moreover, the e-MPF could evolve into a more powerful tool by offering additional features over time, such as investor surveys and account aggregation, allowing the Hong Kong government to develop a more comprehensive understanding of its constituents' financial behaviors and better serve their needs. These analytics may serve as a public good, particularly by leveraging social proof and peer effects. For example, D'Acunto, Rossi and Weber (2022) shows how crowdsourced spending analytics could induce those who spend more than the peer average to save more. Such analytics could create broad-based awareness of how others are doing, encouraging one to reflect on their own investment behaviors. A/B testing could also provide insights on ways to optimize the platform's information architecture. Given that the e-MPF's cost is not low – 0.37% of 1.2 trillion HKD in assets represents about one-fourth of State Street's IT expenditure – the MPFA should set ambitious targets for the e-MPF platform.<sup>17</sup>

## ***Finally, we offer a thought experiment on how the government could play a more active role***

The recommendations outlined above assume a market-based framework, where the government simply acts as a facilitator and regulator. In this approach, the government faces the trilemma of (1) establishing a robust market, (2) educating participants, and (3) developing proper oversight. While necessary, these efforts require significant government resources and attention, and there is a long way to go from here. Our recommendations, even if implemented, serve as somewhat blunt instruments for fee reductions as they operate indirectly through market mechanisms. If the government is willing to exercise less self-restraint, we believe it could redirect resources to achieve better outcomes for market participants.

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<sup>17</sup> State Street's 2023 Annual Report suggests it spends more than \$2 billion per year on technology and operational efficiency, the vast majority of which is purely technology.

What if, for example, the government were to create its own scheme? Such a scheme could offer a selection of vanilla products like low-cost index tracking funds – products notably absent from the current MPF market. Alternatively, the government could provide its own retirement products and asset allocation services, following basic glide paths and made up of the lowest-cost investment products. The government’s credibility would likely attract customers, while its lack of profit motive would keep costs minimal. One apprehension government officials may have is whether they can serve MPF participants well, but it is unlikely that they would make worse decisions than the least sophisticated participants the MPF is precisely designed to protect – especially when operating with lower fees. For those seeking riskier and more exotic products, private MPF schemes and privately managed funds can still exist if they demonstrate clear value propositions. This hybrid model would prevent investors from defaulting into today’s high-cost, mediocre-performing products.

Another possibility is for the government to revisit the sometimes discussed idea of offering a real return instrument, providing returns superior to money market funds. This recommendation draws inspiration from Singapore’s Central Provident Fund, which channels funds into the Government Investment Corporation (GIC), significantly strengthening the financial position of the Singapore government through robust investment returns. The hurdle rate for such an instrument could vary based on prevailing economic conditions, passing through additional upside in good times. Given that Hong Kong faces a looming fiscal deficit, the government will have to issue debt at some point. A government-managed MPF scheme could simultaneously address the market’s mediocre product offerings and help mitigate fiscal shortfalls.

We think a government-managed scheme offering superior returns and lower fees would likely garner widespread support. Money market funds within the MPF system currently offer embarrassingly low returns paired with extremely high fees. The guaranteed funds, per the most recent MPFA annual report, have provided on average 0.9% per year.<sup>18</sup> This would not be difficult to beat. Such a scheme would also be relatively easy to administer. Hong Kong has a deep pool of investment professionals, many of whom would welcome the opportunity to serve. Alternatively, much of the infrastructure needed for a government scheme already exists within the HKMA. The HKMA is staffed with investment professionals and already manages the Exchange Fund, money for various government departments, and the Hong Kong Mortgage Corporation (HKMC), known for offering one of the best annuities on the market.

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18 While money market funds also seem in the data to be quite popular, even though they offer a substantial haircut of around 1-1.2% over the money market rate. The existence, size and high price tags of these options loosely suggest that a fixed return instrument would be extremely popular, a notion affirmed by anecdotes we received in writing this article.



## 5. Conclusion

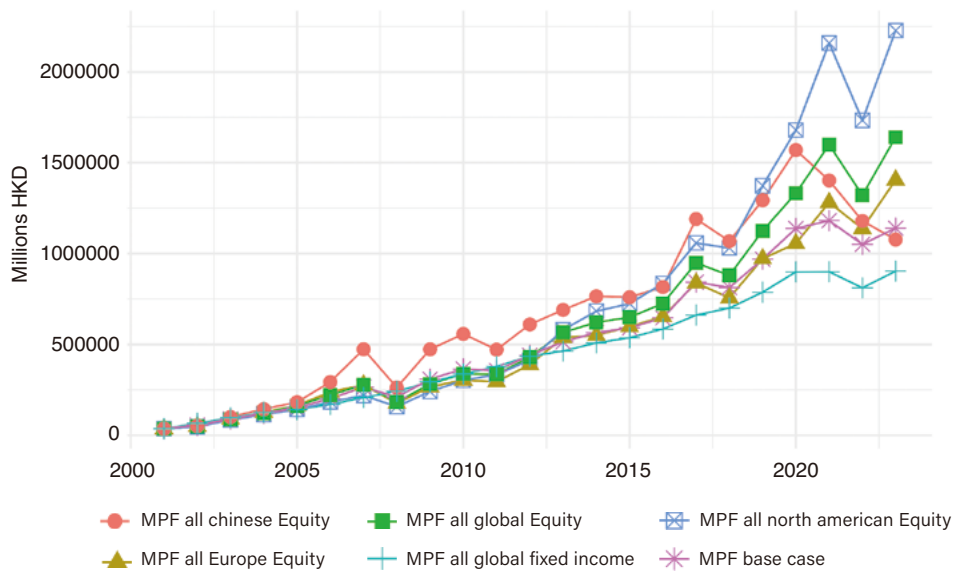
All in all, we believe the MPF can implement a series of straightforward adjustments to position it better for future success. However, we argue that there is more at stake than just the MPF. We all go to the Wan Chai or Sham Shui Po computer centers, knowing we will find fair prices and reasonable quality. Unfortunately, the same cannot always be said about Hong Kong's retail asset management industry. Hong Kong's financial industry is notorious for its high fees, with various Morningstar reports ranking the city among the most expensive major financial centers. Improving the product space and reducing MPF fees through targeted government action would not only benefit participants but also enhance the overall competitiveness, standards, and reputation of Hong Kong's broader financial industry. By more aggressively addressing inefficiencies in the MPF system, the government has an opportunity to strengthen Hong Kong's financial services ecosystem, draw in more capital, and advance the Central Government's strategic vision of Hong Kong as the wealth management hub for the Greater Bay Area and a preeminent one globally.

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## Appendix


### Appendix A – MPF Under Full Sample



### Appendix B – Determinants of the FER in 2024 October

Dependent Var.:	(1) FER	(2) FER	(3) FER	(4) FER	(5) FER
log (Age)	0.1864*** (0.0052)			0.1868*** (0.0100)	0.1734*** (0.0144)
5 year return	-0.0459 (0.0616)	0.0946 (0.0943)	0.0448 (0.0840)	-0.0535 (0.0614)	-0.0586 (0.0615)
log (Fund Size)		0.1325*** (0.0074)		0.0314** (0.0140)	0.0363** (0.0145)
log (Scheme Size)			0.1093*** (0.0048)	-0.0201 (0.0131)	-0.0282* (0.0145)
log (Trustee Size)					0.0143 (0.0112)
Dummy controls	Y	Y	Y	Y	Y
Observations	413	413	413	413	413
R2	0.55426	-0.05096	0.16790	0.56050	0.56231
Adj. R2	0.54543	-0.07177	0.15142	0.54957	0.55030





**Anatomy of a Housing  
Affordability Crisis:  
Hong Kong, 2001-2021**

# Anatomy of a Housing Affordability Crisis: Hong Kong, 2001-2021

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## Abstract

This study examines the distributional effects of high housing costs in Hong Kong using disaggregated population data. We document that public housing shielded much of the population from rapidly rising private housing costs between 2006 and 2016. However, as private housing costs rose, public housing became increasingly misallocated. The population of private-sector renters dramatically increased. The prices and rents of smaller private-sector units disproportionately increased. Younger cohorts disproportionately bore the burden of rising housing costs and increasingly became unable to move up the housing ladder. We argue that Hong Kong's housing affordability problem constrains its economic growth and discuss policy remedies.

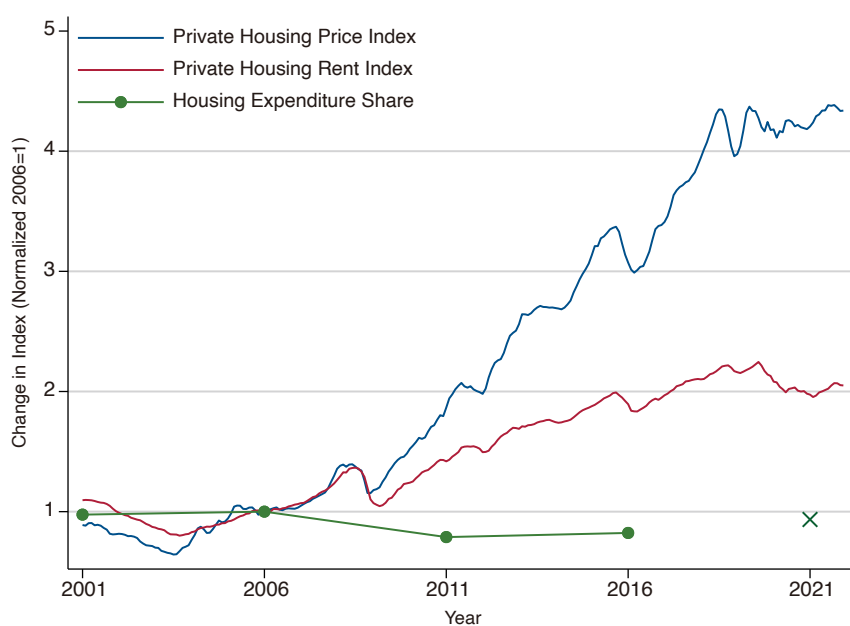
## 1 Introduction

For fourteen years in a row since 2010, Hong Kong has been ranked the least affordable housing market in the world (Demographia 2024). Images of low-income households cramped into tiny subdivided units and inhumane living conditions have earned international notoriety for Hong Kong. The lack of affordable housing options is widely seen as detrimental to society. It not only inflicts hardship on households, but also constrains a city's economic growth (Glaeser and Gyourko 2018; Hsieh and Moretti 2019; Baum-Snow 2023).

In this paper, we measure the distributional effects of Hong Kong's housing affordability crisis by decomposing population, price, and construction data. We focus on the two decades after the repositioning of Hong Kong's housing policy in 2002, which ended aggressive urban development and housing construction. After the policy repositioning, Hong Kong experienced rapid increases in private-sector prices and rents. As shown in Figure 1, Hong Kong's private-sector housing price index increased by 241% and its private-sector rent index increased by 94% between 2006 and 2016.



**Figure 1: Trends in price, rent, and housing expenditure shares, 2001-2021**



Notes: Figure plots the change in private housing price and rent indices and housing expenditure share. The housing expenditure share is calculated as the ratio of equivalised monthly housing expenditure over equivalised monthly household income, where household income is defined as the sum of earnings in cash from all employment and other cash income, and housing expenditure for renters includes basic rent, while housing expenditure for owner-occupiers includes mortgage payment. Because of inconsistent household income definitions, the housing expenditure share in 2021 is not comparable with other waves. Normalized the index in 2006 to one. Source: Rating and Valuation Department; Hong Kong Census Data 2001 - 2021

Our main analysis compares 2006 and 2016, so that our data is not skewed by changes in income definitions in the Population Census data and short-run distortions such as the Covid-19 pandemic. We decompose trends in housing expenditure shares by income, housing tenure, and demographics. We break down changes in housing tenure by income group and age cohort. We disaggregate trends in housing price, rent, and supply by quality segment.

We document that large-scale public housing insulated a large fraction of households from rapidly rising private-sector housing costs. However, as private-sector costs rose, public housing became increasingly misallocated, and the population of private renters dramatically increased. The prices and rents of smaller private-sector units correspondingly increased. These findings suggest that the failure to target housing assistance to needy populations has resulted in skyrocketing housing costs for youths and low-income households outside the public housing system.

Our detailed results are as follows. First, across all income levels, public-sector residents spent a much smaller proportion of their income than their private-sector counterparts. Moreover, a large fraction of middle-income households lived in subsidized public housing. As a result, the relationship between housing expenditure shares and household income exhibits an unusual U-shaped pattern in Hong Kong. In 2006, for example, households in the lowest income decile spent 26% of their

income on housing, while households in the fourth and fifth deciles spent 16%, and those in the highest decile spent 21%.

Second, we document that rising private-sector housing costs did not translate into rising housing expenditure for much of the population. Average housing expenditure as a share of income *fell* from a relatively low 19% in 2006 to an even lower 16% in 2016, even as housing costs skyrocketed. Instead, rising housing costs between 2006 and 2016 in Hong Kong was borne almost entirely by private renters, which accounted for only 11% of the population in 2006. The average housing expenditure share of private renters rose, while that of homeowners and public renters fell. Because private renters only make up a small fraction of households throughout the income distribution, housing expenditure shares fell across income levels.

Third, we find that public housing became increasingly misallocated towards middle-income households between 2006 and 2016. The share of population living as public renters in the middle-income quintile increased by about 4 percentage points. At the same time, the share of public renters in the lowest income quintile fell by more than 5 percentage points.

Fourth, we document that younger age cohorts increasingly lived with parents or rented in the private sector, and are much less likely to become homeowners or public renters.

Fifth, we find that both prices and rents for low-quality housing disproportionately rose, even as the supply of low-quality housing disproportionately increased. These findings are consistent with the rising demand for private rental units in the lower-quality segment. This increase in demand is likely related to the increased misallocation of public housing towards middle-income households.

Finally, we argue that Hong Kong's lack of affordable housing outside the public housing system has significantly hampered the city's economic growth. For this reason, we believe fundamental reform of Hong Kong's housing system is necessary. We discuss specific policy recommendations in the paper's concluding section.

## 2 Background

In this section, we provide background on Hong Kong's housing system. We briefly recount the relevant history of Hong Kong's housing policies, and describe the types of housing available in the city. We also describe the data used for analysis.

### 2.1 A Brief History of Hong Kong's Housing Policy

Hong Kong's public housing system was created in the 1950s to resettle a large refugee population that illegally resided in squatter areas. In the wake of the 1967 riots, Hong Kong's then-Governor Murray MacLehose initiated an aggressive urban development program to redress widespread





discontent regarding housing. This program involved developing rural areas into “New Towns.” It greatly expanded Hong Kong’s Public Rental Housing (PRH) program, which provides subsidized rental housing. The Home Ownership Scheme (HOS), which provides subsidized ownership housing, was also inaugurated.

However, the 1998 Asian Financial Crisis precipitated a deep recession and plummeting property prices in Hong Kong. In response, the Hong Kong Government repositioned its housing policy. Specifically, in 2002, it halted land auctions and suspended the Home Ownership Scheme. Figure 2 Panel (a) shows that new public and private housing construction sharply declined in the early 2000s. For over a decade, construction of subsidized ownership units almost ceased. The average number of new housing units completed between 1997 and 2003 reached 70,900, but fell to an average of 29,300 between 2004 and 2020. It was not until 2017 that construction of new subsidized ownership units restarted.

## 2.2 Hong Kong’s Housing Ladder and Population Trends

Because of its large public housing system, Hong Kong’s property market can be classified into four tenure types: private renters, public renters, public owners, and private owners. The key features of each tenure type are explained below. Tables 1 and 2 provide summary statistics.

**Table 1: Summary Statistics (Renters)**

	2001	2006	2011	2016	2021
<b>A. Public Renter</b>					
Population	2,116,300	2,113,600	2,135,500	2,078,140	2,077,000
As share of a total population	34.4%	33.7%	32.2%	31.7%	31.8%
Number of HHs	630,980	696,820	747,840	762,600	744,120
Share below PRH income limit	55%	56%	62%	61%	61%
Real HH Income	15,916 (11,764)	14,434 (11,801)	14,091 (10,947)	17,026 (13,482)	18,422 (13,855)
Real HH rent	1,425 (665)	1,627 (752)	1,297 (649)	1,400 (735)	1,784 (810)
Average HH size	3.4	3.0	2.9	2.8	2.7
Share with members aged < 15	33.5%	29.6%	23.8%	18.5%	18.0%
Share with members aged > 60	45.2%	42.1%	46.0%	51.3%	60.7%
Share moved in last 5 years	29.7%	29.9%	20.2%	15.9%	14.4%
<b>B. Private Renter</b>					
Population	688,480	647,080	789,860	965,960	926,520
As share of a total population	11.2%	10.3%	11.9%	14.7%	14.2%
Number of HHs	297,560	283,260	331,520	402,080	388,900
Share below PRH income limit	28%	23%	23%	31%	27%
Real HH Income	32,040 (46,899)	37,003 (52,835)	44,868 (58,159)	40,640 (50,389)	39,367 (32,539)
Average HH size	2.5	2.5	2.6	2.6	2.6
Share with members aged < 15	30.6%	30.1%	31.9%	32.0%	29.9%
Share with members aged > 60	16.7%	14.4%	15.6%	18.3%	21.3%
Share moved in last 5 years	75.7%	69.2%	72.5%	65.2%	57.2%

Notes: Table shows the summary statistics of private and public renters respectively, using the 5% sample of the Hong Kong Population Census from 2001 to 2021. Standard deviations are reported in parenthesis.

**Table 2: Summary Statistics (Owners)**

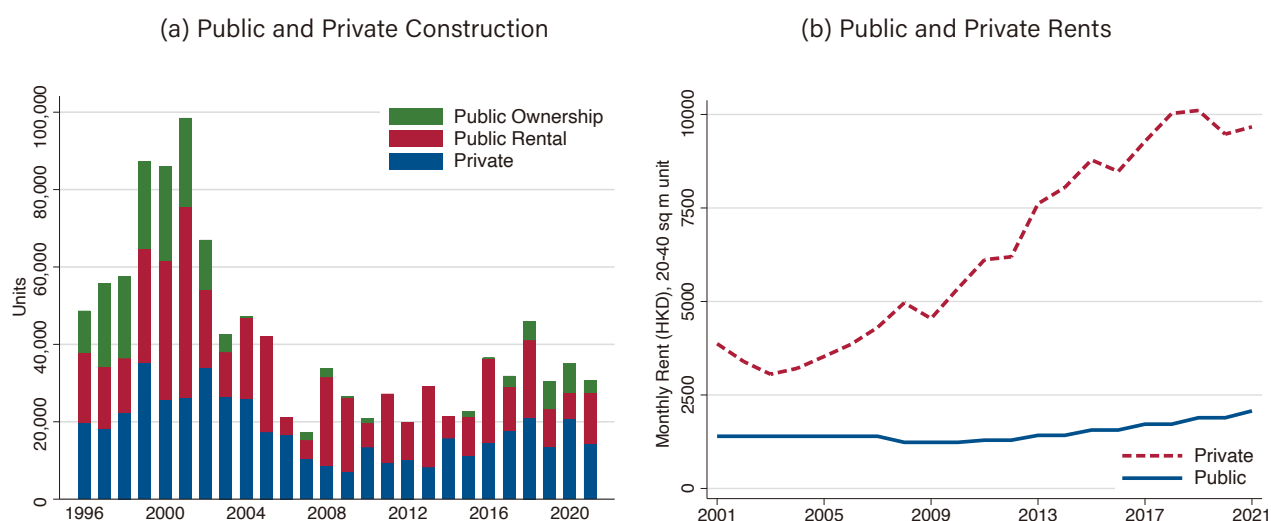
	2001	2006	2011	2016	2021
<b>A. Public Owner</b>					
Population	1,064,760	1,108,820	1,114,700	1,057,500	1,061,360
As share of a total population	17.3%	17.7%	16.8%	16.1%	16.3%
Number of HHs	303,300	334,240	357,340	361,660	372,360
Share below PRH income limit	26%	26%	30%	38%	41%
Real HH Income	25,947	24,538	24,764	26,300	26,248
	(19,120)	(20,532)	(20,350)	(22,204)	(20,629)
Real HH Mortgage	3,818	2,629	1,446	931	1,004
	(4,260)	(3,731)	(2,671)	(2,440)	(2,781)
Average HH size	3.6	3.4	3.2	3.0	2.8
Share with members aged < 15	42.1%	31.0%	21.3%	18.2%	15.6%
Share with members aged > 60	29.2%	32.6%	40.8%	51.3%	65.4%
Share moved in last 5 years	35.1%	8.7%	8.4%	5.1%	7.7%
Share with Zero Mortgage	39.4%	54.0%	69.3%	80.3%	82.0%
<b>B. Private Owner</b>					
Population	2,086,320	2,224,380	2,360,160	2,176,680	2,210,700
As share of a total population	33.9%	35.5%	35.6%	33.2%	33.9%
Number of HHs	704,240	789,300	852,400	798,260	815,900
Share below PRH income limit	23%	22%	25%	28%	27%
Real HH Income	39,145	38,077	41,197	45,389	41,873
	(48,697)	(47,711)	(51,443)	(52,044)	(33,514)
Real HH Mortgage	6,471	5,696	4,149	3,973	4,275
	(10,875)	(10,190)	(8,199)	(7,328)	(7,383)
Average HH size	3.1	3.0	3.0	3.0	2.8
Share with members aged < 15	33.5%	28.9%	25.2%	23.8%	21.9%
Share with members aged > 60	31.3%	29.5%	35.7%	41.0%	49.6%
Share moved in last 5 years	37.2%	29.9%	26.0%	18.7%	17.8%
Share with Zero Mortgage	54.8%	54.7%	58.7%	60.7%	61.0%

Notes: Table shows the summary statistics of private and public owners respectively, using the 5% sample of the Hong Kong Population Census from 2001 to 2021. Standard deviations are reported in parenthesis.

**Public Renters.** Public renters live in subsidized and means-tested PRH units that are owned and operated by the Hong Kong government. These renters accounted for 33.7% of Hong Kong's population in 2006. PRH units, typically 300-400 square feet, are assigned through a first-come, first-serve waiting list system. Applicants must satisfy income and asset tests to receive a PRH unit. Residents are also subject to regular means testing. PRH rents are determined by government policy, which requires residents exceeding certain income thresholds to pay 1.5 times or double the base rent. Nominal rent increases are adjusted according to citywide income growth and capped at a maximum of 10% every 2 years. Figure 2 Panel (b) shows that PRH rents remained stable even as private-sector rents skyrocketed.



**Figure 2: Trends in construction and public-sector rents**



Notes: Panel (a) plots the units of new construction, from 1996 to 2021. Units are divided into three categories: public ownership, public rental and private. Panel (b) plots the rental trends for PRH units and private homes. Private homes are limited to those between 20 and 40 square meters and the private rental indices are weighted by the number of PRH units in each region in 2016 so as to be comparable with the PRH rental indices.

**Public Owners.** Public owners live in government-built ownership units without leasing or resale rights. They accounted for 17.7% of Hong Kong’s population in 2006. A large majority of public owners live in Home Ownership Scheme (HOS) units. The HOS units are typically 500-700 square feet and their selling prices are typically discounted by 35% to 50% from market valuations. They are rationed to eligible buyers using a lottery mechanism. Another subset of public owners lives in Tenant Purchase Scheme (TPS) units – formerly PRH units that were offered to existing tenants at a deep discount between 1998 and 2006.

To earn the right to resell or rent out their units, all public owners are required to reimburse the initial discount at current market rates. We classify TPS and HOS owners as private owners rather than public owners after they repay this discount. Given the hefty financial obligation, repayment is rare. As of 2023, the majority of these owners—more than 77% of HOS owners and 98% of TPS owners—have chosen not to reimburse that discount. Most HOS and TPS owners therefore cannot easily lease or resell their units.

**Private Owners.** Private owners live in units that they can freely sell or lease out. As of 2006, private renters accounted for 35.5% of the population.

**Private Renters.** Private renters are a small fraction of Hong Kong’s population. These households rent from private-sector owners. As of 2006, private renters accounted for only 10.3% of the population.

**Population trends.** Between 1997 and 2019, Hong Kong’s population grew slowly but steadily. Immigration from Mainland China was highly restricted, in part to stabilize political sentiments after Hong Kong’s sovereignty was transferred from Britain to China. Population growth averaged 0.6% per year during 1997-2019. It turned negative after 2019 in the wake of political unrest and the Covid-19 pandemic.

## 2.3 Data

We use data from five waves of the Hong Kong Census/By-Census, covering the years 2001 to 2021. Each wave collects a 5 percent sample of the total population every five years. The Hong Kong census data is the most appropriate resource for our research for two reasons. First, it is the largest micro-level dataset available in Hong Kong, offering comprehensive demographic and income information at both household and individual levels. Second, it includes detailed data on housing tenure types, which allows us to measure income and housing expenditures across different housing tenure groups and assess housing affordability.

For our main analysis, we focus on data from three waves: 2006, 2011, and 2016. We exclude data from before 2006 due to the impact of the Tenants Purchase Scheme, which allowed public renters to buy their homes. We also exclude the 2021 data because the way household income was measured in that wave is not consistent with previous waves.

In the following sections, household income is defined as total monthly cash earnings from employment and other income sources from all household members. Housing expenditure is defined as monthly rent for renters and monthly mortgage payments for homeowners. We exclude renters who reported paying zero rent. To account for household size, both income and housing expenditure are equalised by dividing the total amount by the number of equivalent adults in the household, and the result is distributed equally among all household members.

## 3 Decomposition of Housing Expenditures

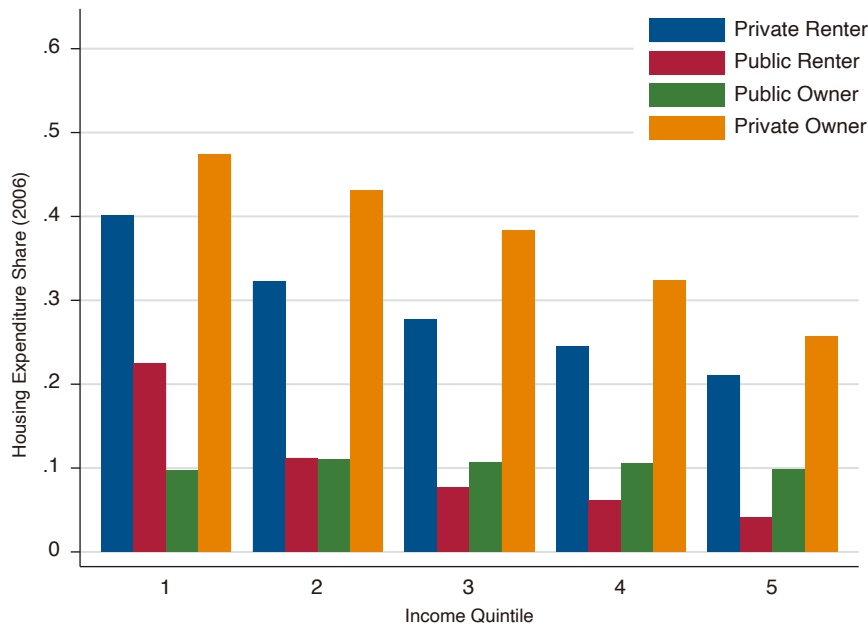
This section examines trends in housing expenditure across the population between 2006 and 2016 using detailed Population Census data.

### 3.1 Cross-sectional Patterns in Housing Expenditure

We begin by decomposing housing expenditure shares by household income, housing tenure types, and demographic characteristics in 2006 and 2016, respectively. We find that: (1) the housing expenditure shares of public-sector populations are much lower than private-sector populations; (2) the cross-sectional relationship between housing expenditure share and income in Hong Kong is U-shaped, due to a large segment of middle-income household living in subsidized housing. These findings suggest that the public housing sector in Hong Kong has significantly distorted its housing market.



**Figure 3: Housing expenditure share by income quintile and housing tenure, 2006**



Note: Figure plots the average housing expenditure share by income quintile and housing tenure in 2006. The housing expenditure share is calculated as the ratio of equivalised monthly housing expenditure over equivalised monthly income. Household income is defined as the sum of earnings in cash from all employment and other cash income. Housing expenditure for renters includes basic rent, while housing expenditure for owner-occupiers includes mortgage payment. Income quintiles are defined by the equivalised monthly household income. Units are divided into four housing tenure types: private renters, public renters, public owners, and private owners.

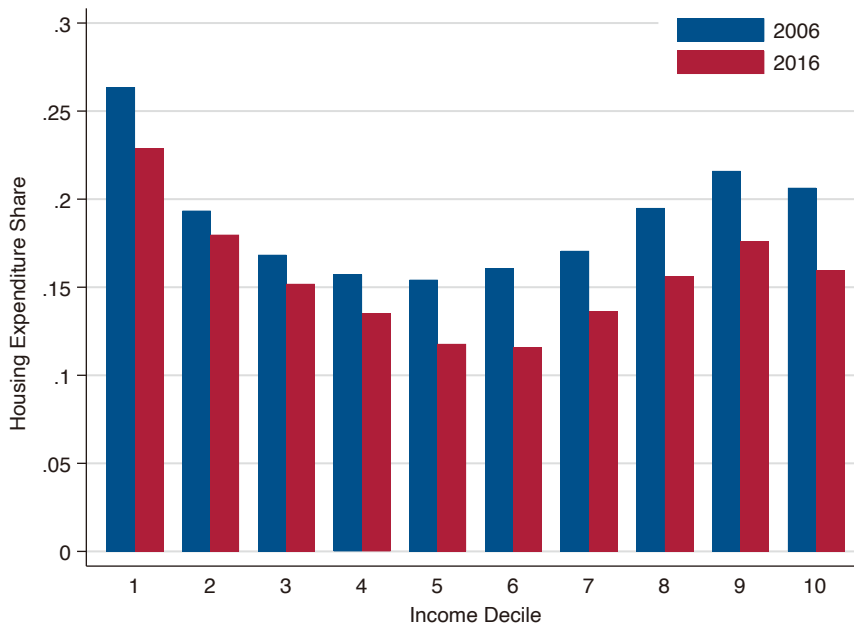
Figure 3 plots housing expenditure shares – defined as the share of income spent on housing expenditure – by household income and housing tenure type in 2006.<sup>1</sup> We find that households living in public housing had a much lower expenditure share than those living in private housing across all income quintiles.

For instance, in the bottom income quintile, public renters spend 22% of their income on rents, while private renters spend 40% of their income on rents. Meanwhile, in the bottom income quintile, public owners spend 10% of their income on housing, and private owners spend 47% of their income on housing. A similar pattern is found throughout the income distribution.

1 Specifically, housing expenditure share is defined as the ratio of monthly adjusted housing expenditure to adjusted household income, where adjustments account for household size and composition.

Within housing tenure types, housing expenditure shares fall with income. Among private renters, the housing expenditure share for households in the bottom income quintile is 40%, but falls to 24% for households in the top income quintile. Among private owners, the housing expenditure share for households in the bottom income quintile is 47%, and falls to 26% for households in the top income quintile. Intriguingly, housing expenditure shares also fall with income among public renters, from 22% in the bottom quintile to 4% in the top quintile. However, housing expenditure shares are similar across the income distribution for public owners, at around 11%.

**Figure 4: Housing expenditure share by income decile, 2006 and 2016**



Note: Figure plots average housing expenditure shares by income decile in 2006 and 2016. The housing expenditure share is calculated as the ratio of equivalised monthly housing expenditure over equivalised monthly income. Household income is defined as the sum of earnings in cash from all employment and other cash income. Housing expenditure for renters includes basic rent, while housing expenditure for owner-occupiers includes mortgage payment. Income deciles are defined by the equivalised monthly household income.



Figure 4 plots the average housing expenditure share in each income decile in 2006 and in 2016. The plot reveals an unusual U-shape relationship: in Hong Kong, the housing expenditure share of middle-income households is much *lower* than that of both high- and low-income households. In 2006, households in the lowest income decile spent, on average, 26% of their income on housing, which is 10 percentage points more than the average for middle-income households. High-income households also had an average housing expenditure share of around 21%. This unusual U-shaped pattern – where both low- and high-income households spend a higher share of their income on housing compared to middle-income households – remains present in 2016. This pattern is unusual because, in most other countries, the share of income spent on housing monotonically decreases as household income rises.<sup>2</sup>

The U-shape relationship between housing expenditure share and income is explained by two facts: (1) higher-income populations are much more likely to reside in the private sector than middle-income populations, and (2) private-sector housing expenditure share is much higher throughout the income distribution. As shown below in Figure 7 in the middle quintile, 38% of households live in public housing. However, in the top quintile, only 2% live in public housing. Moreover, as previously shown in Figure 3, housing expenditure is much higher for private-sector residents.

### **3.2 Trends in Housing Expenditure Shares**

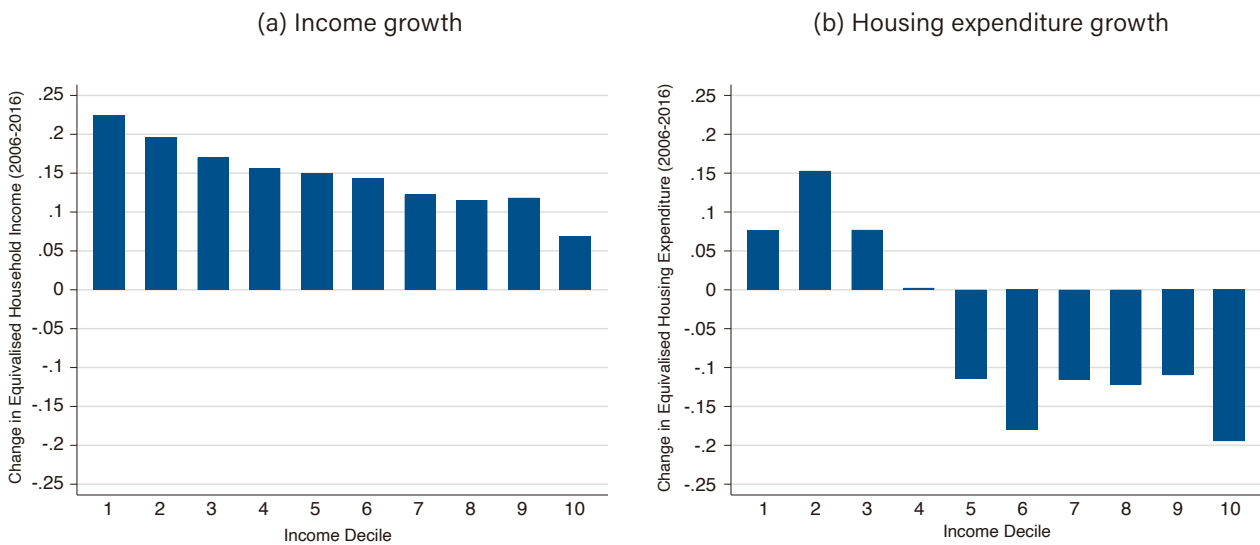
We next decompose the *change* in housing expenditure shares by household income, housing tenure types, and demographic characteristics between 2006 and 2016. Our main findings are: (1) only private renters – which account for a small fraction of the local population – saw large increases in housing expenditures; (2) housing expenditure shares fell in almost all other housing tenure groups. These facts suggest that public housing had helped insulate the vast majority of Hong Kong residents from rising private-sector housing costs.

Figure 4 shows that housing expenditure share decreased in all income deciles from 2006 to 2016. The decline in low-income households is somewhat smaller than that in middle- and high-income households. For instance, the expenditure share in the first income decile fell by roughly 1.5 percentage points. By contrast, the expenditure share in the top two income deciles fell by roughly 4 percentage points.

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2 For example, Figure 7 Panel (a) in Dustmann, Fitzenberger and Zimmermann (2022) shows that the housing expenditure share decreased from 39% in the lowest income quintile to 14% in the highest income quintile in Germany in 2013. Moreover, Figure 1 in Larrimore, Schuetz et al. (2017) shows that the portion of income spent on rent decreased from 56% in the lowest income quintile to 10% in the highest income quintile in the United States in 2015. These figures indicate that housing expenditure share monotonically decreases as income rises, highlighting an atypical pattern in Hong Kong's housing market.

**Figure 5: Changes in income and housing expenditure, by income decile**



Note: Panel (a) plots the changes in average household income by income deciles. Household income is defined as the sum of earnings in cash from all employment and other cash income. Panel (b) plots the changes in average housing expenditure by income deciles. Housing expenditure for renters includes basic rent, while housing expenditure for owner-occupiers includes mortgage payment. Income deciles are defined by the equivalised monthly household income.

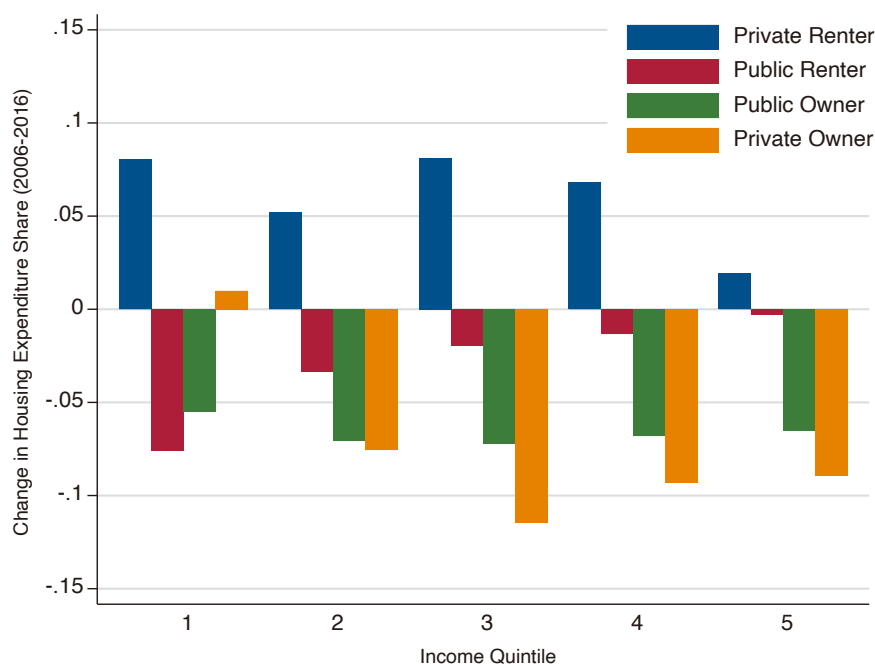
Figure 5 reveals that the uneven decline in housing expenditure share is explained primarily by a large reduction in housing expenditure among higher-income households. Panel (a) shows the changes in real household income between 2006 and 2016 by income decile. We find that incomes rose throughout, and that low-income households saw the largest real income growth. For instance, the average real income in the lowest income decile increased by 22%, while the average real income in the top income decile increased by 7%.

Panel (b) shows the changes in real housing expenditure between 2006 and 2016 by income decile. We find that low-income households experienced an increase in housing expenses during this period, but that housing expenditure fell for higher-income groups. For instance, the average real housing expenditure in the second income decile increased by 15%, while the average real income in the top income decile fell by 19%.





**Figure 6: Change in housing expenditure share by income quintile and housing tenure**



Note: Figure plots the change in housing expenditure share by household income quintile and housing tenure type. The housing expenditure share is calculated as the ratio of equivalised monthly housing expenditure over equivalised monthly income. Household income is defined as the sum of earnings in cash from all employment and other cash income. Housing expenditure for renters includes basic rent, while housing expenditure for owner-occupiers includes mortgage payment. Income quintiles are defined by equivalised monthly household income. Units are divided into four housing tenure types: private renters, public renters, public owners, and private owners. The within-group change is calculated as the ratio of the difference in share between 2006 and 2016 over the 2006 share by each housing tenure type and income quintile.

Figure 6 plots the change in housing expenditure share by income quintile and housing tenure between 2006 and 2016. We find that households living in private rental housing were the only group to see an increase in housing expenditure shares across income levels. Moreover, the increase in housing expenditure shares among private renters is huge. For private renters in the bottom four income quintiles, the housing expenditure share increased by 5-8 percentage points.

By contrast, for public renters, housing expenditure share fell significantly. In the lowest income quintile, the housing expenditure share of public renters decreased by 7.7 percentage points, from 22.5% to 14.8%. In higher income deciles, the decline was smaller, but this is largely attributable to the fact that housing expenditure shares for public renters are already exceedingly low, as previously shown in Figure 3.

Between 2006 and 2016, housing expenditure share dropped significantly for both private and public homeowners – by 9 and 7 percentage points, respectively. As shown below in Figure 7, private and public owners make up roughly 75% of households in the top income quintile. Therefore, the reduction in housing expenditures among owners accounts for 146% of the 4.3 percentage point decline in housing expenditure share within this income group.<sup>3</sup>

## 4 Trends in Housing Tenure

In this section, we decompose the distribution of household tenure between 2006 and 2016 by income and age cohort.

### 4.1 Housing Tenure by Income Group

We first decompose changes in the population's housing tenure distribution by income. We uncover three facts: (1) the share of population living as private renters increased across the income distribution; (2) the share of population living as public renters increased in the middle of the income distribution, but fell in the bottom of the income distribution; (3) these changes were most pronounced among households with children. In other words, public rental housing had become increasingly misallocated to the relatively well-off, to the particular detriment of households with children.

Figure 7 shows Hong Kong's housing tenure distribution by income decile in 2006. As shown in the figure, public renters are primarily households in the lower income deciles. Except for individuals in highest income decile, public owners are evenly distributed across the income distribution. Private ownership shows a positive correlation with income. In the top 10% income decile, 67.5% are private owners. Private renters, while distributed across different income brackets, make up a larger share among high-income groups, which is partially attributable to Hong Kong's population of high-income and high-skilled expatriate workers.

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3 In the top income quintile, the overall housing expenditure share declined by 4.3 percentage points from 2006 to 2016. Among households in this quintile, 75% are owners, whose expenditure share decreased by 8.4 percentage points. Consequently, 146% of the overall decline in housing expenditure share within the top quintile can be attributed to the reduction among private and public owners.



**Figure 7: Housing tenure by income decile, 2006**

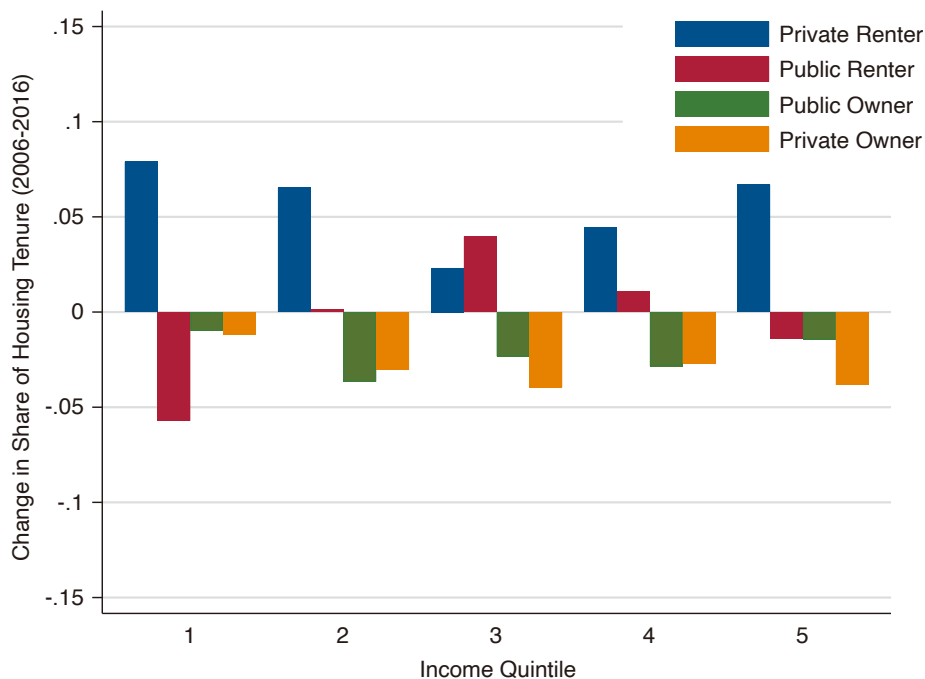


Notes: Figure plots the distribution of housing tenure by household income decile in 2006. Only individuals aged between 20 and 60 are included. For each income decile, the population is grouped into 4 tenure types: private renters, public renters, public owners, and private owners.

Figure 8 plots the changes in the share of population in different housing tenure types for each income quintile between 2006 and 2016. It shows that the share of population living as private renters increased in all income groups. In the bottom two income quintiles, the share of private renters rose by 6-8 percentage points. In the top quintile, the increase is also large, at about 7 percentage points. By contrast, the increase in private-renter share in the middle quintile is smallest, at about 2 percentage points.

While the share of population living as private renters increased, the share of population living as private and public owners fell across the income distribution. In the top four income quintiles, private ownership declined by 3-4 percentage points. In the middle three quintiles, public ownership similarly fell by 3-4 percentage points.

**Figure 8: Change in housing tenure type share by income quintile**

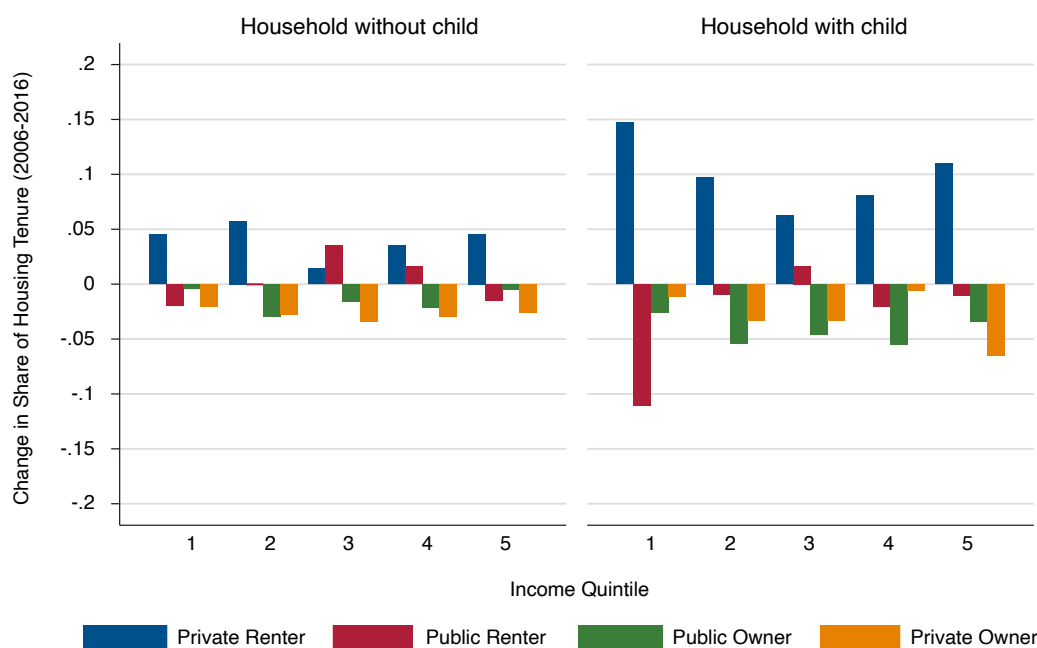


Note: Figure plots the change in housing tenure type share by household income quintile and housing tenure type. The housing tenure type share is defined as the ratio of the population living in each type over the total population by income quintile. Income quintiles are defined by the equalised monthly household income. Units are divided into four housing tenure types: private renters, public renters, public owners, and private owners. The within-group change is calculated as the ratio of the difference in share between 2006 and 2016 over the 2006 share by each income quintile. Households are averaged into five household income quintiles.

Meanwhile, the share of population living as public renters in the middle-income quintile increased by about 4 percentage points. At the same time, the share of public renters in the lowest income quintile fell by more than 5 percentage points. The growing middle-income population and the shrinking low-income population living as public renters suggest that public rental housing, which is meant for low-income populations, was increasingly misallocated to the relatively well-off between 2006 and 2016.



**Figure 9: Change in housing tenure share by income quintile (children)**



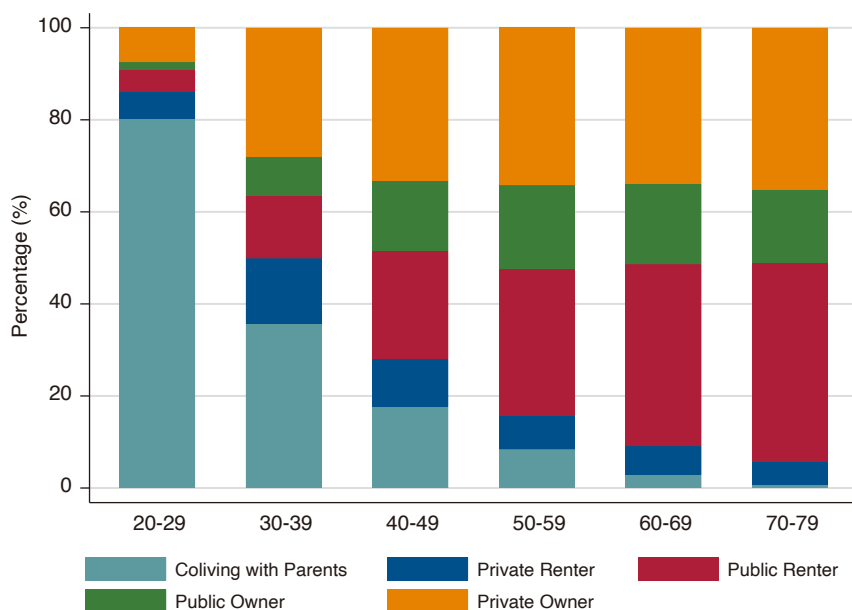
Note: Figure compares the change in housing tenure type share by household income quintile and housing tenure type between households without and with children. The housing tenure type share is defined as the ratio of the population living in each type over the total population by income quintile. Income quintiles are defined by the equivalised monthly household income. Units are divided into four housing tenure types: private renters, public renters, public owners, and private owners. The within-group change is calculated as the ratio of the difference in share between 2006 and 2016 over the 2006 share by each income quintile. Households are averagely grouped into five household income quintiles.

Figure 9 shows that the changes in housing tenure shares are particularly pronounced for households with children (under 15). For instance, among households with children in the bottom income quintile, the share of those living as public renters fell by 11 percentage points, while the share of households living as private renters increased by 15 percentage points. This suggests that the misallocation of public housing was particularly severe for households with children.

#### 4.2 Housing Tenure by Age Cohort

Previously, we found that low-income households with children became disproportionately left out of the public rental sector. We now investigate how the housing tenure distribution has changed by age cohort. We first document housing tenure by age group in 2006. We then document the changes in this distribution between 2006 and 2016. Our main finding is that younger cohorts increasingly live in private rental units and parental homes, without moving up the housing ladder to become owners or public renters.

**Figure 10: Distribution of Housing Tenure Types, by Age Group**



Notes: Figure plots the distribution of housing tenure types in 2006. Only individuals aged between 20 and 79 are included and they are grouped according to their age groups. Private renter, public renter, public owner and private owner exclude members living with their parents.

Figure 10 shows the distribution of housing tenure types by age cohort in 2006. In the figure, individuals who live with their parents are shown as a separate category. We find that, in the 20–29 age group, 80.2% of individuals cohabit with their parents. This number drops to 35.6% for those aged 30–39, and further drops to 17.7% for those aged 40–49.

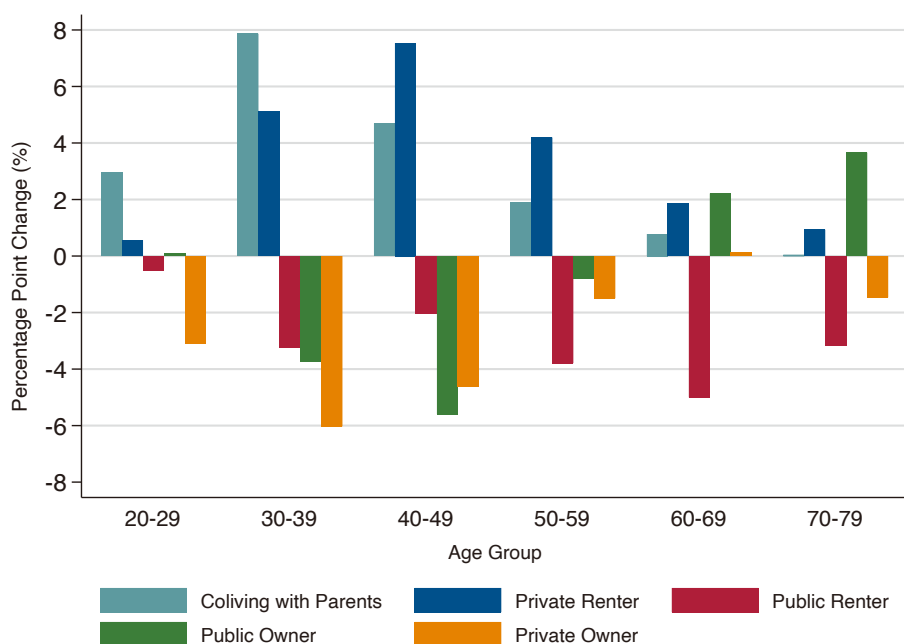
After moving out of cohabitation, individuals are sorted into the other four tenure types. The share of individuals living as private renters is highest among the 30–39 age group before declining with age. In the 30–39 age group, 14.3% of people rent in the private sector. In the 40–49 age group, 10.4% rent in the private sector. In the 50–59 age group, only 7.3% rent in the private sector.

The share of individuals living as owners remains mostly stable after the age of 40. Private owners account for 33.1% of those aged 40–49, 34.2% of those aged 50–59, and 33.9% of those aged 60–69. Public owners make up 15.4% of those aged 40–49, 18.1% of those aged 50–59, and 17.5% of those aged 60–69. These patterns suggest that residents had largely made the decision to buy an ownership unit prior to turning 40.

The share of individuals living as public renters increases with age, however, well into their 70s. For example, public renters constitute 23.4% of individuals aged 40–49, 32.0% of individuals aged 50–59, 39.5% of individuals aged 60–69, and 43.3% among those aged 70–79.



**Figure 11: Change in Housing Tenures by Age Group**



Notes: Figure plots the change in housing tenure between 2006 and 2016. Only individuals aged between 20 and 79 are included and they are sorted according to their age groups. Private renter, public renter, public owner and private owner exclude members living with their parents.

Figure 11 shows the *change* in housing tenure distribution between 2006 and 2016. This figure reveals several facts: First, there has been a marked rise in individuals cohabiting with their parents across all age groups. The increase is largest among those aged 30–39, where the share of people living with parents increased from 35.6% to 43.5%. Among those aged 40–49, that share increased from 17.7% to 22.4%. Among those aged 50–59, that share increased from 8.4% to 10.3%.

Second, the proportion of private renters has increased in all age groups. Among those aged 30–39, the share of people living as private renters increased from 14.3% to 19.4%. Among those aged 40–49, that share increased from 10.4% to 17.9%. Among those aged 50–59, that share increased from 7.3% to 11.5%.

Third, the proportion of public renters has declined in all age groups. Among those aged 30–39, the share of people living as public renters fell from 13.7% to 10.4%. Among those aged 40–49, that share fell from 23.4% to 21.4%. Among those aged 50–59, that share fell from 32.0% to 28.2%.

Fourth, the proportion of owners sharply declined in the 20–49 age groups. Among those aged 20–29, the share of people living as owners fell from 9.2% to 6.2%. Among those aged 30–39, that share fell from 36.4% to 26.7%. Among those aged 40–49, that share fell from 48.5% to 38.3%.

## 5 Private-sector Prices, Rents and Supply: 2006-2016

We previously documented a large increase in the private-renter population, especially among lower-income populations. This increase in the private-sector population may alter prices and supply in the private market. We now examine changes in private-sector prices, rents, and supply by quality segment. Our main finding is that the prices, rents, and supply of low-quality private-sector homes disproportionately increased. This finding is consistent with a disproportionate rise in the demand for low-quality private-sector houses.

### 5.1 Prices and Rents by Quality Segment

Figure 12 plots changes in prices, rents, and the price-to-rent ratio (P/R ratio) between 2006 and 2016 against housing quality. We measure the change in price and rent using indices for each district and unit size class published by the Hong Kong Rating and Valuation Department (RVD). For each quality segment, we compute a quality index using average private-sector rents by district and unit size in the 2016 Hong Kong Population Census.

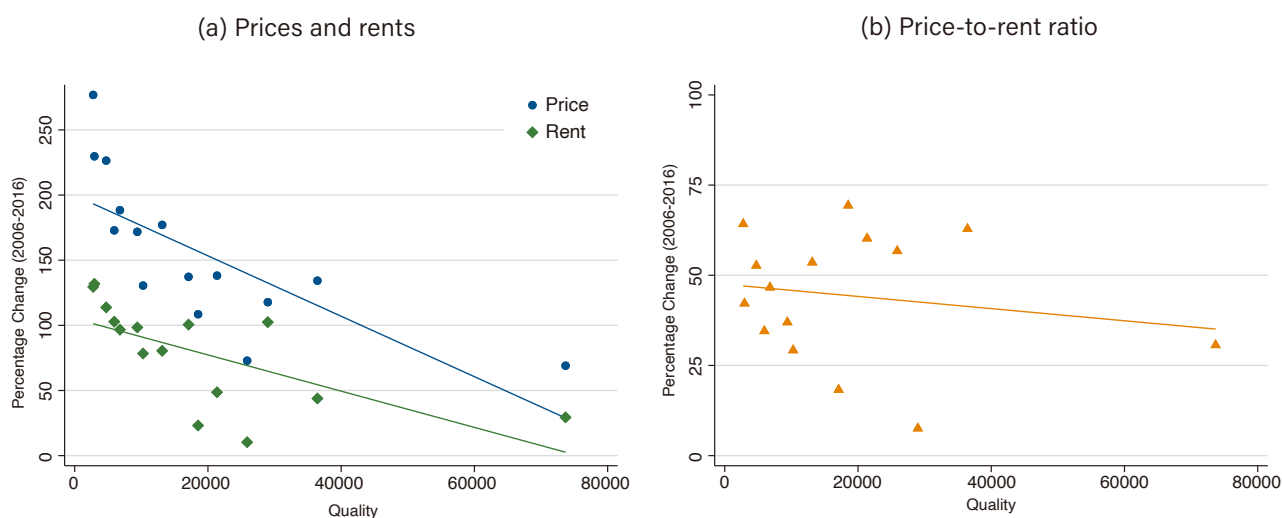
Panel (a) shows that prices and rents have increased disproportionately in the lower-quality segments. On Hong Kong Island, for instance, prices and rents for the smallest units (Class A) rose by 226.4% and 113.8% between 2006 and 2016, respectively, compared to 69.0% and 29.4% for the largest units (Class E). The downward-sloping regression line further highlights these disparities, underscoring a clear pattern of uneven growth.

Panel (b) shows that changes in the P/R ratio appear relatively stable across quality segments, as evidenced by the almost horizontal regression line. Differences in the P/R ratio across segments are smaller than those observed for prices and rents. On Hong Kong Island, for example, the P/R ratio increased by 52.7% for the smallest units and by 30.7% for the largest units.





**Figure 12: Change in prices and rents by quality segment**



Notes: Figure plots percentage change in prices, rents and price-to-rent (P/R) ratio between 2006 and 2016 against unit quality. Price and rental indices are observed from RVD data. P/R ratio is computed by the ratio of price index to annual rental index. Each dot represents one quality segment, which is composed of one region and one unit class. Set of regions contains Hong Kong Island, Kowloon and New Territories. There are 5 classes in total, from A to E. The horizontal axis shows the unit quality.

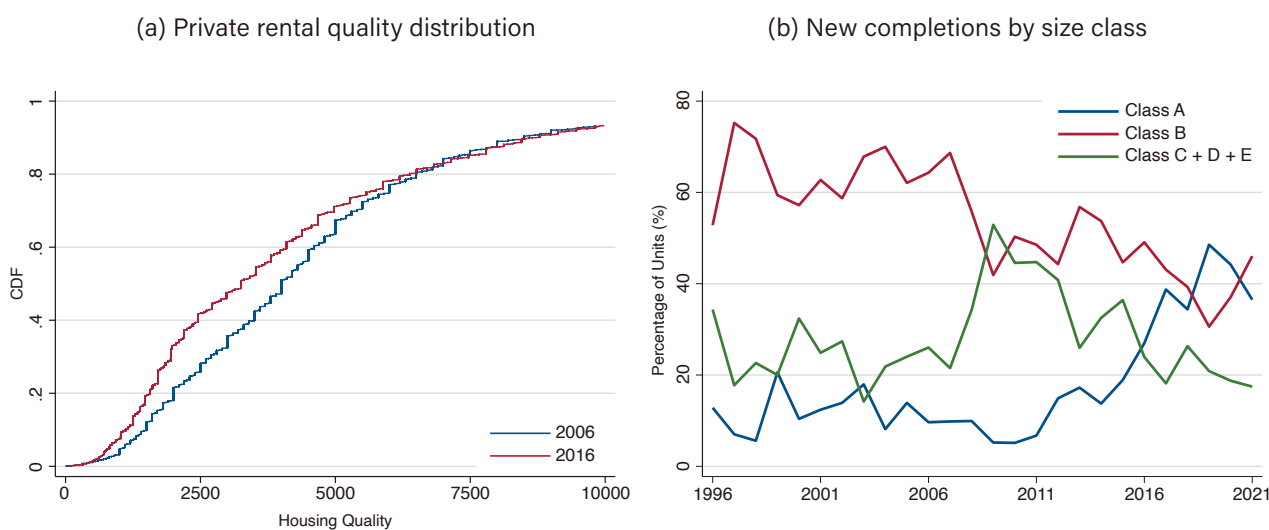
## 5.2 Supply and New Construction by Quality Segment

Figure 13 Panel (a) shows the cumulative distribution function (CDF) of housing quality among Hong Kong's population of private renters between 2006 and 2016. This quality distribution is constructed by combining quality-adjusted rent indices with observed rents in the Population Census.

The figure reveals a leftward shift in the quality distribution. This shift is most prominent in the left tail of the CDF, indicating an increasing prevalence of low-quality units within the private rental market. For instance, the share of private rental housing with a quality index below 5,000 rose from 65.6% in 2006 to 71.2% in 2016, suggesting a decline in overall housing quality.

Figure 13 Panel (b) shows that new construction of smaller units has also grown considerably, especially relative to larger units. New construction of Class B units (40 m<sup>2</sup>–69.9 m<sup>2</sup>) dominated the private market until 2018, when it was surpassed by Class A units (<40 m<sup>2</sup>). Previously, Class A units accounted for only 5% to 20% of new private housing supply, but this figure surged to a peak of 48.5% in 2019. Meanwhile, the share of Class B units fell from a peak of 75.2% in 1997 to 30.6% in 2019.

**Figure 13: Change in quality distribution and new construction**



Notes: Panel (a) plots the cumulative distribution function (CDF) of private rental housing quality in 2006 and 2016. Growth in rental indices amongst different classes between 2006 and 2016 are observed in the RVD data, and household rents in the 2016 Census is used to estimate their rents in 2006 by the relevant growth in the unit class. Note that the class of units is only observable after the 2016 Census. An OLS regression is then used to estimate the linear rent growth equation by considering growth in rent (the dependent variable) and estimated rental value in 2006 (the independent variable). Observed in the 2016 Census, household rents are turned back into 2006's estimated value through the OLS estimated linear rent growth equation. Only households with real household income between \$5,000 and \$45,000 are included. Panel (b) plots the percentage of newly completed units in the private market, categorized by class from 1996 to 2021.

## 6 Policy Implications

This paper studies the origins and consequences of Hong Kong's housing affordability crisis by decomposing population, price, and construction data. We focus on 2006-2016 and find that public housing insulated a large fraction of households from rapidly rising private-sector housing costs. However, public housing also became increasingly misallocated, and the demand for smaller private-sector units disproportionately increased. The result was a dramatic increase in the price of small units, as well as a disproportionate burden borne by young renters, who increasingly lacked the ability to move up Hong Kong's housing ladder.

Hong Kong's housing situation remains similar today. Despite a lull since 2019 and falling prices due to rising interest rates, residential rents in Hong Kong are rising again. From May 2023 to May 2024, the rent index for units smaller than 1,000 sq ft. increased by 5.5%. The public-private rent differential remains very large. Wait times for public rental housing also remain very long, at an average of 5.5 years, compared with an average of 2 years in 2010.



The continuing lack of affordable housing is highly detrimental to Hong Kong's economy. Even though the Hong Kong Government has enacted aggressive schemes to attract talent and investment, their performance has been mediocre at best. Real investment in Hong Kong's machinery, equipment, and intellectual property has fallen from 278 billion HKD (13.7% of GDP) in 2012 to 173 billion HKD (5.8% of GDP) in 2023, despite the enormous sums spent on innovation subsidies. The labor force grew by only 0.4% between May 2023 and May 2024, despite relaxed immigration rules.

Why is Hong Kong struggling to grow its economy? Because the lack of affordable housing is hampering its ability to attract talent and investment. Consider the choices faced by talented immigrants. According to the Urban Land Institute, Singapore's average rent per square meter is 86% of Hong Kong's level. Rents in Beijing, Shanghai, Shenzhen, and Guangzhou are 52%, 44%, 39%, and 27% of Hong Kong's. If rents are significantly cheaper in all of our rival cities, why would talent come? And if there is no talent, why would investments come?

There are three broad policy lessons that one can draw from the above analysis.

First, Hong Kong should reposition its housing policy back towards aggressive urban development – a strategy enacted by Murray MacLehose in the 1970s that laid the foundation for Hong Kong's subsequent prosperity. However, this program was abandoned in 2002 in the wake of the Asian Financial Crisis, directly contributing to the current housing affordability crisis. It is time for Hong Kong to return to its proven development model. Such a program would involve rapidly developing New Towns in the New Territories, rezoning and upgrading its existing housing stock, and reforming its current Town Planning process to remove red tape.

Second, Hong Kong should shift its focus away from constructing low-quality subsidized rentals towards constructing higher-quality ownership housing. The evidence outlined above shows that there is no lack of public rental housing. Instead, public rental housing is grossly mispriced and misallocated. This misallocation has contributed to stratospheric rents for tiny private-sector units, a proliferation of cramped and unsafe coffin homes, and a lack of upward mobility. Therefore, housing policy should instead aim to help middle-income households move up the housing ladder towards ownership.

Third, Hong Kong should reform its public housing system. One useful reform would be to make public sector rents proportional to income, so that subsidies are better targeted towards needy households. Another useful reform would be for the Housing Bureau to relax restrictions on leasing and reselling public-sector units, so that underutilized public-sector units can circulate to needy households.

Several reforms adopted by the Hong Kong Government are steps in the right direction. For example, the Chief Executive's 2024 Policy Address promised to increase the proportion of subsidized sale flats built, tighten the Well-off Tenants Policy, reduce redevelopment red tape, and expedite the development of the Northern Metropolis. These directives are welcome changes.

However, the public has largely failed to recognize that the lack of affordable housing is *the* fundamental malaise plaguing the city's economy. For example, due to pressure from the broader community, Hong Kong responded to falling land prices with a "prudent and paced" approach: significantly reducing land sales. This timid development policy will hurt Hong Kong's long-term competitiveness.

Many in this city are haunted by the 1998 Asian Financial Crisis. They wrongly blame Hong Kong's aggressive urban development program for a deep economic crisis that was foreign and financial in origin. They fail to account for the fact that there is now highly elastic housing demand from skilled migrants to absorb increases in housing supply. Unlike 1998, immigration restrictions are now much looser, the labor market is much tighter, and the wealth of Chinese nationals much greater. Hong Kong also sits next to Shenzhen – China's most youthful, dynamic, and innovative city – whose urban growth is increasingly being limited by land constraints.

There is little doubt that rapid urban development will grow Hong Kong's economy. Like Hong Kong, Shenzhen has been granted special administrative privileges friendly to investment. Unlike Hong Kong, however, Shenzhen has aggressively pursued urban development over the past forty years. Its aggressive program allowed it to attract the best and brightest from around the country. Because of it, Shenzhen rapidly grew from a backwater village to a leading city whose economic production has overtaken Hong Kong's.

To secure its economic future, it is imperative that Hong Kong deepens its housing and development reforms. Deeper reforms are needed to increase the inflow of skilled labor, raise social mobility, attract investment, and bring positivity and business dynamism back. Hong Kong's policymakers should boldly lead these reforms.





**Understanding  
the Hong Kong  
Startup Ecosystem:  
A Framework and  
Future Directions**

# Understanding the Hong Kong Startup Ecosystem: A Framework and Future Directions

Alberto Moel

## Introduction

Entrepreneurship has always been in Hong Kong's DNA. From its early days as a trading port to its rise as a manufacturing and global financial center, the city has spawned "startups" that went on to become regional and global powerhouses.

The dot-com boom of the late 1990s ushered in a new chapter, as Hong Kong began developing a technology startup ecosystem, peaking during 2016-2018. Driven primarily by private enterprise with some public sector support, the ecosystem generated its essential components: venture capitalists, accelerators, incubators, pitch competitions, shared workspaces, training programs, and various industry and public initiatives.

This ecosystem was modeled after Silicon Valley – with mixed results. Local participants attempted to replicate Silicon Valley's success without fully considering the unique initial conditions that had shaped its development over many decades.

By neglecting Hong Kong's own historical strengths and weaknesses, this approach, in my opinion, led to what might be termed "innovation theater." The focus was on chasing, performatively and unsustainably, the outputs of a successful startup ecosystem – large tech firms and high-growth startups – rather than cultivating the necessary inputs: highly skilled talent, technical infrastructure, community support structures, and relevant forms of capital.<sup>1</sup> This first wave of ecosystem development ended with the onset of the COVID-19 pandemic in early 2020.

Today, Hong Kong is at a crossroads again. Technological change, economic uncertainty, and geopolitical realignment are driving Hong Kong to reinvent itself. A crucial element of this process is rethinking Hong Kong's innovation and technology development.

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1 This mismatch between initial conditions and efforts to seed an ecosystem was not unique to Hong Kong and is quite widespread. See, for example, the Inter-American Development Bank report on establishing a startup ecosystem in Latin America: <https://publications.iadb.org/en/best-practices-creating-venture-capital-ecosystem>



In December 2022, the city's government issued the *Hong Kong Innovation and Technology Development Blueprint* as part of this reinvention. Coinciding with several other private and public initiatives, the Blueprint's objective is "to establish a clear development path and formulate systematic strategic planning for Hong Kong's innovation and technology development over the next five to 10 years."<sup>2</sup>

This second attempt at jumpstarting the startup ecosystem incorporates lessons from the last few decades. Instead of blindly pursuing ill-fitting business models for Hong Kong, the focus is now on developing a group of organizations and policies operating at the public-private interface to promote economic development aligned with Hong Kong's strengths.

These efforts include revamped government agencies and departments, novel and more effective funding mechanisms, targeted investment incentives, strong industry associations, new public-private partnerships, as well as "global from day one" collaborations in the Greater Bay Area (GBA) and university-sourced entrepreneurship.

A broader community, rather than a firm-focused ecosystem, is key. But a university-dominated ecosystem without input from industry can also be risky, producing research removed from actual economic demands and lacking clear market potential.

While this latest push benefits from a strong will and substantial resources, stakeholders – including policymakers, potential startups, other ecosystem participants, and the general public – are still not familiar with the available pathways and resources and how they all fit into a cohesive framework.

This analysis aims to frame Hong Kong's startup ecosystem development from a qualitative firm-level microeconomic perspective. The financial, educational, and ecosystem resources required by each startup will vary depending on its stage of development and its technology and product offering.

Through field research and in-depth interviews with ecosystem participants – startups, academics, venture capitalists, and executives at private, government, and educational entities – I present a framework using the startup as the unit of analysis. Although startups come in many flavors, I focus primarily on technology startups, particularly "deep tech" ventures requiring the advancement and commercialization of basic and applied technologies.

By examining how the ecosystem structure relates to startup lifecycles, my analysis seeks to show how different elements interact with each other, identify areas that require additional resources based on Hong Kong's current state, and provide high-level policy insights that could inform the design and refinement of Hong Kong's startup ecosystem.<sup>3</sup>

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2 <https://www.info.gov.hk/gia/general/202212/22/P2022122200213.htm>

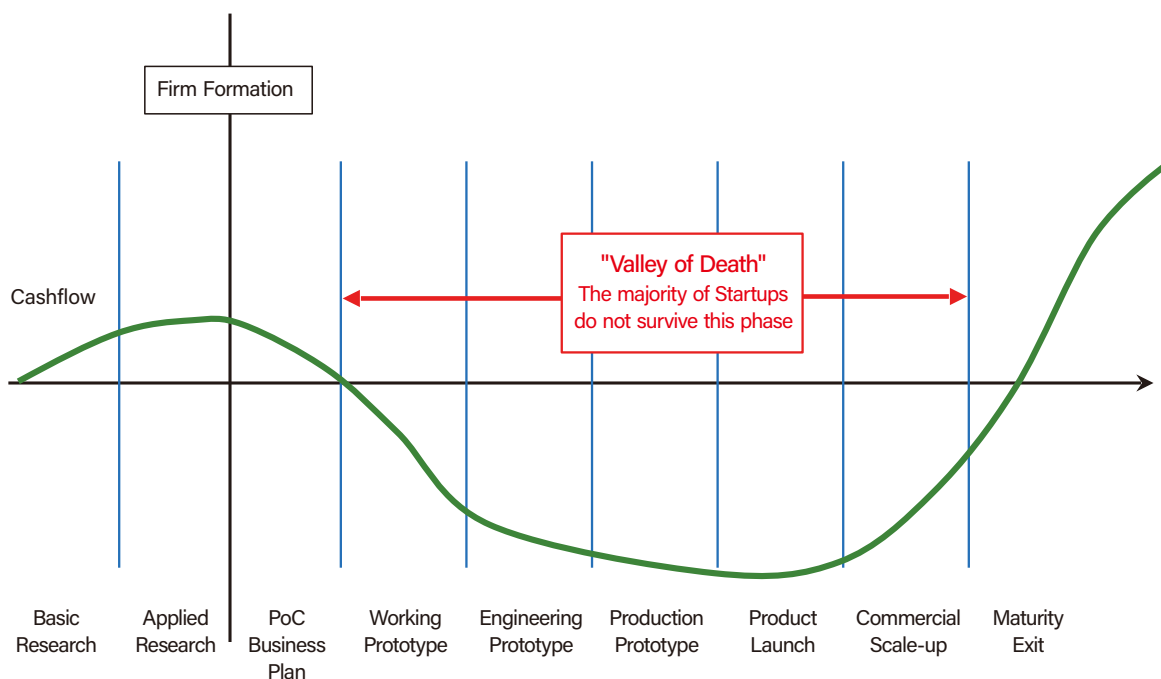
3 Other recent work similar to this monograph include KPMG-Alibaba Entrepreneurs Fund's Transforming Hong Kong through Entrepreneurship (with Professor Marta Doweiko at Hong Kong Baptist University); FoundersHK Internet Report 2023; and Our Hong Kong Foundation and Alibaba Entrepreneurs Fund's Building Hong Kong as a Cradle for Successful Entrepreneurship.

## The Startup Lifecycle

**Figure 1** illustrates the typical startup lifecycle, though variations of this model exist to capture its distinct phases.<sup>4</sup> The timing shown is schematic and conceptual rather than literal – in practice, some of these phases can be very long. Consider flat panel display technology: basic and applied research took decades before the technology matured enough to present viable business opportunities.<sup>5</sup>

Also critical to understanding startup development is the “Valley of Death”<sup>6</sup>, the period between company formation and the first injection of external capital coupled with product launch, when the path to positive cash flows becomes possible. This phase represents the greatest threat to startup survival.

**Figure 1. The startup lifecycle**



4 This particular version was first developed in Professor Andrew Hargadon's center at UC Davis (<https://innovate.ucdavis.edu/>)

5 Conversely, for software-centric technology startups, the phases can be much shorter, but equally as risky to the success of the enterprise.

6 A related concept is the “the Chasm”, where companies are unable to move past early adopters of the product or service into mass market adoption and scale. This concept was popularized by Geoffrey Moore in his book “Crossing the Chasm”, 1991.





A detailed study<sup>7</sup> finds that 75 percent of venture capital-backed companies never generate equity returns for their founders. Other estimates of startup failure rates range from 50 percent to 90 percent, with variations largely attributable to how researchers define “startup” and “failure.” Some analyses exclude companies that survive or get acquired but are not expected to deliver positive returns to investors.<sup>8</sup>

Startups face multiple risks during their lifecycle: market viability, product development, technological feasibility, management execution, macroeconomic conditions, and funding environment. Given the long odds of success, a thriving and sustainable startup ecosystem is necessary. While places like Silicon Valley, Boston, and New York have favorable initial conditions (top universities, an entrepreneurial culture, a long history of technical innovation), others must carefully craft policies and institutions to increase the chances of success. Moreover, these support structures will vary along the startup lifecycle to address their different needs.

## Key Performance Indicators (KPIs)

Measuring a startup’s progress along its lifecycle is crucial for determining appropriate resource allocation. While measuring innovation and technology is inherently challenging, it remains important when evaluating startups. Traditional metrics such as job creation, funds raised, or “unicorn” status are commonly cited,<sup>9</sup> but they are incidental to the policy objective of fostering startup success.

One popular method to determine a technology’s maturity is the *Technology Readiness Level* (TRL), created by NASA<sup>10</sup> in 1974 for space exploration technologies. Now used extensively by research organizations, innovation agencies, and public funding programs, the TRL scale ranges from 1 to 9, with 9 representing the highest level of technological maturity.

Complementing the TRL is the Business Readiness Level (BRL), which measures the maturity of a business or business model.<sup>11</sup> The BRL evaluates multiple areas: business concept, model, and strategy; team and management structure; awareness of competitors; and financial metrics like capital, cash flow, scalability, and sustainability. BRLs similarly range from 1 to 9 (Figure 2).

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7 Robert Hall and Susan Woodward, “The Burden of the Non-Diversifiable Risk of Entrepreneurship,” *American Economic Review* 100, no. 3 (2010): 1163–1194

8 For a detailed review of startup failure, see Professor Tom Eisenmann’s research at HBS on the topic ([www.whystartupsfail.com](http://www.whystartupsfail.com))

9 A “unicorn” is a common term (coined by Aileen Lee of Cowboy Ventures) for a startup valued at over USD 1 billion.

10 <https://www.nasa.gov/directorates/somd/space-communications-navigation-program/technology-readiness-levels/>

11 Ramsden and Chowdhury popularized the concept in their book *The Business Readiness Levels* (2019). The BRL is based on the philosophies of Design Thinking and Lean Startups.

The TRL and BRL align roughly with the startup lifecycle of Figure 1, progressing from lower levels on the left to higher ones as the startup matures. Figure 3 presents a proposed breakdown of different TRLs and BRLs assessed in parallel.<sup>12</sup>

**Figure 2. Technology Readiness Level and Business Readiness Level**

	Technology Readiness Level	Business Readiness Level
<b>Purpose</b>	Assesses the maturity of a technology's development	Assesses the maturity of the business in relation to the technology development
<b>When Used</b>	To determine if a technology is ready for the market	To determine if a business based on a technology can be profitable
<b>How Used</b>	To benchmark technical risk and understand a startup's maturity	To establish a technology that is financially commercially viable

**Figure 3. Technology Readiness Levels and Business Readiness Levels**

TRL/BRL	Technology Readiness Description	Business Readiness Description <sup>2</sup>
1	Scientific research begins to be translated into applied research and development. Examples might include models of a technology's basic properties.	Brainstorming possible business concepts, with limited knowledge or insight into the market or competition.
2	Invention begins and practical applications can be developed. Applications are speculative.	First possible business concept described, and overall market and competitors or alternatives identified.
3	Active research and development targeted at a defined outcome is initiated. Intellectual Property (IP) protection is examined.	Business model drafted. Customer and market segments are identified, and validation of those segments commences. IP licensing (if appropriate) is evaluated.
4	Basic technological components are integrated to establish that the pieces will work together in a working Proof of Concept device, breadboard, or code. Provisional patent protection is considered.	Validation of the market and/or customer segments for a defined business offering is completed. The product/offering is generally defined. A preliminary <i>pro forma</i> P&L is built based on initial customer/ market validation data
5	The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.	Market price point is examined. A cash flow analysis is completed. The complete Business Model is defined. The company is established.

12 TRL adapted from NASA guidelines, BRL adapted from Steve Blank's Lean Launchpad course at Stanford, both captured in the State of Wyoming's incubator, Impact 307 (<https://impact307.org/>)



6	Representative model or prototype system is tested in a relevant environment. Non-Provisional patent and/or copyright (for software) filings are determined.	An alpha product test plan is built and executed, one that tests “first article” or prototype units in relevant environments. Sales channels are defined.
7	Prototype system or product demonstrated in an operational environment. Manufacturing/ Operations models, building the product, are exercised and validated.	IP licensing is finalized. Final pricing is determined along with gross and net margins. Financial controls are put in place.
8	Technology is proven to work. Actual technology completed and qualified through test and demonstration.	Beta test plan is completed validating the product meets or exceeds both operational and customer requirements.
9	Technology/product proven through successful operations and user experience.	Product is launched and iterated. Marketing strategy is fully launched. Sales channels are fully implemented. Initial sales growth is seen.

## A Startup-Centered Model of the Ecosystem

A startup ecosystem is a complex web of interdependent people, organizations, resources, and initial conditions unique to each time and place. This ecosystem grows and evolves through effective interactions between system participants and startups across their lifecycles. Although it’s important for policies to help ensure ecosystem components are aligned, those that promote collaboration, connectivity, and shared learning are equally critical.

Financial capital for startups comes in various forms, each suited to different lifecycle stages and their target technologies, products, or end markets. Startups can be bootstrapped (self-funded), or they can access *non-dilutive financing* such as grants or corporate R&D contracts. As startups grow, they may need external financing, and typically tap individual investors, family offices, angel groups, or seed funds for external equity. Later stages attract traditional venture capital, growth capital, vendor financing, and debt capital. The final stage – exit via IPO or acquisition – provides returns to investors and management. This progression has led to inordinate focus on establishing diverse funding sources across all lifecycle stages.

But we must recognize there is more than one type of capital. In the book *The Startup Community Way*<sup>13</sup>, Feld and Hathaway describe seven forms of capital: intellectual (technologies, ideas, information); human (talent, knowledge, skills); financial (equity, debt, non-dilutive financing); institutional (ecosystem organizations, markets, stability); physical (density, infrastructure, standards of living); network (connectedness, relationships, collaborations); and cultural (attitudes, mindset, behaviors). Government policy can influence many of these forms of capital, and how they are promoted should align with the nature and lifecycle of startups in a given ecosystem.

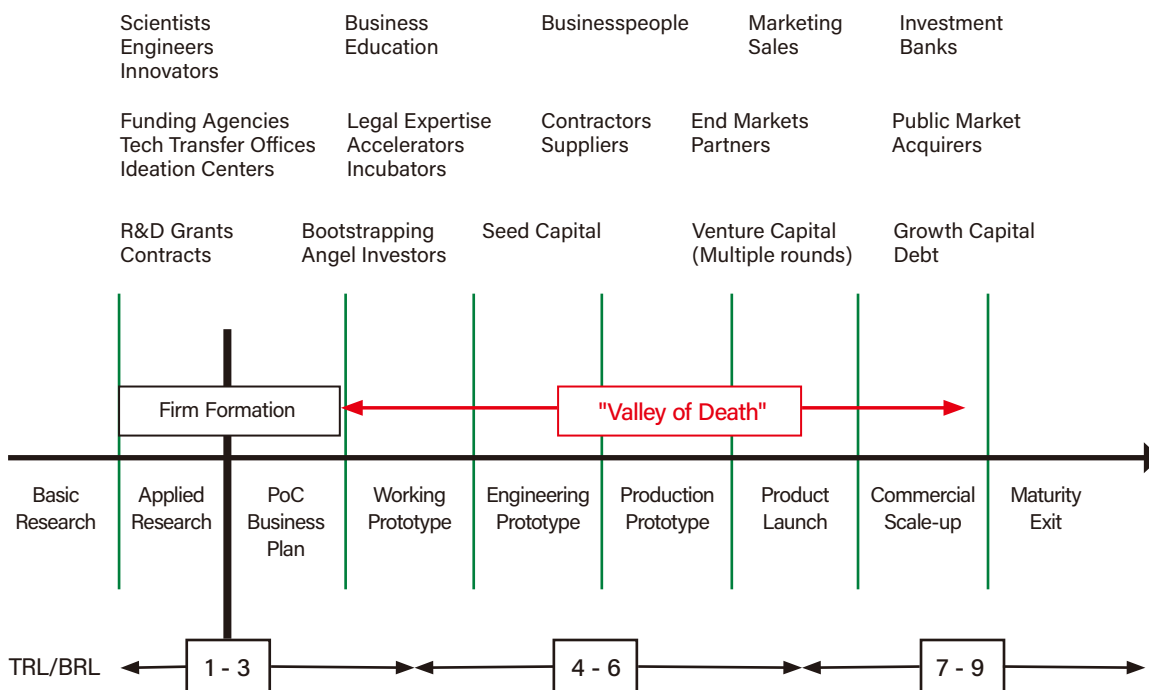
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13 <https://startupcommunityway.com/>

It is important to prioritize supporting people and networks over buildings and institutions, and to focus on experimentation and learning over rigid planning and execution. Although startups drive productivity, innovation, and job growth, most of them will likely end in failure. Designing an ecosystem that maximizes their chances of success over the long term is crucial.

Figure 4 illustrates how a startup, across its lifecycle, engages with financial and other select forms of capital, potentially shaped by government policy and mapped against different TRLs and BRLs. While not exhaustive – and geared toward hardware-centric ventures – this framework shows the components required of a successful ecosystem beyond financial resources.

**Figure 4. A startup-centered ecosystem**



For example, human capital in the early TRL/BRL phase of a startup could involve university scientists and academics carrying out applied research from first principles in deep tech (e.g. robotics or semiconductors), or technically savvy business innovators who see an opportunity. As the idea starts to take shape, people with translational and business skills can be brought in to assess its market potential. As prototypes and first articles are produced, sales and marketing experts can scope out potential customers and partners. And as the company aims to exit, financial intermediaries can help with the transaction.



Similarly, in terms of institutional capital, an early-stage startup could rely on funding agencies for financial support, and university technology licensing and transfer offices to help identify and protect its intellectual property and craft an agreement for its commercialization. Firm formation involves law and accounting firms, and the need for reasonably accessible third-party partners and service providers will arise as the product develops. Of course, customers are essential for generating revenues, and partners are likely needed to help expand markets and amplify reach.

The optimal mix of different capital forms in a thriving ecosystem varies by startup type and maturity (TRL and BRL). For example, in an environment dominated by early-stage deep tech companies, academic funding, functioning technology, entrepreneurship education, and licensing programs are more important than having a large local end market or a thriving market for IPOs. Conversely, a hub for late-stage biotech firms (like Cambridge, Massachusetts) needs advanced laboratory facilities and manufacturing capabilities rather than basic entrepreneurship training or IP licensing support, as their founders likely have prior startup experience or have already navigated these processes years ago.

This mix will evolve as startups mature, fail, or exit. Job hopping, business failure or success, and knowledge diffusion also create endogenous effects that shape the kinds of capital needed in the future. Effective ecosystem development policies must account for this dynamic endogeneity.

## The Hong Kong Startup Ecosystem – A High-Level Framing and Issues

Hong Kong has begun to reimagine its startup ecosystem in recent years. The city's government, working alongside private entities, has launched initiatives and investment programs to harness Hong Kong's strengths and entrepreneurial drive.

At the heart of this approach is leveraging Hong Kong's universities and research institutes. Hong Kong's eight University Grants Council-funded institutions of higher learning,<sup>14</sup> particularly its five world-class research universities (HKU, HKUST, PolyU, CUHK, and CityU), offer an untapped reservoir of scientific and technical intellectual property that could be commercialized.

Focusing on scientific advances that could be turned into products (and companies) utilizes Hong Kong's unheralded but significant capabilities in basic and applied science.<sup>15</sup> This contrasts with the

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14 City University of Hong Kong (CityU), Hong Kong Baptist University (HKBU), Lingnan University (LU), The Chinese University of Hong Kong (CUHK), The Education University of Hong Kong (EdUHK), The Hong Kong Polytechnic University (PolyU), The Hong Kong University of Science and Technology (HKUST), and The University of Hong Kong (HKU).

15 Although Hong Kong universities rank low on the patents per capita issued, the universities and their science and engineering departments have a high ranking in global university surveys, such as the QS survey (<https://www.topuniversities.com/university-rankings>).

previous *laissez-faire* approach that relied on organic ecosystem growth. The shift toward policy-driven ecosystem development should align with Hong Kong's strengths and weaknesses as an innovation hub: top-flight pure and applied research universities, a high-quality talent pool, a compact footprint conducive to collaboration, and a business-friendly environment; coupled with a small market size, high living costs and expensive infrastructure.

The initiatives and institutions, both public and private, are too numerous to list here,<sup>16</sup> but we can map them onto our framework with some key examples. At the early stages (TRL/BRL 1-2), there are plenty of institutions and forms of capital that provide a solid foundation, including the eight UGC-funded universities and their research centers populated by world-class scientists and engineers. Educational resources for early-stage entrepreneurship abound (e.g. HKU's Techno-Entrepreneurship Core.<sup>17</sup>). Technology and knowledge transfer offices at universities scout the IP space and help extract IP for commercialization. R&D grants and other early-stage financial support are readily available (e.g. CUHK Innovation Limited<sup>18</sup>).

At the next level (TRL/BRL 3-4), incubation and acceleration programs are available at Hong Kong Science and Technology Park<sup>19</sup> and Cyberport.<sup>20</sup> Financial support can be obtained from programs such as RAISE+<sup>21</sup> and ITF's Technology Start-up Support Scheme for Universities (TSSSU).<sup>22</sup> For more mature and late-stage startups (TRL/BRL 9), vehicles like the Hong Kong Growth Portfolio<sup>23</sup> and the Hong Kong Investment Corporation<sup>24</sup> funds offer ample capital resources.

The ecosystem is weakest at the intermediate "Valley of Death" stages (TRL/BRL 5-8) – precisely where startups need the most support. Our interviews and research reveal several challenges:

1. Technology entrepreneurship in Hong Kong remains poorly understood. It is easy for young people to see their futures as doctors, bankers, or lawyers; it is much harder to see a path toward successful entrepreneurship. Technology startup formation rates are therefore low. There is not much of a "flywheel" where successful entrepreneurs reinvest experience and capital into new ventures, serving as role models or offering lessons for aspiring founders.

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16 A topic for subsequent in-depth quantitative research.

17 <https://tec.hku.hk/>

18 <https://cuhkinnovation.hk/en>

19 <https://www.hkstp.org/en/programmes/incubation/incubation-programme>

20 [https://www.cyberport.hk/en/cyberport\\_incubation\\_programme](https://www.cyberport.hk/en/cyberport_incubation_programme)

21 <https://www.itf.gov.hk/en/raiseplus>

22 <https://www.itf.gov.hk/en/funding-programmes/supporting-start-ups/tsssu/index.html>

23 [https://www.fstb.gov.hk/en/financial\\_ser/hong-kong-growth-portfolio.htm](https://www.fstb.gov.hk/en/financial_ser/hong-kong-growth-portfolio.htm)

24 <https://www.hkic.org.hk/>



2. Research often develops in isolation from industry needs, making it difficult to tease out a product and market. Many academics and researchers are focused on their own agendas and lack business mindsets, hindering innovation. Many founders have scattered and informal business knowledge, which can lead to major blind spots – they don't know what they don't know. Promising prototypes may struggle to bridge the gap to commercialization.
3. Interactions and integration between business schools and early-stage R&D efforts are weak. Technical founders struggle to find business-focused partners, which is fundamental to success. At universities, program directors are siloed, and there is little incentive for a business school and an engineering school at the same institution to exchange knowledge and develop ties or cross-faculty initiatives. There is no institutional clearinghouse to facilitate collaboration across universities and technologies, resulting in fragmented access to information and missed opportunities for partnerships.<sup>25</sup>
4. Current accelerator and incubator programs, while well-structured, often fail to provide tools for long-term growth. Many startups face an "accelerating into a wall" phenomenon, unable to maintain momentum, raise funds and commercialize their technology after completing those programs.
5. Early-stage investor (e.g. angel investor) education is weak. Small investors do not have the bandwidth and do not know what to do post-investment. There aren't any structured programs to train individuals or angel investors such as family offices on investing in startups. They only learn through failure, which hinders continuous risk-taking and development of a broader investment culture.
6. Early and mid-stage venture capital remains scarce. Very few investors understand and are willing to support technologies that require many years to mature and offer only modest financial returns over the life of a VC fund. Many Mainland VC funds have onerous redemption clauses that make it impossible to fund promising startups. Private capital and corporate R&D play crucial roles in bringing new technologies to market, but they lack the patience and consistency to cultivate something fundamentally new over multiple decades.
7. Hong Kong's end markets for technology startups are small and likely insufficient to support large and scaled revenue models. Its small local market prevents startups from achieving the critical mass or scale necessary to attract traditional venture capital. Partnership opportunities are equally limited due to the narrow focus of established homegrown technology corporations.

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25 An exception is the InvestHK Innovation & Technology site (<https://innotech.investhk.gov.hk/>) but even that is geared for external actors, not local participants.

## Policy Recommendations and Conclusion

This analysis provides a framework for understanding startup ecosystems, applied here to Hong Kong's landscape. While Hong Kong demonstrates considerable strengths, my research identifies a critical pain point: a dearth of resources following firm formation and proof of concept, creating a notable gap between prototyping a technical concept and commercial viability. This shortfall leaves startups poorly positioned to attract traditional venture capital. Some high-level policy suggestions for strengthening the ecosystem include:

1. **Foster a Culture of Innovation:** Promote a culture that embraces risk-taking and innovation through education, public campaigns, and support for entrepreneurial activities in schools and universities. Look beyond Hong Kong for sources of technology that could be commercialized in the city. At the same time, provide a social and psychological “safety net” that reduces the personal cost of entrepreneurial failure.
2. **Establish a Clearinghouse for Innovation and Startup Support:** Currently, the available resources for startups are not easily understood or accessible. Establish a physical center with a virtual element, staffed by human experts and supported by AI, where startup participants can learn about the resources at hand and how to utilize them.
3. **Promote Cross-University Collaboration:** Avoid duplicating R&D efforts and create a pool of knowledge and intellectual property by uniting the “brain trusts” of different universities and research centers. Present it as a mutual gains partnership to overcome the “Not Invented Here” syndrome. Establish strong derisking programs that offer grants to help companies transition from TRL 5/6 to TRL 8, and staff evaluation committees with a mix of technologists and businesspeople.
4. **Bridge Industry-Startup Divide:** Encourage collaborations between startups, academic institutions, and private industry to create structured pathways from prototypes to viable products. Build networks and connectivity to identify end-market opportunities.
5. **Support Market Expansion:** Provide support for “global from day one” technology startups to expand into markets outside Hong Kong through trade missions, networking opportunities, and partnerships with overseas corporate partners. In particular, encourage collaborations with GBA corporations to tap neighboring markets.







**Opportunities and  
Strategies for Hong Kong  
to Become a Global Supply  
Chain Management Center**

# Opportunities and Strategies for Hong Kong to Become a Global Supply Chain Management Center

Heiwai Tang

## Introduction

The structure of global supply chains has been undergoing continuous transformation, driven by nations' economic development, evolving economic policies, technological advancements, and, more recently, domestic and global geopolitical dynamics. Managing these supply chains is inherently complex, encompassing upstream activities like product design, research and development, midstream manufacturing and production, and downstream processes such as sales and post-sales services for consumers. Effective coordination of logistics, capital flow, and information exchange among the various stakeholders along the supply chain is crucial. In his seminal article, *The Triple-A Supply Chain*, Lee (2004), a renowned global supply chain expert from Stanford University, highlights that optimal supply chains must be agile in responding to short-term shocks, adaptive to medium-term changes, and aligned with the incentives of all partners.

Historically, Hong Kong has played a pivotal role as an international trade hub. However, its position has faced increasing challenges over the past two decades for three key reasons. First, the significant expansion of cargo ports across Asia, particularly in nearby mainland Chinese cities, has gradually reduced Hong Kong's role in handling maritime trade. This shift is especially notable as 99% of Hong Kong's exports are re-exports for producers worldwide.

Second, the rise of cross-border e-commerce has diminished the need for traditional trade intermediaries, weakening Hong Kong's significance as a global trade intermediary.

Third, global supply chains have faced significant disruptions due to the COVID-19 pandemic (2020–2023) and heightened geopolitical tensions. In response to the growing prevalence of protectionist policies among major nations, characterized by inward-looking industrial strategies, companies worldwide, including those headquartered in China, have increasingly adopted the "China+N" strategy. This approach aims to expand and diversify production networks across multiple countries beyond China. In the United States, both the Trump and Biden administrations have advocated for reshoring manufacturing production, while governments in advanced economies have prioritized enhancing self-sufficiency in critical sectors such as semiconductors and minerals. In Asia, the Indian



government has introduced initiatives to balance local manufacturing with foreign direct investment in the semiconductor industry. Meanwhile, Indonesia is striving to establish itself as a hub for electric vehicle and battery production and has proposed tariffs on Chinese imports to protect small local businesses.

The evolving economic and geopolitical landscape suggests a future where China and its neighboring nations will continue to play a dominant role in driving industrial and supply chain development across Asia. Many Chinese enterprises have shifted from exporting goods through Hong Kong to redirecting intermediate products to other nations for further processing and eventual export to major markets, particularly the U.S. and Europe. This strategy not only helps bypass tariffs targeting direct Chinese exports but also mitigates the challenges of shrinking profit margins caused by intense domestic competition. Amid these shifts, Hong Kong must identify new opportunities and redefine its strategic position as a consolidated international commercial and supply chain hub. To adapt to these emerging opportunities and challenges, Hong Kong should explore four broad directions:

1. Hong Kong must redefine its role as an international center. Relying solely on its position as a bridge between China and the traditionally defined West is increasingly risky and unsustainable. Instead, Hong Kong should position itself as a gateway between China and emerging economies—both affluent and developing—in an increasingly interconnected and multimodal world.
2. To strengthen its status as an international hub for trade, finance, and corporate headquarters, Hong Kong should identify segments of regional supply chains where it holds a comparative advantage. Leveraging its financial expertise, the city can support and stimulate new economic activities. A key strategic focus should be on integrating into upstream and downstream activities within regional supply chains anchored in manufacturing across other Asian nations. Notable upstream opportunities include trade finance and logistics management for both onshore and offshore trade, which will be further discussed in the next section.
3. Hong Kong must adapt to escalating geopolitical tensions and the ongoing regionalization and fragmentation of global supply chains. It should strategically identify opportunities arising from new globalization trends. A key role for Hong Kong is to serve as a professional and financial hub, supporting Chinese enterprises in their efforts to “go out” by establishing export platforms and exploring foreign markets as part of the “China+N” production expansion strategy. This is particularly relevant in the Global South, including Southeast Asia and Latin America, as well as Eastern Europe. Hong Kong’s banking, consulting, accounting, legal, and accreditation sectors should play a vital role in facilitating legal and sustainable outward direct investment by mid-sized Chinese companies.

## The “Smiling Curve” in Supply Chain Management

The “Smiling Curve” theory illustrates a common characteristic of production chains. The upstream and downstream stages typically yield a higher value-added-to-sales ratio or greater profitability, compared to the middle stages. For instance, upstream activities like research and development (R&D) generate substantial value-add, surpassing the contribution of midstream production and distribution phases. In the context of mobile phone production, the R&D phase significantly boosts profitability, while the midstream production stages contribute relatively less. Similarly, downstream activities, such as retail, marketing, and mobile application development, offer additional opportunities for profit generation.

In the 21st century, international trade extends far beyond the physical transportation of goods between nations. It encompasses a range of critical components, including insurance, trade finance, banking, and risk management—areas where Hong Kong has historically held a competitive edge. With a rich pool of internationally experienced talent and a robust network of companies providing high-quality professional services, Hong Kong is well-positioned to meet the evolving demands of global trade.

Hong Kong must develop a new economic model that focuses on high-value segments of industrial and other value chains, enabling better integration of business value chains with regional resources. The city’s highly transparent and rigorously regulated financial system offers distinct advantages that are difficult for other cities to replicate. Furthermore, the “One Country, Two Systems” framework and a strong common law system reinforce Hong Kong’s position as a rising hub for supply chain management. Considering the increasing fragmentation and volatility of global supply chains, Hong Kong must enhance its resilience and risk management capabilities. One strategic direction is to expand the general business segment of the insurance sector, including offering climate risk-related insurance and risk management services to support local and foreign companies in their overseas ventures.

## The Competitive Advantages of Hong Kong as a Supply Chain Management Centre

Hong Kong’s competitive advantages in supply chain management can be summarized in three key areas:

- 1. A robust and stable financial system offering diverse financial products and services for businesses.**

Hong Kong’s well-regulated financial system and extensive track record in financial services make it an ideal hub for trade finance and cross-border payments. The Hong Kong Monetary Authority (HKMA) is actively modernizing the financial landscape by exploring Central Bank



Digital Currency (CBDC) initiatives and collaborating with central banks in the UAE, Thailand, and Mainland China to develop cross-border CBDC payment systems. Additionally, major banks in Hong Kong are leveraging advanced technologies such as artificial intelligence and blockchain to deliver innovative solutions, including digital guarantees and enhanced frameworks for trade, supply chain, and cross-border financing.

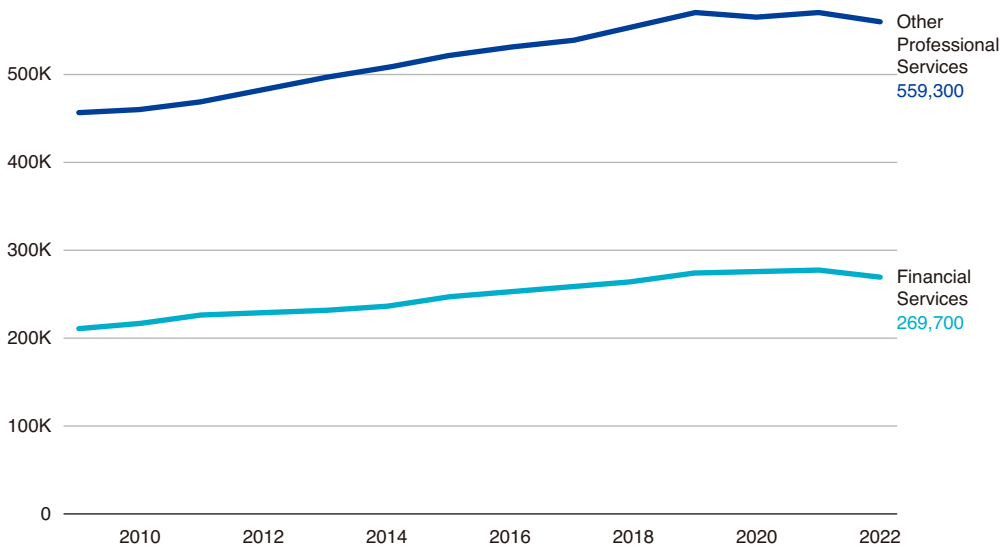
## **2. A comprehensive professional services ecosystem.**

Businesses and investors rely on a range of trade and management services in Hong Kong that have made the city a strategic base for supply chain operations. Hong Kong's adherence to global legal and commercial standards positions it as a leading choice for international arbitration, trade compliance, and standards certification. The Hong Kong International Arbitration Centre (HKIAC) handles a significant volume of international cases, further cementing its reputation as a key trade arbitration hub in Asia. Moreover, Hong Kong is home to over 900 institutions providing globally recognized certification services in more than 100 countries. This emphasis on professional standardization and certification remains a distinct advantage for Hong Kong in the global marketplace.

## **3. A robust business environment and world-class educational system ensuring a steady supply of talent.**

Developing strong professional service sectors requires continuous efforts in talent cultivation and attraction—a goal that Hong Kong's tertiary education institutions and regional headquarters are actively pursuing (see Figure 1). While expertise in finance, business, and law is widely available globally, professionals with multilingual proficiency, adaptability to diverse cultural contexts, international exposure, and a global career trajectory remain rare. Hong Kong's educational institutions focus on fostering these multifaceted skills, highlighting the unique strengths of its workforce in supply chain management. This emphasis on nurturing diverse and versatile capabilities reflects Hong Kong's strategic approach to sustaining its competitive edge in the evolving global trade landscape.

**Figure 1. Employment in Professional and Financial Services**



Source: Census and Statistics Department

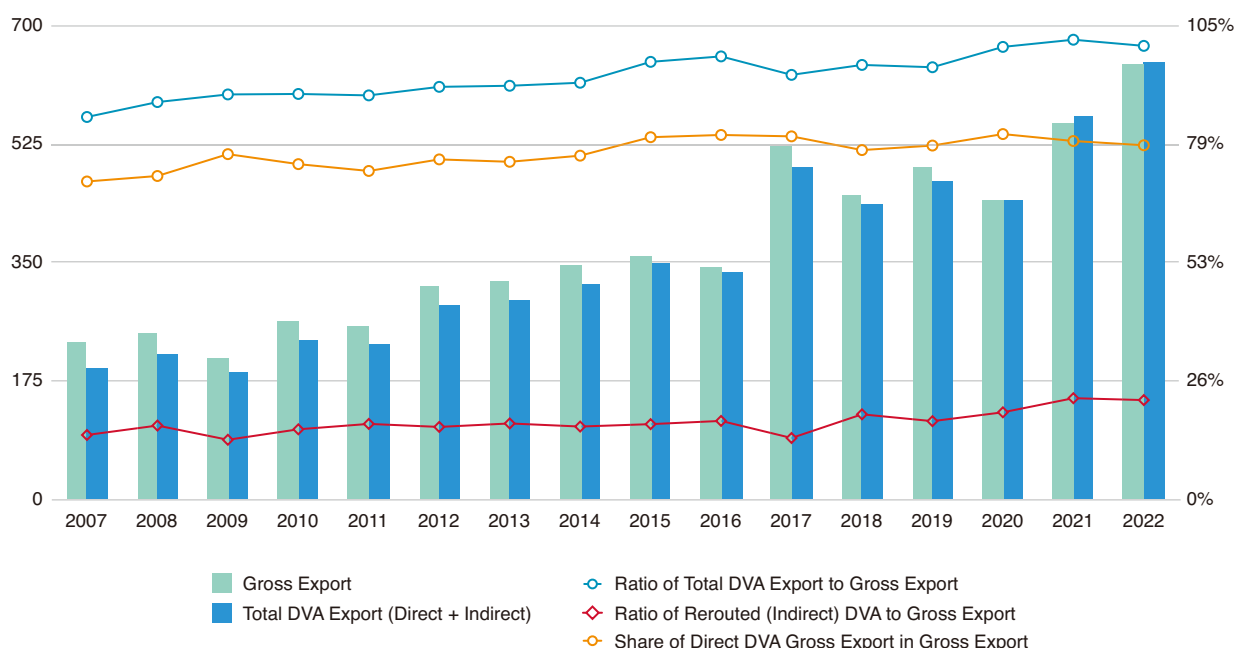
## More Specifics about Developing Hong Kong into a Multinational Supply Chain Management Center

While the prominence of European and American markets has been gradually diminishing for mainland exports and Hong Kong's re-exports, they remain the primary final destinations for goods originating from Mainland China. ASEAN, as the primary and secondary direct export destinations for Mainland China and Hong Kong respectively, holds considerable potential with a projected middle-class population exceeding 400 million. Despite this, many regional companies view ASEAN's highly industrialized economies as 'connector' countries, linking Chinese goods and services to end consumers in Europe and North America, which collectively account for over half of global consumption. Hong Kong businesses and the government should seize this opportunity presented by the global trade rerouting.

Utilizing the global input-output tables supplied by the Asia Development Bank, Tang, Yan and Zheng (2024) discovered a continuous rise in domestic value-added exports (DVAX) from China to the U.S. This increase occurred despite a decline in direct gross exports from China to the U.S., a result of U.S. tariffs imposed on 60% of Chinese goods (Figure 2). Specifically, approximately 24% of China's DVAX to the U.S. in 2022 was routed through third countries such as Mexico, Vietnam, and Korea.



**Figure 2. China's Gross Exports and DVA Exports to USA, All Sectors Included**



Given the shifting dynamics of global supply chains, China’s preeminence in providing crucial products—such as new energy vehicles, lithium, renewable energy solutions, electronics, and infrastructure projects—offers prospects for the growth of manufacturing centers in other areas. A recent illustration of this is the decision by battery manufacturer CATL to establish a technology innovation R&D center at the Hong Kong Science Park. As Chinese businesses strategically broaden their global presence, Hong Kong is primed to exploit its competitive edge in infrastructure and professional services, potentially transforming into a top-tier supply chain management hub. The city is especially equipped to offer extensive professional services to Chinese enterprises looking to extend their market reach internationally.

A recent survey conducted by the Hong Kong Trade Development Council in the third quarter of 2023 showed a substantial surge in mainland companies intending to “Go Global.” Nearly 90% expressed plans to expand internationally within the next three years. Significantly, 62.1% of these companies aim to use Hong Kong’s professional services, underscoring an escalating demand in the service sector.

Likewise, Hong Kong-based businesses can play a pivotal role in drawing foreign investments into the mainland and aiding outbound investments by mainland funds. Beyond financial services, professionals in legal services, risk management, and accounting within the city can offer specialized expertise sought by both mainland and foreign companies.

By using Hong Kong as a base for managing transnational supply chain processes, companies can effectively supervise their production flow remotely. Hong Kong's strengths—such as a straightforward tax system, a conducive business environment, an efficient and transparent market, and regulations meeting international standards—make it an ideal location. These advantages uniquely position Hong Kong as a bridge between international markets and China. Consequently, the city is an appealing destination for mainland production companies looking to establish regional headquarters and streamline their supply chain management operations.

## References

1. Lee, Hau (2004) 'The Triple-A Supply Chain', *Harvard Business Review*.
2. Tang, H., Yan Y., and Zheng X. (2024) "Trade Rerouting under the US-China Trade War", HKU Business School Working Paper.





A futuristic cityscape featuring a prominent, tall, slender skyscraper with a glass facade, surrounded by other modern buildings. The scene is set against a backdrop of green mountains and a blue sky with scattered clouds. In the foreground, there is a body of water with several small boats. A large green circular overlay on the right side of the image contains the text "Artificial Intelligence and the Future of Hong Kong".

**Artificial  
Intelligence  
and the Future  
of Hong Kong**

# Artificial Intelligence and the Future of Hong Kong

Michael Chau

## 1. The Rise of AI

Artificial intelligence (AI) has advanced dramatically in recent years. In particular, deep learning and generative AI models have gained widespread popularity at both organizational and individual levels, with a range of innovative and viable applications being developed. Deep learning techniques focused on classification and prediction have substantially improved the performance of various fundamental AI tasks such as speech, image, and facial recognition, resulting in many real-world applications including identity verification, self-driving cars, medical diagnosis, and supply chain management. Meanwhile, generative AI has widened access to sophisticated content creation tools for texts, images, and videos, particularly the easy-to-use ChatGPT released by OpenAI in November 2022 and similar chatbots based on large language models. These developments have fuelled worldwide interest in AI across government, industry, academia, and the general public.

While AI brings promising applications to society, it also presents significant challenges. For example, many people fear AI-driven automation will disrupt some industries, eliminating certain job categories and potentially causing mass unemployment. Organizations and people must therefore adapt and prepare for AI's rapid growth. Another area of concern is AI safety and responsibility. The legal consequences of AI's actions have not been clearly defined in many situations involving fast-growing applications. Criminals are also using AI to conduct sophisticated scams and other illegal activities. This article explores three key dimensions linked to AI, namely Hong Kong's competitiveness, the labour market, and safety considerations. Following these discussions, we make several policy recommendations related to education, funding mechanisms, and regulatory frameworks.



## 2. AI and Hong Kong's Competitiveness

AI has seen its fair share of ups and downs in past decades. The rise of generative AI in 2022 symbolizes the industry's current boom, but its foundation lies in deep learning and large language models that have been gradually gaining momentum since the 2010s. AI's renaissance today has yielded breakthroughs across virtually every domain, from scientific research and medicine to engineering, business, and the arts.

To maintain Hong Kong's competitiveness globally, it is important for all sectors to embrace AI. While AI's potential is particularly evident in areas such as financial technology, e-commerce, marketing, logistics, healthcare, and smart city solutions, its applications extend far beyond these industries. The city must think about where and how it can strategically use AI to boost productivity and efficiency across society. By leveraging AI technologies, Hong Kong can improve its business environment, attract more investment, and foster economic growth. Without such planning, we will easily lag behind our peers and competitors.

Many people have asked: Can Hong Kong become a leading AI hub? Hong Kong offers a number of advantages, including its free-market economy, business-friendly environment, access to the Greater Bay Area and the China market, and a diverse talent pool. But Hong Kong also faces fierce competition from regional rivals such as Shenzhen, Taiwan, and Singapore. Or worse, Hong Kong is caught in the technology war between China and the United States. For example, OpenAI has suspended services to users in Hong Kong, while Nvidia has banned export of powerful computer chips to Hong Kong and mainland China. These moves severely hamper Hong Kong's potential role as a regional leader in AI.

To address these challenges, Hong Kong must forge a distinctive strategy and consider alternatives. One solution is to develop our fundamental research capabilities. While some prominent applications like AlphaGo and ChatGPT were developed by large organizations with strong financial backing, startups can still succeed and achieve breakthroughs in this field. One notable example is SenseTime, a leading AI company founded in Hong Kong that focuses on image recognition.<sup>1</sup> Building our own strengths in both basic research and real-world applications is crucial for keeping Hong Kong ahead in the global competition.

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1 <https://www.sensetime.com/>

### 3. AI and the Labour Market

AI has the ability to fully or partially automate many tasks in the job market. The International Monetary Fund estimated that AI will impact nearly 40% of global employment, with that figure reaching up to 60% in advanced economies like Hong Kong.<sup>2</sup> Job categories at high risk of being disrupted or even replaced by AI include data entry and administrative jobs, customer service, manufacturing and assembly lines, retail checkouts, analytical roles, graphic design, translation, and commercial photography.<sup>3</sup> Others have suggested that vehicle drivers and jobs that involve content creation, such as social media marketers, computer programmers, and technical writers, are also particularly vulnerable.<sup>4</sup>

While technology has upended labour markets before, what is distinct about this AI wave is its likely impact on high-skilled, high-income jobs, compared to earlier waves of industrial automation that mostly affected lower-income occupations.<sup>5</sup> Optimistically speaking, AI will substantially enhance the productivity of high-income workers, allowing these individuals to direct their time to more value-adding work that could only be done by humans. However, a more sobering perspective suggests that many high-income professionals will be displaced from their jobs. Without appropriate training, these individuals may find it even harder than low-income workers to adapt to the AI era, as AI may now be able to perform their once-valuable skills at a much lower cost.

At the same time, AI can create entire job categories, like how the Internet revolution brought about new ones like blogging and live-streaming. Examples of novel professions include prompt engineers, AI experience designers, and AI trainers. In any case, AI will profoundly impact global and local labour markets, replacing and creating many jobs in a complex interplay.

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2 <https://www.imf.org/en/Blogs/Articles/2024/01/14/ai-will-transform-the-global-economy-lets-make-sure-it-benefits-humanity>

3 <https://www.forbes.com/sites/bernardmarr/2024/06/17/what-jobs-will-ai-replace-first/>

4 <https://www.techtarget.com/whatis/feature/Will-AI-replace-jobs-9-job-types-that-might-be-affected>

5 <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-AI-the-next-productivity-frontier>



## 4. Responsibility and Safety of AI

AI can automate many tasks currently performed by humans, and is expected to take charge of even more functions without human intervention. Examples include verifying identities, managing an investment fund, driving a car, or even making medical diagnoses. Any missteps could result in disastrous consequences, from investment losses to traffic accidents involving casualties.<sup>6</sup> AI systems, like other information technologies, are subject to hacking, viruses, and software bugs. AI may also suffer from bias and discrimination inherited from the data it was trained on. These issues, which could lead to unintended and costly results, make clear that AI poses safety issues to society. Moreover, bad actors may take advantage of AI; for example, a company was scammed HK\$200 million through a video meeting produced by deepfake technologies.<sup>7</sup> Governments must therefore educate the public about the power and risks of AI, and devise regulations and guidelines on the responsibilities and ethical considerations of AI usage.

Since AI technologies and applications are advancing rapidly, laws and regulations are often playing catch-up, like in the autonomous driving industry. Regulators must strike a balance between providing a legal basis for the latest AI technologies and clearly defining their responsibilities and boundaries.

## 5. Policy Recommendations

To prepare for the AI era, Hong Kong could consider the following recommendations:

- 1. AI Education:** AI literacy, competencies, and its responsible uses should be woven into education at all levels. Citizens should understand the benefits, risks, and limitations of AI from a young age. Primary and secondary schools can incorporate AI into formal curriculums. Authorities and educators can set up a council dedicated to boosting AI literacy and education through public seminars, workshops, television and online videos, and other activities. These initiatives will allow the general public to use AI more effectively and responsibly and better prepare the workforce for the changing dynamics in the labour market.
- 2. Help Organizations Get On Board with AI:** Many organizations, especially small and medium enterprises and non-government organizations, are eager to apply AI to improve their productivity, but do not have the resources or expertise to do so. The government can provide assistance, such as training workshops and funding focused on AI, to help these organizations.

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6 <https://www.bbc.com/news/technology-67133409>

7 <https://www.scmp.com/news/hong-kong/law-and-crime/article/3250851/everyone-looked-real-multinational-firms-hong-kong-office-loses-hk200-million-after-scammers-stage>

3. **Support Frontier AI Research:** With a wide range of applications, AI is critical to Hong Kong's future economic success. To maintain global competitiveness, the government must support cutting-edge AI research and development across universities and startups. Increased funding for both fundamental research and practical applications will not only accelerate Hong Kong's AI capabilities but also create high-value job opportunities.
4. **Attract Non-local Investments on AI:** Hong Kong should attract non-local companies, including both mainland China and overseas companies, to develop and apply advanced AI technologies in the city. Various incentives and subsidies can be provided to non-local companies to establish offices and businesses in Hong Kong. At the same time, authorities should facilitate non-local investments into homegrown AI companies to bring in expertise, resources and collaboration opportunities, fostering AI's growth in the city.
5. **Regulations and Guidelines on AI:** Given the ethical, legal, and safety challenges associated with AI, the government should continuously review and update existing AI and data-related laws in Hong Kong. New regulations or amendments should be introduced as needed in response to the rapid advancements in AI. These laws should also consider frameworks from other advanced economies and mainland China. More industry-specific regulations and guidelines, such as those published by the Hong Kong Monetary Authority<sup>8</sup> on AI usage, can help different sectors embrace AI responsibly.

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8 <https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2024/20240819e1.pdf>





# Transform Climate Risks into Development Opportunities

*– Implications for  
Hong Kong's Economic  
Development in an Era of  
Climate Change*



# Transform Climate Risks into Development Opportunities

## – Implications for Hong Kong’s Economic Development in an Era of Climate Change

Guojun He Qidan Wang Vivi Hu Cheng Bi

### 1 Introduction

According to the World Economic Forum’s Global Risks Report (2024), three key climate issues have been identified as critical challenges facing humanity: extreme weather events, critical change to earth systems, and biodiversity loss and ecosystem collapse. The current warming of 1.44°C, compared to pre-industrial times, is already causing disruptive global economic impacts (NASA, 2023).

As a coastal city with low-lying terrain, Hong Kong is frequently affected by extreme weather events and has experienced multiple climate disasters in the past decades. Two climate risks are particularly concerning: the occurrence of severe typhoons and rising sea levels. On the one hand, strong tropical cyclones bring heavy rainfall, strong winds, storm surges, and flooding, often disrupting economic production and negatively affecting vulnerable areas and people. On the other hand, most of the economic activities in Hong Kong are concentrated in low-latitude regions, making the economy particularly susceptible to the damages caused by sea level rises.

In the following chapter, we first summarize the major climate risks Hong Kong has been exposed to, with an emphasis on typhoons and sea level rise. Taking “Saola,” a recent typhoon, as an example, we review the impact of its path, surge height, and wind intensity. Next, we focus on how typhoons and sea level rises would affect public housing and conduct scenario analysis on the potential economic losses under different climate pathways. Finally, we provide policy recommendations for adaptive strategies to enhance climate resilience and mitigate risks.

### 2 Overview of Climate Risks in Hong Kong

Hong Kong has been warming up in the last century. Analysis from the Hong Kong Observatory (HKO) showed that the average mean temperature has increased by 0.14°C per decade from 1885 to 2023.





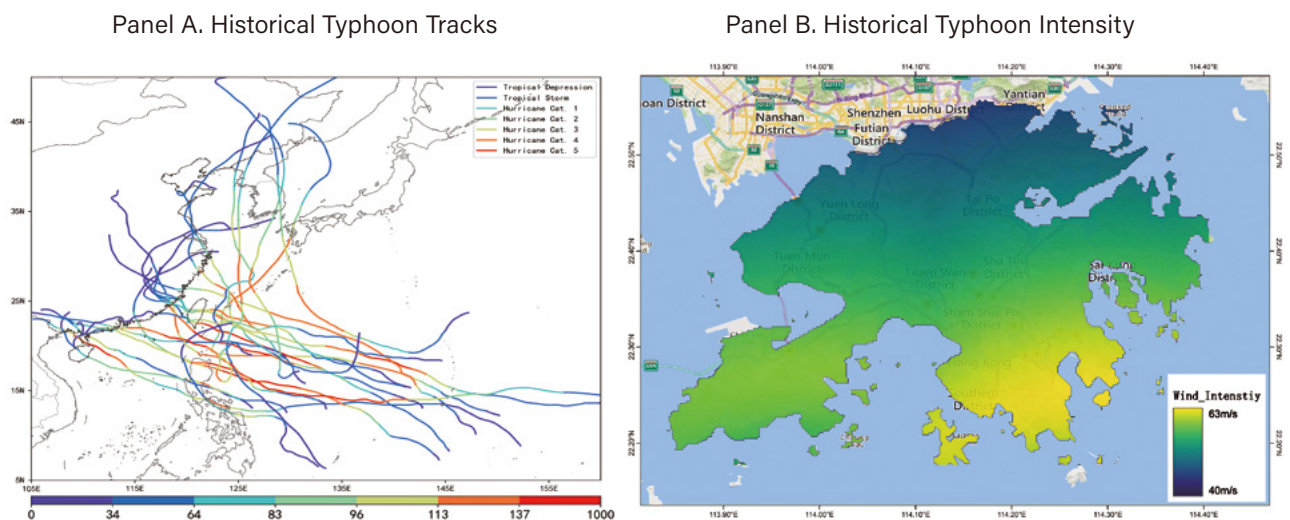
That number reached 0.30°C per decade from 1994 to 2023. Consistent with this trend, the annual average number of hot nights from 2001 to 2023 has increased by 67.18%, while the number of cold days has decreased by 18.19%, relative to 1991-2000 averages.<sup>1</sup> The sea level is also steadily rising, with a growth rate in mean sea level of 31 mm per decade at Victoria Harbor from 1954 to 2023.

Meanwhile, Hong Kong has experienced more typhoons and heavy rainfall in the last two decades. These weather events, including storm surges, strong winds and coastal flooding, have caused significant damages.

## 2.1 Typhoons: The Most Frequent Climate Disaster in Hong Kong

With its back to the northwest Pacific Ocean, Hong Kong is bordered by a range of east-west mountains to the north and a vast ocean to the south, making it highly susceptible to typhoons. The city's temperature and humidity provide ample moisture for tropical cyclones, creating ideal conditions for typhoon formation.

**Figure 1. Historical typhoon tracks and intensity from 2014 to 2023.**



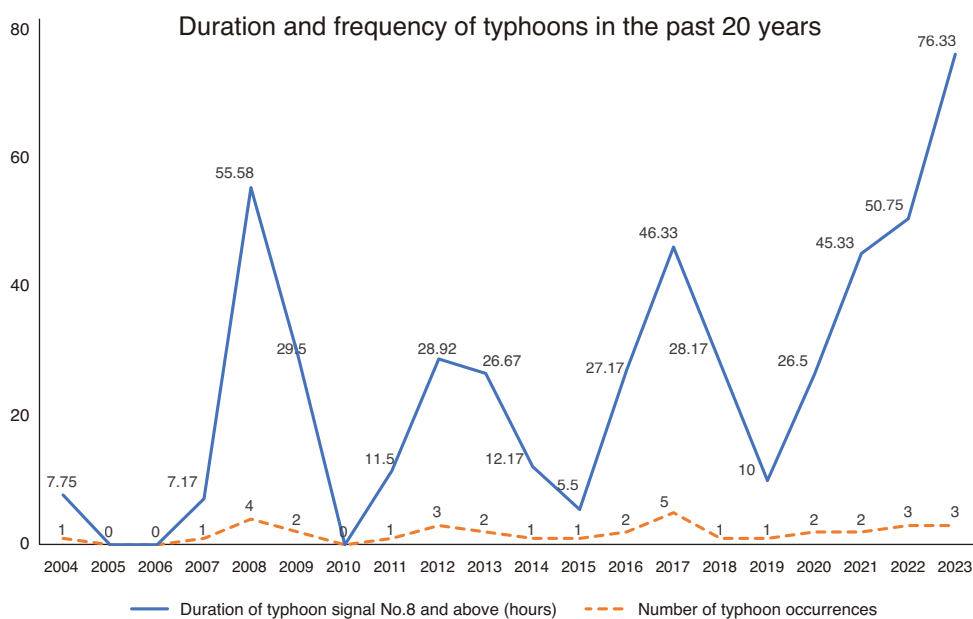
Notes: This figure shows the analysis of typhoons affecting Hong Kong with two panels. Panel A (Left) shows the statistical representation of typhoons in the northwest Pacific region from 2014 to 2023. Typhoons are categorized by intensity levels equal to or exceeding Category 3 typhoons, which is significant for Hong Kong. The depicted line segments represent typhoon trajectories, with a color gradient from purple to red indicating increasing storm intensity. The maximum intensity recorded is capped at  $\leq 137$  knots, or 210 km/h, with the peak observed in 2023. Panel B (Right) illustrates the historical record of the maximum intensities of typhoons impacting Hong Kong. Peak intensities across different regions range from 40 m/s to 63 m/s. (Data source: YoujiVest Climate Lab)

1 According to the Hong Kong Observatory's definition, a hot night is a night with a minimum temperature of 28°C or above, and a cold day refers to a night with a minimum temperature of 12°C or below.

Figure 1 summarizes typhoon activity affecting Hong Kong and mainland China from 2014 to 2023. Panel A shows that many typhoons have made landfall in Hong Kong and nearby areas, making Hong Kong a particularly vulnerable site for typhoon-related damage. Panel B further examines historical typhoon intensity patterns in Hong Kong, revealing an increase in intensity from the northwest to the southeast, with Hong Kong Island being the most affected. Hong Kong Island is not only the economic center of Hong Kong but also a densely populated area with significant production activity. Buildings and infrastructures in the area face elevated risks when strong winds strike, especially those directly exposed to high wind speeds.

Figure 2 summarizes the duration and frequency of typhoons (Signal No.8 or higher) in the past two decades. We observe that Hong Kong has been hit more frequently by typhoons, while the duration of severe typhoons has also increased. Notably, three severe typhoons struck Hong Kong in 2023, resulting in a cumulative 76 hours of Signal No.8 or higher. Hurricane Signal No. 10 was issued during the passage of "Saola," Storm Signal No. 9 was issued during the passage of "Koinu," and Gale or Storm Signal No. 8 was issued during the passage of "Talim."

**Figure 2. The number and duration of typhoons occurring in Hong Kong each year from 2004 to 2023.**



Notes: The blue line represents the annual cumulative duration of typhoon Signal No. 8 or above issued by the HKO. The yellow dotted line represents the number of typhoons making landfall or severely affecting the region each year. The cumulative duration of typhoon signal No. 8 and above shows a significant surge in 2023, the highest record in two decades. (Data source: Hong Kong Observatory)

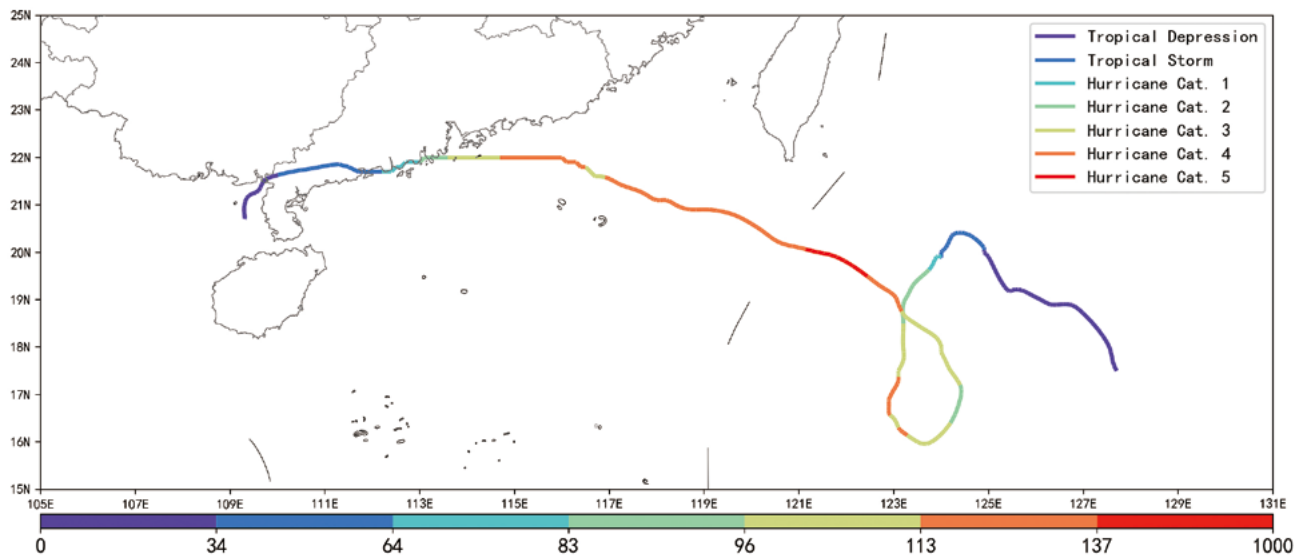


## 2.2 Devastating Consequences of Super Typhoons: Recent Experiences

Multiple super typhoons have hit Hong Kong in the past few years. These extreme weather events threaten ordinary people's livelihoods and cause significant economic losses, mainly through impacts on properties and other assets. In 2018, for example, Super Typhoon "Mangkhut" (Signal No. 10) struck Hong Kong on September 16, leading to an estimated direct economic loss of more than HK\$4.60 billion (Choy et al., 2020).

A recent example is Super Typhoon "Saola," the third tropical cyclone to impact Hong Kong in 2023, prompting the HKO to issue a No. 10 Signal. At its center, "Saola" reached a maximum sustained wind speed of 210 kilometers per hour, setting a new record in Hong Kong's typhoon history. Figure 3 plots the path of "Saola," which formed in the Pacific Ocean, made its first landfall in Hong Kong, and subsequently impacted Guangdong Province in China.

**Figure 3. Observed path of "Saola" in 2023.**



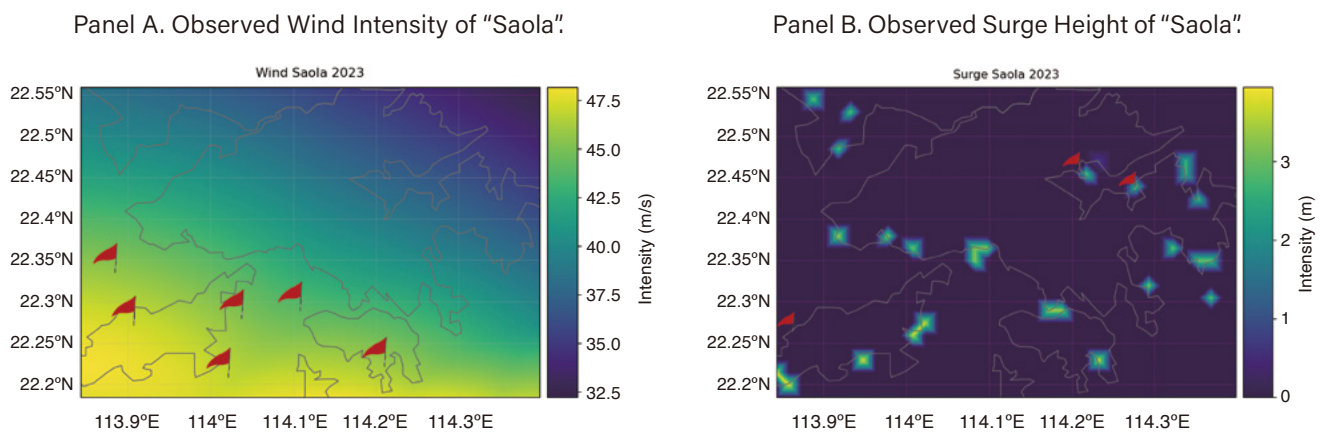
Notes: The trajectory and intensity map of "Saola." The color intensity from purple to red represents the escalating severity of the typhoon's influence. "Saola" demonstrated considerable force, with wind speeds ranging from 96 to 113 knots. (Data source: YoujiVest Climate Lab)

Figure 4A shows the wind intensity during “Saola.” We observe that the southwestern parts of Hong Kong, including areas such as Ngong Ping, Sha Chau, Cheung Chau, Ping Chau, Tsing Chau (as flagged in Figure 4A), and the southern part of Hong Kong Island, experienced more pronounced wind impacts.

The strong winds led to severe destruction, including shattered glass, fallen trees, and damaged infrastructures. In addition to the strong winds, “Saola” also triggered a storm surge, causing a rapid rise in tidal levels. Figure 4B shows that the rise in the tidal level was mainly concentrated in the bays, especially in the bay areas of Sha Tin, Tai Po, and Tai O. The water brought by the storm surge not only destroyed many boats in the bays but also caused widespread floods that eroded coastal lands, roads, and properties. Many parts of Hong Kong experienced waterlogging on streets, traffic congestion, and significant delays in public transportation.

According to the Hong Kong Insurance Authority, the total gross claims caused by “Saola” and a subsequent black rainstorm reached HK \$1.9 billion. The most insurance claims were for property damage and business interruption, with a total compensation of HK \$1.64 billion. Employee compensation, automotive, and travel claims amounted to HK \$210 million.

**Figure 4. Typhoon “Saola’s” impact on wind and storm surge.**



Notes: The figure shows the distribution of impacts from “Saola” across regions in Hong Kong in two panels. Panel A (Left) shows the distribution of wind intensity impacts. The intensity gradients range from blue to yellow, indicating increasing strength. The highest wind intensities were recorded from the southwest to the northeast of Hong Kong within a range of 32.5 m/s to 47.5 m/s. Panel B (Right) displays the distribution of storm surge intensity impacts. The intensity of the storm surge, measured by the height of the surge, is indicated by a color gradient from blue to yellow. (Data source: YoujiVest Climate Lab)



### **2.3 Sea Level Rise: Hong Kong's Major Climate Risk in the Long Run**

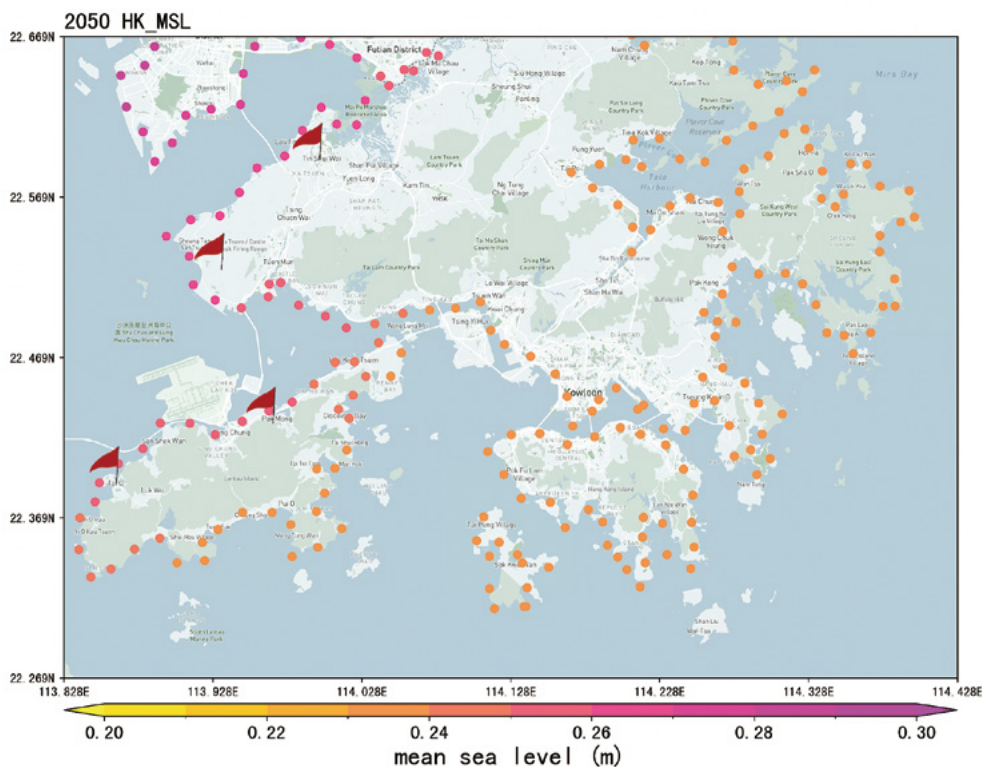
In 2023, the global mean sea level was 101.4 millimeters above 1993, the highest in the satellite record from 1993 to the present (NOAA, 2023). According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6) and the National Oceanic and Atmospheric Administration,<sup>2</sup> on a high emissions pathway triggering rapid ice sheet collapse, the sea level could rise by up to 2 meters in 2100 compared to 2000. For Hong Kong, 5–6 meters of coastal defenses would be needed, affecting an estimated 82% of the Hong Kong government's total revenues (China Water Risk, 2022). According to the HKO, Victoria Harbor's annual mean sea level grew by 31 mm per decade from 1954 to 2023.

Figure 5 projects the sea level rise in Hong Kong by 2050 based on our analysis of sea-level data. The year 2050 is a key point because Hong Kong, like many other countries and regions, has committed to achieving net zero by that year.

A rising sea level will cause severe economic and property losses, increase the probability of coastal flooding, and affect nearby residents. For example, Shen et al. (2022) estimate that a rise in sea level would affect approximately 8,500 square meters of land near Victoria Harbor under RCP4.5 by 2060.<sup>3</sup> Combined with the projections in Figure 5, western and north-western regions such as Tin Shui Wai, Tuen Mun, Tung Chung, and Tai O would be at particularly high coastal inundation risk (as flagged in Figure 5).

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- 2 IPCC AR6, the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. It is a comprehensive and authoritative assessment of the current state of knowledge on climate change, its impacts, and potential future risks, as well as the options for adaptation and mitigation.
  - 3 RCP4.5, Representative Concentration Pathways Scenarios, include time series of emissions and concentrations of the full suite of greenhouse gases and aerosols and chemically active gases, as well as land use/land cover. RCP4.5 is an intermediate stabilization pathway in which radiative forcing is stabilized at approximately 4.5 W/m<sup>2</sup> after 2100.

**Figure 5. Projected regional mean sea level rise for Hong Kong in 2050.**



Notes: In 2050, the mean sea level in Hong Kong is projected to rise by 0.2 to 0.3 meters. The chromatic gradient from yellow to purple signifies increasing sea-level heights. The western areas of Hong Kong predominantly exceed 0.24 meters in sea-level elevation. (Data source: YoujiVest Climate Lab)

### 3 Case Study: Future Climate Risks and Public Housing in Hong Kong

There is an urgent need to understand what the future climate will look like in Hong Kong and how various climate risks will affect the economy. Constrained by our research capacity, we cannot provide a comprehensive assessment in this report. Instead, we pick a few high-risk locations in Hong Kong and demonstrate how granular climate data and climate-risk analysis can be helpful for decision-making. Moreover, we focus on one specific type of property: public housing. The reason for analyzing public housing is twofold. First, most of Hong Kong’s vulnerable groups, including low-income (Census and Statistics Department of the Government of HKSAR, 2024), high-density (GovHK, 2022), and elderly (Peng and Maing, 2021) populations, live in public housing units. These groups often have the least knowledge and capacity to understand and respond to climate risks. Second, public housing is owned by the government, so our analysis can have direct policy implications.



### 3.1 Site Selection

We map the distribution of public housing units against 26 low-lying or windward areas susceptible to storm surges and waves. The results are summarized in Figure 6. The pentagram markers indicate units facing high typhoon and rising-sea-level risks. The red pentagrams represent low-lying areas with the highest rising-sea-level-rise. The blue map markers represent Hong Kong's 239 public housing units. We observe that public housing units are predominantly located in these areas with relatively fragile infrastructure, making them more vulnerable to storm surges, waterlogging, and strong winds. The yellow pentagrams identify seven regions that would be severely affected by storm surges. The purple pentagrams represent three areas facing significant threat from overtopping waves.<sup>4</sup>

**Figure 6. Public housing exposed to climate risks and the locations.**



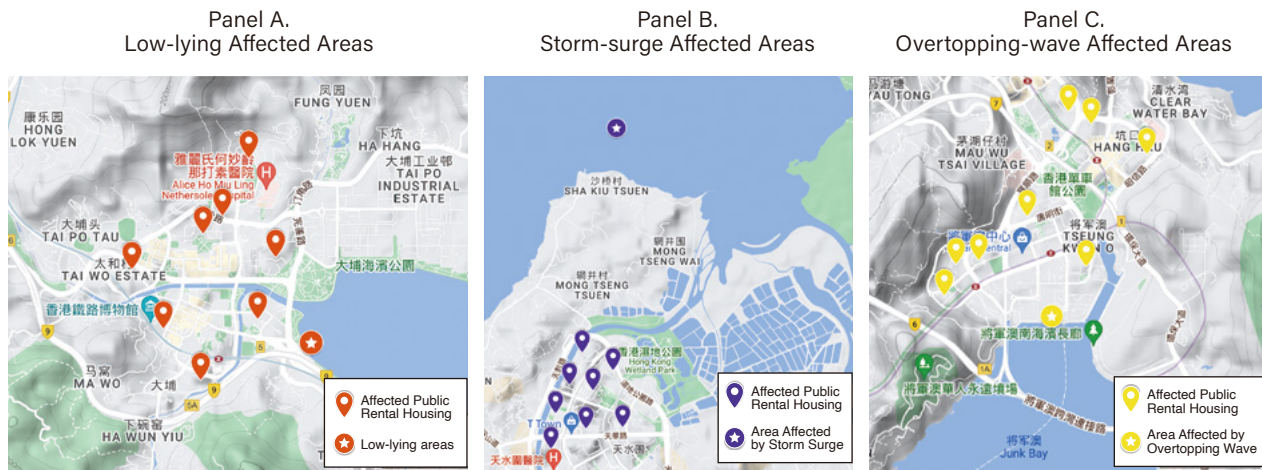
Notes: The map shows the location of public housing units and areas prone to flooding or wind disasters in Hong Kong. Red pentagrams denote low-lying areas. Yellow pentagrams indicate regions susceptible to storm surges. Purple pentagrams represent areas vulnerable to overtopping waves. The blue map markers indicate all public housing estates in Hong Kong. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

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4 Overtopping waves are those that exceed the crest elevation of a sea defense structure, such as a seawall or levee, and flow over the top, potentially causing flooding and erosion on the landward side.

Figure 7 zooms in on the map and highlights the public housing units most affected by low-lying risk, storm surge risk, and overtopping wave risk. These areas are near Lam Tsuen River in the Tai Po District, the Northwest New Territories, and the southern part of Tseung Kwan O. Table 1 provides the names of these public housing units, which we identify as high-climate-risk properties.

**Figure 7. Public housing units exposed to significant climate risks and the location distribution.**



Notes: This figure illustrates the areas most impacted by the risk of low-lying storm surges and overtopping waves. Panel A (Left) depicts the areas around Tai Po Lam River Village in the Tai Po District, marked by a red pentagram indicating the area with the highest low-lying risk in Hong Kong. The red map icons represent public housing units near risk points. Panel B (Middle) shows the Northwest New Territories, with a purple pentagram highlighting the area that is most at risk from storm surges in Hong Kong. The purple map icons indicate public housing units near risk points. Panel C (Right) presents the southern part of Tseung Kwan O, where a yellow pentagram signifies the area with the greatest overtopping wave risk in Hong Kong. Yellow map icons denote public housing units within this region that are close to risk points. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

**Table 1. List of public housing affected by three specific risks.**

Public Housing Affected by Low-lying Areas	Public Housing Affected by Storm Surge	Public Housing Affected by Overtopping Wave
Kwong Fuk Estate	Tin Heng Estate	Yee Ming Estate
Wan Tau Tong Estate	Grandeur Terrace	Shin Ming Estate
Po Heung Estate	Tin Chak Estate	Choi Ming Court
Fu Shin Estate	Tin Yat Estate	Kin Ming Estate
Tai Wo Estate	Tin Yan Estate	Sheung Tak Estate
Tai Yuen Estate	Tin Yuet Estate	Ming Tak Estate
Fu Heng Estate	Tin Ching Estate	Hau Tak Estate
Fu Tip Estate	Tin Wah Estate	King Lam Estate

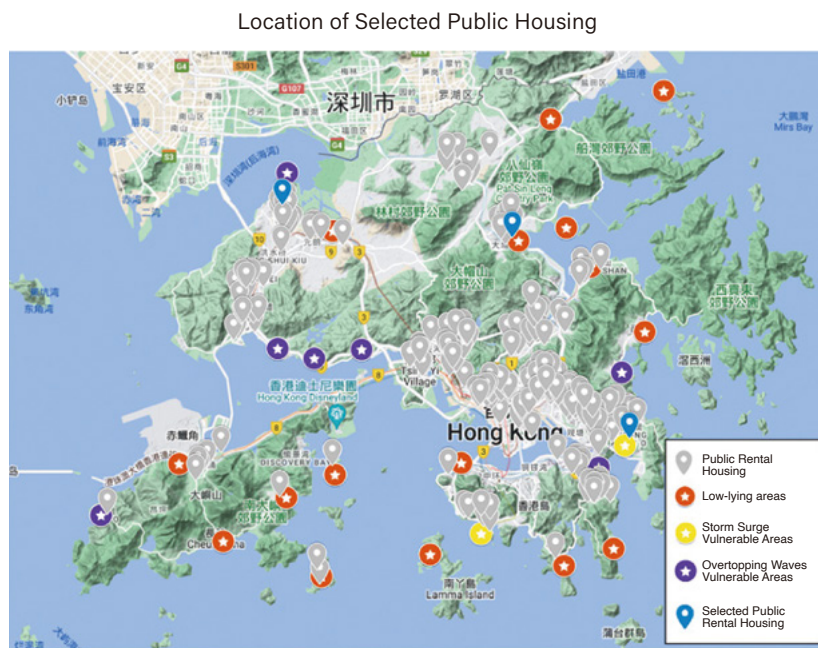




For the following analysis, we select the public housing units affected by typhoons and sea level rise in these regions, highlighted in blue in Figure 8.

- Kwong Fuk Estate, affected by low-lying risks
- Tin Heng Estate, affected by storm surges
- Yi Ming Estate, affected by overtopping waves

**Figure 8. Locations of the selected public housing units for research.**



Notes: The map icons denote the location of various public housing estates, with the blue icons highlighting those near three specific risk areas. Areas identified include Kwong Fuk Estate in the Tai Po District, at risk of low-lying risks; Tin Heng Estate in the Yuen Long District, at risk of storm surges; and Yee Ming Estate in the Tseung Kwan O District, susceptible to wave overtopping. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

### 3.2 Physical Climate Risks Assessment: Methodology and Climate Scenarios

#### (1) Overview of the Methodology

Our climate-risk assessment involves the following key steps: real estate data and historical climate-risk data collection; climate-risk analysis that combines general circulation model, regional climate model, and economic data; scenario simulations based on different future pathways; quantification of climate-risk impacts; data visualization and output.

**Table 2. Key steps and data & models for physical risks assessment.**

Main Steps	Data Sources & Models
Physical Risks Identification	<ul style="list-style-type: none"> <li>Gather real estate data in Hong Kong, including property locations and asset types.</li> <li>Obtain historical hazards data for the region, including frequency, intensity, etc.</li> </ul>
Physical Risks Analysis	<ul style="list-style-type: none"> <li>General Circulation Models</li> <li>Regional Climate Models</li> <li>Historical Observations</li> <li>Geospatial Data</li> <li>Economic Data</li> </ul>
Climate Scenarios Analysis	<ul style="list-style-type: none"> <li>SSP1-RCP2.6</li> <li>SSP2-RCP4.5</li> <li>SSP4-RCP6.0</li> <li>SSP5-RCP8.5</li> </ul>
Physical Risks Quantification	<ul style="list-style-type: none"> <li>CLIMADA Model <a href="https://wcr.ethz.ch/research/climada.html">https://wcr.ethz.ch/research/climada.html</a></li> </ul>
Data and Model Integration, Visualization	<ul style="list-style-type: none"> <li>YoujiVest Climate Risk Model</li> </ul>

## (2) Climate Scenarios

The Shared Socioeconomic Pathways (SSPs) are projected climate change scenarios defined by the IPCC AR6.<sup>5</sup> The combined SSP-RCP scenarios, summarized in Table 3, are among the most commonly used global climate scenarios. They combine baseline SSPs with different emissions trajectories (based on the RCPs). We adopt the combined SSP-RCP scenarios to project future climate extremes in the selected sites, taking both emission trajectories and socioeconomic development into account.<sup>6</sup>

**Table 3. Different climate scenarios and implied temperature rises.**

Time horizon	Near-term (2030)	Mid-term (2050)	Long-term (2080)	Long-term (2100)
<b>Scenario</b>	<i>Temperature increasing (°C)</i>			
<b>SSP1-2.6</b>	1.47	1.76	1.83	1.76
<b>SSP2-4.5</b>	1.49	1.97	2.46	2.63
<b>SSP4-6.0</b>	1.49	2.05	2.80	3.16
<b>SSP5-8.5</b>	1.60	2.48	4.05	5.05

Data source: The data derives from Our World in Data, <https://ourworldindata.org/>

- 5 SSPs, Shared Socioeconomic Pathways, describe plausible future narratives for socioeconomic development, while RCPs outline possible pathways for greenhouse gas emissions and atmospheric concentration levels (IPCC).
- 6 SSP-RCP Scenarios, sometimes referred to as the 'SSPX-Y scenarios', combine the baseline SSPs with RCP scenarios from the IPCC's fifth assessment reporting period. The SSP-RCP scenarios impose global warming targets on the baseline SSP scenarios using the radiative forcing levels of the RCP scenarios.



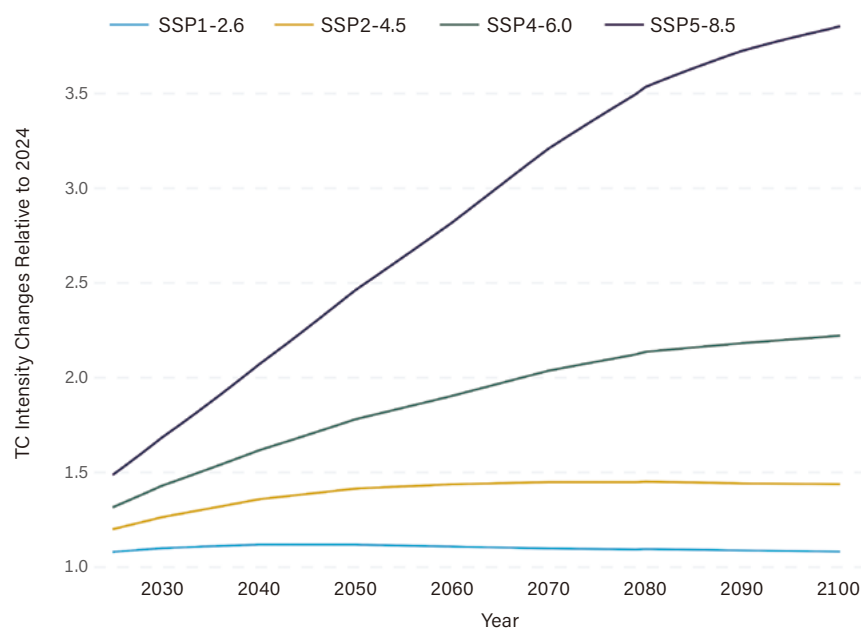
### (3) Key Assumptions & Limitations

- The government owns public housing units, so they lack accurate market values. Our study estimates physical value loss and infers their values using the prices of the five nearest Home Ownership Scheme units. We then use the weighted average prices (based on the distance and building age difference of the five nearest Home Ownership Scheme units) to infer their values.
- This analysis does not incorporate the climate adaptation measures already in place, which may change the estimation results.
- Current understandings of emissions and socioeconomics constrain climate models. They may fail to anticipate future technological advancements or policy changes, overlook local climate characteristics, and underestimate extreme events, affecting the modeling outputs.

### 3.3 Results

We start by visualizing the projected typhoon intensity under different climate pathways in Figure 9. We project the extent of change in typhoon intensity relative to 2024 under various scenarios between the present and 2100. Under the high emissions scenario (SSP5-8.5), typhoon intensity is projected to increase significantly, more than 3.5 times relative to 2024. In contrast, in the low emissions scenario (SSP1-2.6), while typhoon intensity may rise slightly in the short term, after reaching a peak around 2050, the intensity is expected to decrease gradually.

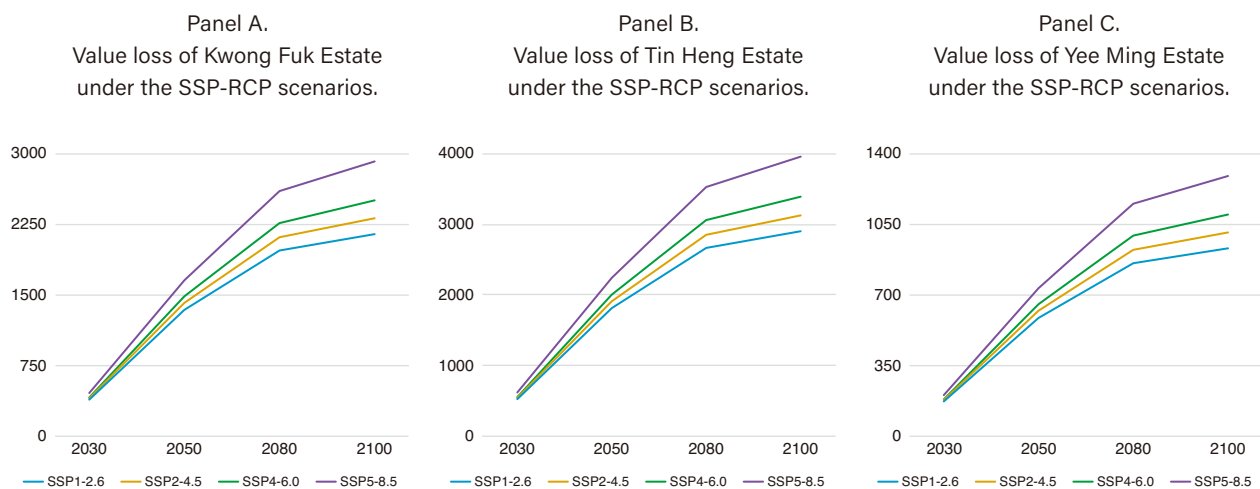
**Figure 9. Projected typhoon intensity under different combined SSP-RCP scenarios.**



Notes: Projected changes in typhoon intensity relative to 2024 across various combined SSP-RCP scenarios from 2024 to 2100. The blue, yellow, green, and purple line segments represent the SSP1-2.6, SSP2-4.5, SSP4-6.0, and SSP5-8.5 scenarios, respectively. The SSP5-8.5 scenario exhibits a significantly higher and more rapidly increasing typhoon intensity than other scenarios. Typhoon intensity continuously strengthens in all scenarios except for SSP1-2.6, which shows a slight decline after 2050. (Data source: YoujiVest Climate Lab)

Next, we summarize the expected economic losses under different climate pathways for the selected public housing units in Figure 10. Panel A demonstrates the results for Kwong Fuk Estate; Panel B is for Tin Heng Estate, and Panel C is for Yee Ming Estate. The value loss trends are consistent across the three public housing units under four combined SSP-RCP scenarios, with risks increasing over time. Significant value losses are anticipated even under the most optimistic (the low emissions pathway) scenario (SSP1-2.6). For example, a loss of HK \$2,639.75 million for Tin Heng Estate would occur based on our projection. In more extreme cases, the potential loss in asset value would increase to HK \$2915.45 million for Kwong Fuk Estate, HK \$3,956.91 million for Tin Heng Estate, and HK \$1288.15 million for Yee Ming Estate.

**Figure 10. Projected value losses of the selected public housing units.**



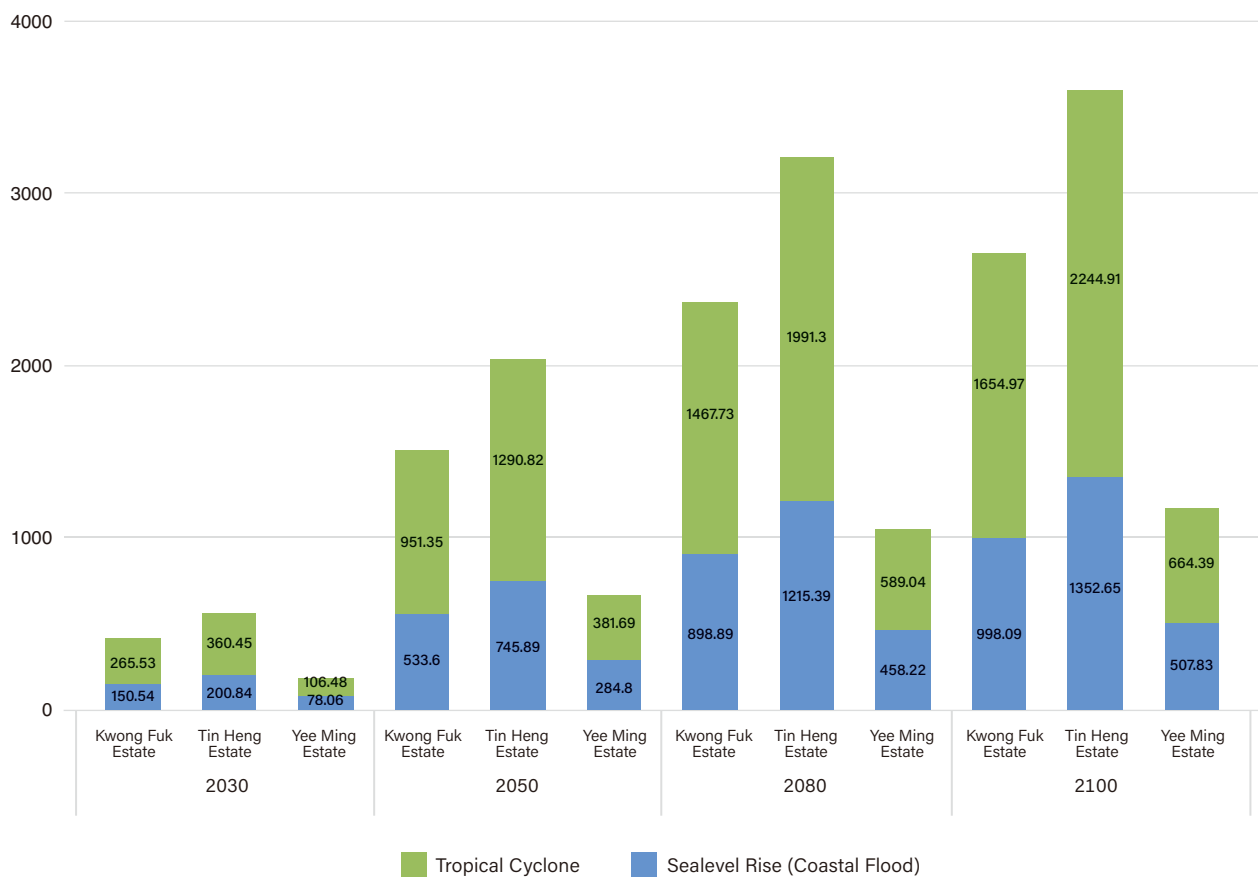
Notes: The figure presents the value losses for the selected public housing units under various climate scenarios. Panels A, B, and C illustrate the projected value loss changes for three selected public housing estates from the present until 2100 under four combined SSP-RCP scenarios. Different colors represent distinct climate scenarios, with purple indicating the high carbon emission scenario (SSP5-8.5). The upward trend suggests that value losses are increasing over time. (Data source: YoujiVest Climate Lab)

Figure 11 summarizes the asset value losses under the SSP5-8.5 scenario. We further distinguish the specific factors causing these losses. The results indicate that Tin Heng Estate would suffer the most severe losses, followed by Kwong Fuk Estate and Yee Ming Estate.

Importantly, our analysis shows that the potential damages caused by sea level rise can be more severe, especially in the long run. It is projected that the asset loss due to sea level rise for the three public housing estates by 2100 would reach around HK\$4,500 million, significantly higher than that caused by typhoons. By 2050, the value loss due to flooding for all selected public housing could be tripled.



**Figure 11. Projected value losses of public housing caused by typhoons and sea level rise under SSP5-8.5 scenario across time horizons.**



Notes: Under the SSP5-8.5 scenario, the value losses faced by three selected public housing units due to typhoons and sea level rise across different time horizons (2030, 2050, 2080, and 2100) are summarized. The figure illustrates the primary risks these public housing units would face and the relative value losses for these risk types. (Data source: YoujiVest Climate Lab)

## 4 Hong Kong Current Climate-related Policies and Regulations

Several government bodies in Hong Kong have designed strategies and actions to address growing climate risks. Meanwhile, financial regulators also consider climate risks a pivotal threat to Hong Kong's future economy and financial stability, having implemented a series of regulations to better manage climate risks in the financial sector.

### 4.1 Governmental Departments

In 2016, the Civil Engineering and Development Department (CEDD) established the Climate Change Working Group on Infrastructure (CCWGI) to coordinate departments adapting to climate change. The CCWGI regularly revises various infrastructure design standards and reviews the resilience of existing infrastructure under climate change.

CEDD began a consultancy study in 2019 to review low-lying coastal or windy locations. The department investigated storm surges and waves to assess the impacts caused by sea level rise in these locations. Furthermore, CEDD has continuously improved the Hong Kong Slope Safety System and formulated strategies to prepare for the threat of landslides caused by extreme rainfall, including prevention, preparedness, and education.

The Drainage Services Department (DSD) has updated its drainage system design to factor in climate change in its Stormwater Drainage Manual. It now addresses rainfall increase and sea level rise caused by climate change.

The Highways Department has also leveraged the HKO's climate scenario analysis during road drainage design. The Development Bureau oversees urban planning and development strategies. Its development initiatives incorporate green building practices, sustainable design, and climate-resilient infrastructure.

### 4.2 Financial Regulators

The Hong Kong Monetary Authority (HKMA) has focused on climate-risk management since 2019. As a banking supervisor, the HKMA focuses on building banks' resilience against climate risks and climate-risk management capabilities. The HKMA has enhanced climate risk management for financial sectors and launched a pilot climate-risk stress test for Hong Kong's banking sector in 2021.

The Securities & Futures Commission of Hong Kong (SFC) plays a crucial role in overseeing and regulating companies' environmental, social, and governance (ESG) and climate-related disclosures. The SFC and the HKMA also co-chair Hong Kong's Green and Sustainable Finance Cross-Agency Steering Group and support the government's climate strategies.

The Hong Kong Stock Exchange (HKEx) also advocates for increased awareness and transparency around financial risks related to climate change.



## 5 Policy Implications

If climate risks are tackled appropriately, they can be transformed into development opportunities. To better adapt to climate change, we provide the following policy recommendations.

### ***5.1 Data Integration and Comprehensive Climate-Risk Analysis***

The Hong Kong government is instrumental in gathering data on weather patterns, topography, buildings and infrastructures, and socio-economic conditions. However, data integration is largely non-existent in Hong Kong, making it difficult for researchers to comprehensively analyze how climate risks affect different aspects of the economy. We recommend that the government create a geo-coded data platform that integrates these datasets to support comprehensive climate-risk analysis. This will serve as the cornerstone for researchers to identify the buildings and infrastructures exposed to high climate risks so that the government can target vulnerable populations and coordinate efforts across different units.

### ***5.2 Adaptative Retrofits for Old Buildings and Infrastructures***

For existing buildings and infrastructures, we suggest gradually conducting adaptative retrofits for high-risk regions, which include measures to improve energy efficiency, enhance structural integrity, use resilient materials, and increase their capability to withstand floods, storms, and heat waves. Noting that the Hong Kong government has implemented several initiatives to renovate old buildings, it is important to incorporate more climate-resilient designs in this process. For new buildings, the location selection needs to consider rising sea levels. It is important to highlight that properties in low-lying areas will have lower asset value in the medium to long term, and such value shifts may influence the pricing patterns of Hong Kong's properties. Leveraging geographic conditions, nature-based solutions can also be effective in adaptively protecting and strengthening infrastructures and buildings.

### ***5.3 Targeting Vulnerable Groups***

Vulnerable groups, such as older people and low-income families, are often disproportionately affected by climate extremes due to limited resources and mobility. When developing climate adaptation policies, these groups should be given more attention. This includes providing more social protection, targeted support, and climate-related education to these groups.

### ***5.4 Improving the Climate Disaster Prediction, Warning and Response System***

The Hong Kong government has made great efforts through various initiatives and measures to minimize the impacts of extreme weather events. Nevertheless, it is important to continuously summarize past experiences, adjust current response strategies, and ensure rapid recovery in the future.

Among various things that the government can do, we believe it should consider integrating the disaster prediction, warning, and emergency response systems. It is well understood that disaster prediction is often tricky. The government can consider setting up a competitive fund for climate risk analysis and disaster prediction. Climate-risk products with the highest predictive power during each extreme climate event (based on ex-ante/real-time information) should be rewarded. Meanwhile, real-time disaster data should be collected from social media and other sources for swift planning and responses.

### ***5.5 Developing the Climate Catastrophe Insurance and Reinsurance Market***

Insurance and reinsurance could also be essential tools for coping with climate catastrophes. Some early examples include Mexico's FONDEN disaster fund and the Caribbean Catastrophe Risk Insurance Facility, which build shared-risk mechanisms for post-disaster reconstruction and recovery. As a global financial center, Hong Kong has many insurance and reinsurance companies with professional experience and risk assessment capabilities. Given its relevance to Hong Kong, the government should consider developing the city into a hub for climate catastrophe insurance and reinsurance products. Doing so requires close collaboration between regulatory bodies, insurance and reinsurance companies, climate experts, and other stakeholders.

### ***5.6 Supporting Early-Stage Climate-Tech Companies and Application of Climate-Adaptation Technologies***

Supporting early-stage climate-tech companies and applying climate adaptation technologies are crucial for addressing Hong Kong's climate risks. The government should consider providing financial support to help climate-tech startups develop and scale up their technologies. In addition, the government should design incentives for companies in Hong Kong to adopt climate-adaptation technologies, such as tax incentives, subsidies, and procurement preferences. Demonstration projects can be initiated to showcase the effectiveness of climate adaptation technologies in real-world settings.

### ***5.7 Paying Attention to Transition Risks***

Apart from the physical risks discussed in this report, risks arising from transitioning to a low-carbon economy and shifting towards sustainable practices are also worth our attention. The Hong Kong Climate Action Plan 2050 includes ambitious interim targets to cut carbon emissions by 50% before 2035 from the 2005 level. This will require systemic changes in regulations, technology adoption, market preferences, and more. The government should evaluate viable pathways to achieve these targets and assess the impacts of climate transition risks on Hong Kong's economy, environment, and society.





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