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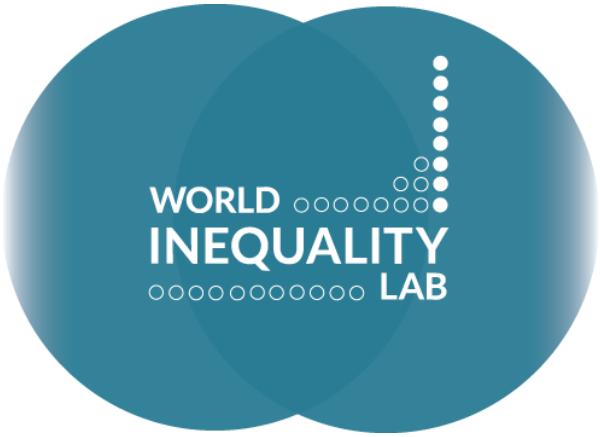


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# Income and Wealth Inequality in Hong Kong, 1981-2020: The Rise of Pluto-Communism?

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## Abstract.

In this paper, we aim to better understand the evolution and institutional roots of Hong Kong's growing economic inequality and political cleavages. The main findings of this paper are twofold. First, by combining multiple sources of data (household surveys, fiscal data, wealth rankings, national accounts) and innovative methodologies, we conduct a comprehensive analysis of the evolution of wage inequality, the capital share, as well as the concentration of top wealth in Hong Kong. Our evidence suggests a very large rise in income and wealth inequality in Hong Kong over the last four decades. Second, based on the latest opinion poll data, we provide evidence suggesting that business elites, who carry disproportionate weight in Hong Kong's Legislative Council, are more likely to vote for pro-establishment camp to ensure that policies are passed that protect their political and economic interests. We argue that the unique alliance of government and business elites in a partial democratic political system is the institutional root of Hong Kong's rising inequality and political cleavages.

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## 1. Introduction

The 2019-2020 Hong Kong protests have garnered significant international attention. Starting in June 2019, demonstrations against a proposed extradition law escalated into a much broader anti-government and anti-Beijing movement that resulted in violent clashes and upset the economic and social order of the city. Protests and demonstrations have indeed been increasing in Hong Kong over the past twenty years, as seen in the 1 July Protests of 2003 and the Umbrella Revolution of 2014. It is generally believed that the political conflicts over democratic rights that trigged the recent wave of protests have their roots in a set of economic and social conditions that lead to social unrest. One of the most important but often overlooked of these is the city's extreme economic inequality (Ng 2013; Nagy 2015; So 2016; Dieter 2019). In this paper, we aim to better understand the evolution of Hong Kong's economic inequality and the roots of the widespread social unrest.

By combining multiple data sources (household surveys, fiscal data, wealth rankings, national accounts, opinion polls) and innovative methodologies, we document a very large rise in wage inequality, in the labor share, and the concentration of top wealth over the last four decades. We then seek to provide economic and institutional explanations for the growing inequality and political cleavages.

Our results raise interesting questions about the nature of the political regime that is currently in power in Hong Kong and Beijing. The case of Hong Kong is an intriguing and probably unique historical example of a country becoming more unequal in terms of income and wealth after becoming officially "communist," or at least after joining a communist regime, following the 1997 handover of Hong Kong to the People's Republic of China. In investigating this paradox, we coin the term "pluto-communism" to describe a form of communism dominated by the power of money. It is also worth pointing out the lack of transparency about income and wealth inequality in Hong Kong (as well as in the PRC in general). In particular,

Hong Kong's inheritance tax was abolished in 2006, meaning that we have no data at all on inheritances in Hong Kong since then. We attempt to compensate for this by combining the data sources at our disposal, but it is clear that one would need access to more detailed sources (especially on wealth and capital incomes) to gain a more precise understanding of the forces at play.

This paper contributes to the existing literature in several ways. First, we provide the first corrected series of Hong Kong wage distributions based on salary tax data and census data.[2] Compared with census-based inequality estimates, our results provide a sharp upward revision and point to a much larger rise in wage inequality, especially in the period after the handover of Hong Kong. Our conclusion is confirmed by various robustness checks.

Second, our analysis based on the recentered influence function (RIF) of the Gini index (Firpo et al. 2009, 2018) suggests two major driving forces in the rise of wage inequality: the expansion of higher education and the transformation of industrial structures from manufacturing to the financial and service sector. After the handover, the rise of wage inequality was mainly driven by the change in wage premiums in the finance and service sectors. Our findings complement existing studies that point to a rise in producer services and outward processing trade as a major cause of the rise in wage inequality (Chiu and Lui 2004; Ho et al. 2005).

Third, we contribute to the literature on functional income distribution. In recent years, the research on inequality has been integrated with a focus on capital's share in income. According to Piketty (2013) and Piketty and Zucman (2015), capital shares increased in all rich countries from about 15–25% in the 1970s to 25–35% in 2010.[3] Given that capital ownership is highly concentrated at the top, the rise in capital income will tend to increase both income and wealth inequality in the long run (Piketty 2014; Bengtsson and Waldenström 2018). However, since

[2] For other studies that have attempted to correct survey data using fiscal data, see, Jenkins (2017). Burkhauser et al. (2016, 2018), Blanchet et al. (2018), Piketty, et al. (2019), and Branko (2020).
[3] See also Ellis and Smith (2007), Azmat, Manning, and Van Reenen (2012), and Karabarbounis and Neiman (2014).

wealth or capital income data of Hong Kong are extremely limited at both the aggregate and household level, largely due to the absence of a comprehensive progressive tax on capital income and wealth in Hong Kong, the evolution of Hong Kong's capital share has not yet been documented in the literature. To bridge this gap, we construct a new capital share series for Hong Kong using corporate profit tax data and national accounts. Our results suggest that Hong Kong's capital share has grown substantially after the recovery from the Asian financial crisis. Today, Hong Kong's capital share remains at such a high level that is no longer comparable to major high-income economies.

As is the case with capital share data, there is also a lack of wealth survey and fiscal data, leading to a dearth of literature on the evolution of Hong Kong's wealth concentration. We seek to fill this gap by constructing the first set of internationally comparable measurements of the concentration of top wealth in Hong Kong based on Forbes rich lists. Hong Kong's wealth concentration increased substantially over the last three decades and currently appears to be one of the highest in the world. Our findings are consistent with simulations based on the wealth accumulation model[4] for the period 1996 to 2016, which show a rise in wealth inequality since 1996 due to the different roles of price and saving effects in the evolution of wealth shares among the rich and poor.

Finally, the institutional roots of the rising inequality and political cleavages in Hong Kong have been widely discussed in the literature (See Li 1995, 2000; Lau and Kuang 2000; Loh 2004; Wong 2017; Scartozzi 2017) as well as the media (See Wang 2017; Sheng and Geng 2019; Fang and Lee 2019; Carroll 2019). However, there are few empirical studies systemically investigating the relationships between income inequality and political cleavages in Hong Kong.[5] We contribute

[4] For further discussion on the wealth accumulation model, see Piketty and Zucman (2014), Saez and Zucman (2016), and Kuhn et al. (2020).

[5] Among the few existing studies, Wong (2000a, 2000b) studies the shift in Hong Kong political parties' positions on redistribution and the relationship between individual sociological and psychological factors and attitudes toward redistribution. Using data from the Collective Survey of Election Studies (CSES), Durrer and Gethin (2021) provide a descriptive analysis of political cleavages in Hong Kong for the period from 1998 to 2016.

to this discussion by providing important empirical evidence on the political inclinations of business elites. We find that business elites (the upper class) are more likely to vote for pro-establishment parties as a means of ensuring that policies are enacted that will protect their political and economic interests. Additionally, political cleavages in Hong Kong have widened since the 2019 Hong Kong protests. We argue that in Hong Kong's partial democratic political structure, business elites carry disproportionate weight in the Legislative Council. Thus, by voting for the pro-establishment camp, these elites are able to block policies that would limit their political influence or harm their economic interests. Such alliances between government and business elites contribute to the rise in inequality in Hong Kong over recent decades.

The rest of this paper is organized as follows. In Section 2, we introduce the background of Hong Kong's political cleavages. In Section 3, we describe our main data sources and methods. In Section 4, we present our results on the evolution of wage inequality and discuss the drivers of inequality trends. Sections 5 and 6 discuss our methods for estimating capital shares and wealth inequality and present our results, comparing Hong Kong to other countries. In Section 7, we further investigate the relationships between income inequality and political cleavages in Hong Kong. Section 8 provides concluding remarks. This paper is supplemented by an extensive online appendix that includes all our raw data sources and computer codes and presents additional robustness checks.[6]

## 2. Political Background

Starting in the late 1980s, the British government began introducing measures of democratization in Hong Kong in anticipation of its exit in 1997. This opened up a portion of political power for renegotiation (Lau and Kuan, 2000). Since that time, Hong Kong's politics have been characterized by a struggle to increase the representation of the general population in political institutions.[7] The 2019 Hong

[6] Appendices A-F will be published together with the paper. The full data appendix is available upon request.

[7] For detailed discussion on the formation and evolution of political system in Hong Kong, see Li

Kong protests are, to a large extent, the continuation of this struggle. Under Hong Kong's current political structure, only the seats representing geographical constituencies in the Legislative Council are elected by popular vote, while the seats representing functional constituencies are elected through smaller closed elections in business and professional sectors. Furthermore, the seats of the functional constituencies make up almost half of all seats in the Legislative Council.[8] As for the election of the Chief Executive, only the members of the Election Committee, most of whom are voters in the functional constituencies, are entitled to vote.

This partial democratic political structure not only introduces disparities in representation between constituencies (e.g., large corporations and business elites have privileged access to many constituencies that make up a small overall percentage of the electorate) but also creates political cleavages in the voting public that would not exist otherwise. Under the status quo, the disproportionate weight of business elites in the Legislative Council enables them to block policies that would either reduce their political influence or harm their economic interests through, for example, redistributive reforms. In the context of this unique alliance between the government and business elites in Hong Kong, the last four decades have witnessed a sharp rise in inequality.

The government of Beijing has undoubtedly played a decisive role in fostering the close relationship between Hong Kong's government and its business elites. The alliance between the PRC government and Hong Kong's business elites has been studied extensively (Goodstadt 2000; Fong 2014a, 2014b). After the transition, Beijing continued to franchise Hong Kong's government to the city's business elites, and Deng Xiaoping's concept of "Gangren zhi Gang (港人治港)" or "Hong Kong

(1995), Lau and Kuan (2000), So (2002), and Wong (2017).

[8] From 2004 to 2020, the Legislative Council was made up of two groups of constituencies, the geographical constituencies and the functional constituencies. In the 2021 Hong Kong Legislative Council election, the Election Committee constituency, which had been abolished in 2004, was re-introduced as a third group of constituencies. Appendix F, Sheet AT1 presents the distribution of seats in Hong Kong Legislative Council since 1991.

people governing Hong Kong" was interpreted to mean governance by the bourgeoisie rather than by the proletariat.[9] Beijing's long-term strategy is "political absorption of economics," which positions the government of Hong Kong as an "absorber" that would have minimized political conflicts "through the granting of special positions to the business elite"[10] This strategy has shaped a political system that is unresponsive to the median voter and that leads to the extreme level of inequality and widening political cleavages in Hong Kong that we refer to as "pluto-communism."

Given this unequal distribution of electoral power since the first direct elections of the Legislative Council in 1991, attitudes toward the Chinese government and the democratization process have been a source of major political cleavages between parties. The pro-democracy camp generally advocates for a faster pace of democratization, including universal suffrage in the election of the Chief Executive and the abolition of functional constituencies. The pro-establishment camp places less emphasis on progress in democratization and more emphasis on the need for stability and harmony.[11] The centrists do not take sides between the other two camps.

Due to the unique alliance between the government and business elites, there has been a sharp rise of inequality in Hong Kong over recent decades that has deepened the existing political cleavages. The 2019 Hong Kong protests are one extreme outcome of the widening chasm between social groups. Probably with the same understanding, Beijing formulated an amendment in 2021 to Hong Kong's electoral rules to be able to influence the legislative council more directly,[12] and meanwhile began discussing measures to mitigate the rising inequality with Hong

[9] Chu (2010), 69.
[10] Chu (2010), 47.
[11] Cleavages have also developed in attitudes toward protection of the rule of law, the degree of Hong Kong's autonomy, and integration between Hong Kong and the mainland.
[12] Under the amendment, the total number of seats was increased from 70 to 90, with the directly elected geographical constituencies (GCs) being reduced from 35 to 20 seats, the trade-based indirectly elected functional constituencies (FCs) staying at 30, and the additional 40 seats being elected by the 1,500-member Election Committee.

Kong's government.[13] Whether this will eventually reduce the level of inequality and calm public anger toward the rise of "pluto-communism" is very uncertain at this stage.

## 3. Data Sources

To estimate the evolution of wage inequality, we rely on two data sources. First, we use random micro subsamples of eight waves of census data from the Census and Statistics Department of Hong Kong covering the period 1981 to 2016;[14] Second, we use tabulated fiscal income data from Hong Kong Salaries Tax Assessments, published in the Hong Kong Inland Revenue Department Annual Reports from 1981 to 2018.[15]

Our new Hong Kong capital share series are estimated based on corporate profit tax data and national accounts. Hong Kong's corporate profit tax is levied on profits from both corporations and unincorporated businesses[16] in Hong Kong. Data on corporate profit tax revenues are from annual reports of the Hong Kong Inland Revenue Department for the period 1989 to 2019. National accounts, including balance of payments data, are reported annually by the Census and Statistics Department of Hong Kong.

We estimate the evolution of the top wealth concentration in Hong Kong using "rich lists" published by Forbes magazine from 1988 to 2019. Before 2007, Forbes did not publish a separate rich list for Hong Kong. For the years prior to 2008, we therefore use data from the world billionaires list. From 2008 to 2012, the data are taken from "Hong Kong's 40 Richest" list, the late data after 2012 are from "Hong

[13] Senior officials from mainland China and Hong Kong SAR have recently begun discussing ways to broaden the city's tax structure and increase land supply in an effort to mitigate Hong Kong's inequality and high living costs (Zhai and Wong, 2021). https://www.wsj.com/articles/china-targets-hong-kong-wealth-gap-housing-woes-after-political-purge-11615813651

[14] For waves 1981 and 1986, the subsample covers 1% of the full census. For the rest of the waves, the sample, the data set covers 5% of the full census (i.e., the sample covers 366,319 individuals in census year 2016).

[15] Hong Kong salaries tax covers the pretax total salary income, but not capital income or business income. For detailed tax rules on salaries, see Related Tax Rules of Guide to Tax Return, https://www.ird.gov.hk/eng/pdf/bir60_st_e.pdf.

[16] Unincorporated business includes sole proprietor-ships, partnerships and family trusts.

Kong's 50 Richest." Additionally, we estimate the aggregate value of privately owned housing in Hong Kong based on the housing statistics published by the Hong Kong Rating and Valuation Department.

Finally, to investigate the determinants of the political inclinations of business elites, we rely on data from the opinion survey on ethnic identities conducted biannually by the Hong Kong Public Opinion Research Institute (PORI) from 2016 to 2021. The sample for the survey is selected randomly using telephone numbers from telephone directories, with a sample size of around 1000 (successful cases) for each wave.

More details on data sources are available in Appendix A.

## 4. Rising Wage Inequality in Hong Kong

In this section, we aim to address the two following questions. First, how has wage inequality in Hong Kong evolved since 1981? Second, what are the major drivers of rising wage inequality in Hong Kong?

### 4.1. Measuring Wage Inequality

Census data are often used to measure income and wage inequality in Hong Kong. However, this data source has two main limitations. First, wage data in the Hong Kong census are top-coded, which generates a downward bias in the top wage distribution. Furthermore, due to misreporting and small sample bias at the top, survey and census data often fail to capture the dynamics at the top of the distribution (Piketty, Saez, and Zucman 2018; Garbinti, Goupille-Lebret, and Piketty 2018; Piketty, Yang, and Zucman 2019; Khalid and Yang 2021).

To account for these issues, we apply two corrections to the raw census-based estimation. First, to tackle the top-coding issue, we assume that the top of the wage distribution follows a Pareto distribution, where the average income of individuals above any income threshold, divided by that threshold, is constant and equal to the inverted Pareto coefficient b. This property allows us to estimate the inverted

Pareto coefficient $\hat{b}$ using the observations near the top-coding threshold $C$ (see Blanchet et al. 2018 and Blanchet et al. 2022). With the estimated inverted Pareto coefficient $\hat{b}$ at the threshold $C$, we then estimate the wage mean for the top-coded observations, which is subsequently assigned to all observations above the top-coding threshold $C$.

Furthermore, to overcome the problem of underestimating the top income shares due to misreporting and small sample bias at the top, we combine fiscal data from the Hong Kong Salaries Tax Assessment and the census. The idea is not new (see, e.g., Jenkins 2017; Burkhauser et al. 2016, 2018; Piketty, et al. 2019; Branko 2022), but so far, no consensus has been reached on a standardized methodology to combine the two data sources. One of the major challenges is how to choose the "merging point" between the survey (or census) data and the fiscal data. For our benchmark wage inequality series, we adopt the data-driven method proposed by Blanchet et al. (2018), in which the merging point is automatically selected by comparing the survey and fiscal data. As robustness checks, we adopt the 99.5th, 99th, 95th, and 90th percentiles as predetermined merging points. We find that the impacts of choosing various merging points are not significant. A complete description of our correction process is provided in Appendix B.

In our benchmark series, we measure wage inequality using the equal-split income concept, that is, assuming that wage income is equally distributed among the adults in a household. To this end, we convert the individual adult wage into the wage split equally between the adults in one household. Below we only present the main results and findings on wage inequality in Hong Kong from 1981 to 2018.[17] The full results, including corresponding distributional series of individual income, are available in Appendix E.[18]

[17] Unfortunately, census data are not available for the year 2018. To estimate corrected wage inequality in 2018, we first interpolate the 2018 raw wage distribution using 2016 census and national accounts data by assuming a constant growth rate of wages for all individuals, then apply the same correction using the 2018 Salaries Tax Assessment.
[18] See Sheet A2.1 and A2.3

Wage inequality in Hong Kong has been increasing markedly since 1981, with a particularly steep rise since 1996. According to our benchmark estimates (based on corrected census data), the wage share earned by the top 1% of the population has increased from 10.7% in 1981 to 16.3% in 2018, while the share earned by the bottom 50% has dropped from 18.7% to 11.6% (panel A of **Figure 1**). The bottom 50% of the population used to have about twice the wage bill of the top 1%, while their wage bill is now 70% of the top 1%. Wage shares between the top 10% and the middle 40% have also been diverging, mainly driven by the strong rise in the wage share of the top 10% (panel B of **Figure 1**).

*Figure 1 about here*

Panel A of **Figure 2** compares the corrected Gini coefficient series with the raw census-based estimates. Here, several remarks are in order. First, similar to our benchmark series, census-based data also show a rising trend in wage Gini coefficients from 1981 to 2016. Second, our benchmark series provide a sharp upward revision to the census-based estimates. The upward correction is particularly large in recent years: By our estimates, the wage Gini coefficient is 60.8% in 2016 compared to 55.5% in the raw census. Third, most of the difference between our estimates and the raw census data comes from the fiscal data correction. Although the series have improved since the 1990s through the top-coding correction of the census, this is always less important than the fiscal correction. In 2016, for instance, the wage Gini is 55.5% in the raw census, reaches 57.4% after factoring in the top-coding correction, and rises to 60.8% after factoring in the fiscal data correction.

When applying the correction proposed by Blanchet et al (2018) to the period from 1981 to 2016, the automatically selected merging points range from the 82$^{nd}$ percentile to the 97$^{th}$ percentile (See Appendix B, Table 2). As robustness checks, we adopt merging points at the 99.5$^{th}$, 99$^{th}$, 95$^{th}$, and 90$^{th}$ percentiles.[19] Panel B of

[19] Blanchet et al. (2018) also provide the corresponding Stata package (bfmcorr) for the correction process, which allows the user to choose predetermined merging points.

**Figure 2** compares our benchmark Gini series with the series generated using various merging points. Although in some years, the choice of merging points has a larger impact on the level of wage Gini coefficients, overall the impacts are not significant. In all scenarios, wage Gini coefficients have significantly increased since 1981 (panel B of **Figure 2**).[20] The full results of the benchmark series, raw census-based series, and robustness checks are available in Appendix E[21].

*Figure 2 about here*

Our new series on the wage distribution allow us to decompose growth by income group. **Figure 3** compares the distribution of 1981–2018 wage growth before and after the handover of Hong Kong in 1997. Growth rates of average wages are obviously much higher in the early period than in the later period: 7.5% versus 3.1%. For both periods, wage growth accruing to the bottom 50% is lower than average wage growth, while growth accruing to the top 10% is higher, and even higher when looking at the top 1%. Annual wage growth for the middle 40% is higher than that of the total population as well as the top 10%, while in the later period, it is lower than that of the total population.

*Figure 3 about here*

### 4.2. Drivers of Wage Inequality Trends

In this section, we turn to the major drivers of the rising wage inequality trends in Hong Kong by estimating the impact of various socio-economic characteristics on the evolution of Gini index.

Following Firpo et al. (2009, 2018), we regress the recentered influence functions

[20] Calibration convergence cannot be achieved in the year 2001 when specifying the merging point at the 90$^{th}$ percentile. Thus, in curve of "Corrected Gini (MP P90)" in Figure 2, data point for 2001 is missing.
[21] See Sheet A2.1.

(*RIF*)[22] of the Gini index on the explanatory socio-economic variables.[23] With this approach, we are able to estimate unconditional partial effects of the socio-economic characteristics (gender, education, industries, occupations, etc.) on the level of Gini index for each year. We then adopt a Blinder-Oaxaca-type decomposition of the Gini index and evaluate the impact of socio-economic characteristics on the change of the Gini index over time.[24] With the standard Blinder-Oaxaca decomposition, we are able to decompose the changes in inequality into two parts: mechanical changes in workforce composition (composition effect) and a wage structure effect, which reflects changes in skill prices. More details on the Blinder-Oaxaca-type decomposition based on the *RIF* of Gini index is available in Appendix C. We have to stress that our findings based on Blinder-Oaxaca decomposition are not causal and should therefore be seen as suggestive evidence.

Our analysis is based on the Hong Kong census after the top-coding correction. We restrict the sample to all employees aged between 20 and 65 years, who were born in Hong Kong, mainland China, Macao, and Taiwan. **Table 1,** columns 1 to 3, presents summary statistics for the key explanatory variables. Compared to 1981, in 2016, employees in Hong Kong are more gender-balanced, skilled, and educated. They are also concentrated in non-manufacturing sectors.

Column 4 to 6 present the estimates of the *RIF* regressions for the years 1981, 1996, and 2016. Income is measured by individual monthly wages. Our explanatory variables of interest include gender, place of birth, education, industry, and occupation. We also control for age, marital status, and residential districts in the regression. All the variables are dummies. The coefficients in the *RIF* regressions indicate the magnitude and direction of the expected change in the

[22] The influence function (IF) is a widely used tool in the robust estimation of statistical or econometric models. As its name suggests, the influence function $F(Y; v, Fy)$ of a distributional statistic $v(Fy)$ represents the influence of an individual observation on that distributional statistic. Adding the statistic $v(Fy)$ to the influence function yields the recentered influence function (*RIF*).
[23] The RIF function of the Gini is automatically estimated with the Stata command.
[24] Fortin et al. (2011) provide a thorough discussion of this methodology, comparing its econometric properties with other regression-based decomposition methods available in the literature.

Gini index after a small increase in the average value of the corresponding variable.

In 1981, higher education, share of professionals, and managers, female labor participation, and the share of people born in Hong Kong are inequality-enhancing variables. In contrast, the industrial shift from the manufacturing sector to non-manufacturing sectors such as restaurants and hotels as well as wholesale and retail trade decreases the Gini index. In 2016, this picture flips: All the variables of industrial sectors become inequality-enhancing, while the Hong-Kong-born dummy and the share of professionals become inequality-diminishing. Higher education is inequality-enhancing in all periods, but its effect decreases over time. High-wage occupations in administration and management remain the most inequality-enhancing variable.

Columns 7 to 10 present results for the standard Blinder-Oaxaca decomposition of the Gini index between two years. From 1981 to 1996, the Gini coefficient rises 8.6 percentage points from 32.7% to 42.8%, which can be further decomposed into aggregate composition effects (14.1%) and aggregate wage structure effects (-5.5%). Correspondingly, from 1996 to 2016, the Gini coefficient rises 1.5%, of which 6.9% is due to composition effects and -5.4% to the change in skill price. In both periods, the wage structure changes in a way that reduces wage inequality, so the returns to socio-economic characteristics become more balanced across the distribution. The composition effect has a positive sign, indicating that the changing composition of the workforce is inequality-enhancing. However, the composition effect decreases over time, while the wage structure effect remains almost the same.

*Table 1 about here*

The aggregate composition and wage structure effects can be further decomposed by explanatory variables (socio-economic characteristics). This decomposition enables us to calculate the overall contribution of each explanatory variable (or cluster of explanatory variables) to the change of Gini by adding up the composition effect and structure effect. **Figure 4** presents overall effect by main

explanatory variables calculated based on **Table 1**.

Before the handover of Hong Kong (blue bars), the major driving force in the rise of the Gini coefficient is the expansion of education, especially higher education, which is followed by the change in industrial structure from manufacturing to non-manufacturing sectors. Rising female labor market participation, the increase in the share of Hong-Kong-born employees, and the occupational change toward high-skilled jobs lower the wage Gini coefficient. In contrast, after the handover (orange bars), the change in industrial structure becomes the only driver of the rise in the Gini coefficient, having the largest absolute magnitude among all the factors. Further decomposing the overall effect of the change of industrial structure shows that the lion's share is due to wage structure effects, and the evolution of returns in the finance and service sectors contributes the most to the increase in overall inequality (see **Table 1**). Meanwhile, the increase in Hong-Kong-born employees and occupational change, especially the increase in professionals, play an even more important role in reducing wage inequality.

*Figure 4 about here*

## 5. The Evolution of the Capital Share in Hong Kong

In this section, we turn to the evolution of the capital share in Hong Kong and its implications for inequality.

Due to the lack of data, the evolution of the capital share of income in Hong Kong has not yet been explored in the literature. To fill this gap, we construct a new Hong Kong capital share series by combining fiscal data[25] and national accounts. Following Piketty (2011, 2013), national income $Y_t$ is equal to the sum of aggregate capital income $Y_{Kt}$ (excluding government interest) and labor income $Y_{Lt}$ minus net production tax and subsidies $T_{pt}$.

[25] That is, profit tax and property tax.

$$Y_t = Y_{Kt} + Y_{Lt} - T_{pt}$$

Aggregate capital income $Y_{Kt}$ can be further broken down into (pre-tax) net corporate profit $Y_{Kct}$, pure rental value of housing $Y_{ht}$, capital income components of self-employed income $Y_{Kset}$, and net foreign capital income $FY_{Kt}$.

$$Y_{Kt} = Y_{Kct} + Y_{ht} + Y_{Kset} + FY_{Kt}$$

The aggregate capital share $\alpha_t$ (excluding government interest) in national income is defined as follows.

$$\alpha_t = Y_{kt}/Y_t$$

Before 2018, profits of both corporations and unincorporated businesses were subjected to a flat-rate tax in Hong Kong. For example, in 2016, the tax rate for corporations was 16.5%, while the tax rate for unincorporated businesses was 15%. Thus, we are able to retrieve taxable income of corporations and unincorporated business from corporate profit tax revenues.[26] We take the taxable income of corporations and unincorporated business for the estimation of net profit of corporate profit $Y_{Kct}$ and capital income components of self-employed income $Y_{Kset}$. $Y_t$, $Y_{ht}$, and $FY_{Kt}$ can be obtained directly from Hong Kong's national accounts.[27] Detailed calculations are available in Appendix E.[28]

Panel A of **Figure 5** presents our benchmark estimation of Hong Kong's capital share (bold black curve) and its components since 1993. Several observations can be made from the graph. Since 1997, the Asian financial crisis (AFC) has led to a significant decrease of profits in both corporations and self-employed businesses. Hong Kong's capital share shrank from 43% of national income in 1997 to 32% of national income in 2001. Driven by sharp rise in net corporate profits, the first decade of the millennium saw a drastic increase in the capital share, reaching 53%

[26] The profits are net of fixed capital consumption.
[27] Pure rental value of housing $Y_{ht}$ is equal to value added in the sector of ownership of properties minus net production tax and subsidies, which is provided in the Hong Kong Gross Domestic Product Yearbook. Net foreign capital income is provided in Hong Kong's Balance of Payments.
[28] See Sheet 3.0.

of national income by 2012, which is 10 percentage points higher than its level before the AFC. Since 2014, the capital share has been gradually decreasing due to the increased deficits in net foreign capital income.

In our benchmark estimation, we assume that the annual depreciation of housing is equal to 2% of housing market value. As a robustness check, we present the alternative series with a depreciation rate equal to 5% (the black dashed curve). There is only a minor difference between the two series (around 1%), so our estimation seems to be fairly robust with regard to this assumption.

Capital share can also be calculated based on labor income with the following equation.

$$\alpha_t = (Y_t - Y_{Lt} - T_{pt})/Y_t$$

Labor income is measured by the compensation of employees in Hong Kong's national accounts. The red dashed curve presents the alternative estimation based on labor income as another robustness check. Before 2006, the alternative series show a similar trend and level of the capital share to our benchmark series, but afterward, the two series diverge. This divergence originates in the discrepancy between the fiscal data and national accounts in corporate profits. The discrepancy between two estimates of corporate profits (based on corporate profits tax vs. based on labor income and national accounts) rises sharply starting in 2006 from less than 5% of national income to about 15% of national income (see Figure 5 Panel B).[29] Given that corporations do not have the incentive to overreport their profits, we are inclined to believe that the fiscal data are more trustworthy. Nevertheless, we suggest that the estimates based on labor income be taken as a lower bound for the estimation of the capital share, especially for the period after 2006, as we are not yet able to explain the exact cause of the discrepancy due to the data limitations.

[29] All estimation results are available in Appendix E, Sheet A3.0.

*Figure 5 about here*

**Figure 6** compares the evolution of capital shares in Hong Kong and five high-income economies between 1993 and 2019. Two remarks are in order. First, the level of Hong Kong's capital share is substantially higher than other high-income economies, except for the five-year period following the financial crisis, where its capital share dropped significantly, yet remains on par with the UK's capital share. Even when applying the lower bound of the estimation, which is based on labor income (red dashed curve), the results still hold except for a very few years. Second, since the recovery from the Asian financial crisis, Hong Kong's capital share has grown substantially. In about one decade, from 2001 to 2012, it surged from 32% to 53% of national income. Despite the gradual decline that followed, Hong Kong's capital share reached such a high level by 2018 that is no longer comparable to other high-income economies. Since 2010, for example, Hong Kong's capital share has been more than twice as high as France's.

*Figure 6 about here*

Due to lack of microdata on household wealth and capital income,[30] we are unable to estimate the impact of the evolution of the capital shares on income and wealth inequality in Hong Kong. Nonetheless, existing evidence shows that the distribution of capital income is strongly skewed to the right (Piketty 2014; Bengtsson and Waldenström 2018). Hence it is plausible to assume that the rising capital share in Hong Kong contributes to the increase in income and wealth inequality.

## 6. Wealth Inequality in Hong Kong

Discussions about the extreme wealth inequality in Hong Kong have been ongoing for several decades among the general public and policy makers. However, due to

[30] The lack of (or very limited) taxation of capital incomes in Hong Kong results in a lack of fiscal data. To date, both capital gains and dividend incomes, whether from Hong Kong or overseas, are exempt from taxation in Hong Kong. Interest income is subject to Hong Kong profits tax only when it is sourced in Hong Kong. Furthermore, there has never been a household wealth survey in Hong Kong to date.

the lack of micro-level wealth survey or administrative data, empirical studies are still extremely limited.

To address this gap, we provide the first set of internationally comparable wealth concentration estimates based on Forbes magazine's rich lists. Additionally, based on a wealth accumulation model, we conduct simulations for the evolution of wealth inequality in Hong Kong over the period 1996 to 2016. Our findings suggest that the top 0.001% wealth (normalized by national income) has increased substantially in Hong Kong since the end of 1980s (**Figure 8**). Today, Hong Kong's top wealth concentration level is at the very top internationally. Our empirical results are consistent with the simulations, which show that wealth inequality has been increasing since 1996, since the price effect and the savings effect play very different roles in the evolution of wealth shares for the rich and poor.

### 6.1. Measuring the Top Wealth Concentration in Hong Kong

In the recent emerging literature on the evolution of wealth inequality, Forbes rich lists have been increasingly used to estimate the wealth concentration at the very top, often as consistency checks or corrections for wealth survey data and fiscal data (see Saez and Zucman 2016; Alvaredo et al. 2018; Novokmet et al. 2018; Piketty et al. 2019; Garbinti et al. 2021). The reliability of these lists has been questioned in light of several drawbacks. First, the data are compiled by relying on various sources and the methodology cannot be transparently evaluated. Second, the rich lists presumably neglect a number of private assets and liabilities, which may lead to the underestimation of wealth concentration. Last but not the least, the unit of analysis is not always consistent across observations, and often, wealth is reported for an entire family consisting of more than one individual (or household).[31] Therefore, further adjustment is required when using Forbes rich lists to estimate individual-level wealth concentration.

[31] For the methodology used to construct the Forbes rich lists, see https://www.forbes.com/sites/kerryadolan/2012/03/07/methodology-how-we-crunch-the-numbers/?sh=77a4e714d3d8

Despite the aforementioned drawbacks, rich lists are the only source we can rely on to estimate top wealth concentration in Hong Kong, where neither wealth survey nor fiscal data on either capital incomes or inheritances (which can be used in a number of other countries) are available. We would like to stress that our estimations still suffer from serious limitations due to the lack of accurate statistical information on both the production and bias of the rich lists. Our estimations must be seen as first steps towards to a better understanding of the level and evolution of the wealth concentration in Hong Kong. To simplify our discussion, we treat each observation in the rich lists as a family, regardless of whether it consists of one or more individuals. Furthermore, we define the origins of the billionaires by their citizenship.[32]

**Figure 7** presents the number (Panel A, normalized by the adult population) and total wealth (Panel B, measured by national income) of billionaire families[33] in 63 major economies in 2017. The results are sorted by national income per adult.

*Figure 7 about here*

Hong Kong ranks at the very top in both wealth concentration statistics, and its level of wealth concentration is far above the level in any other economy, regardless of the level of national income per adult. For example, in 2017, there were about 11 billionaire families for every million adults in Hong Kong, while the numbers for Switzerland and Singapore, which rank second and third, were 5.3

[32] This is due to the following two concerns. First, the definition of residency in different countries might vary significantly. Moreover, it is not clear to us how Forbes rich lists define a billionaire as a resident in the country.
As a special administrative region of China, Hong Kong does not have its own nationality law, and natural-born residents are generally Chinese citizens. Permanent residency is the *de facto* citizenship status in Hong Kong. To acquire the status of a permanent resident of Hong Kong, Chinese citizens who were not born in Hong Kong and non-Chinese citizens are normally required to have resided in Hong Kong for a continuous period of not less than seven years and to have taken Hong Kong as their place of permanent residence. After obtaining the status of permanent resident, one is not required to take Hong Kong as one's main residence in order to keep the status. However, a Hong Kong permanent resident is not necessarily a tax resident of Hong Kong. An individual is regarded as a tax resident of Hong Kong, China if (a) he/she ordinarily resides in Hong Kong, China; or (b) he/she stays in Hong Kong, China, for more than 180 days during a year of assessment or for more than 300 days in two consecutive years of assessment, one of which is the relevant year of assessment.
[33] A billionaire is defined as a family whose net wealth is more than one billion US dollars.

and 4.5, respectively. The United States, as a representative example of a high-income country with extreme wealth inequality, has 2.3 billionaire families per million adults. When we look at economies with similar income levels (50,000 to 60,000 US dollars in national income per adult), the Netherlands ranks lowest, with only 0.8 billionaire families per million adults. This finding shows that Hong Kong is really in a class of its own. Switching to the total wealth of billionaire families, the picture is similar. The total net wealth of billionaire families accounts for 85% of Hong Kong's national income in 2017, while it accounts for less than 35% in all other countries. Such results confirm public concern about inequality in Hong Kong. The level of wealth concentration in Hong Kong is not comparable to any other economy in the world.

How did wealth concentration in Hong Kong reach this high level? How did it evolve there compared to other economies? To address these questions, we need to construct comparable wealth shares series across economies and over time, which requires us to estimate individual-level (instead of family-level) wealth statistics. So far, there is no consensus in the literature on how to individualize the family wealth reported in rich lists. Novokmet et al (2018), Piketty et al. (2019), and Alvaredo et al. (2018), for example, treat each billionaire as either a married couple or an individual. Garbinti et al. (2021) find that in order to reconcile the challenges lists (rich lists in France) with administrative data, they would have to assume a family size of as many as 10-15 individuals. Yet underestimating the size of billionaire families would lead to an overestimation of individual wealth. In our paper, we individualize family wealth from rich lists by assuming that the average billionaire family consists of five adults and that this size is consistent across economies and time. To provide a piece of indirect evidence to support our assumption, we compare two series of top 0.001% wealth (normalized by national income) in the United States from 2008 to 2016: benchmark series estimated by Saez and Zucman (2016, 2020) using fiscal data, and alternative series estimated using the Forbes rich lists under the assumption of five adults per family (See

Appendix F[34]). The results show that, at least in the case of the United States, our assumption leads to an underestimation of top wealth and thus can be seen as the lower bound of the benchmark series.

**Figure 8** presents the evolution of top 0.001% wealth (normalized by national income) of Hong Kong and other countries for the period from 1988 to 2020. Estimates in Panel (A) are based solely on Forbes rich lists. In Panel (B), estimates of Hong Kong's top wealth are based on Forbes rich lists, and series for China, France, Russia, and the United States are retrieved from the World Inequality Database.

As illustrated in panels (A) and (B), the top 0.001% wealth increased substantially in Hong Kong over the last three decades, despite several drops during economic recessions. In the end of 1980s, the top 0.001% wealth accounted for 17% of national income. At the time, it was comparable with other economies. By 2020, it rose to 55% of national income, more than tripling since 1988. The upward trend was even more pronounced after the recovery from the Asian financial crisis. In consequence, Hong Kong's normalized 0.001% wealth today is far higher than that of other economies. Even Russia, which is notorious for its high concentration of wealth among oligarchs, pales in comparison.

*Figure 8 about here*

The top 0.001% wealth (normalized by national income) can be decomposed into the product of top wealth share and net private wealth-income ratio $\beta_t^{private}$ following the equation below,

$$\frac{W_t^{top\ 0.001\%}}{Y_t} = \frac{W_t^{top\ 0.001\%}}{W_t} * \frac{W_t}{Y_t} = Wealth\ share_t^{top\ 0.001\%} * \beta_t^{private}$$

Here, $Y_t$ and $W_t$ indicate net national income and net private wealth, respectively,

[34] See Sheet AF1.

in year t. We are able to estimate the top 0.001% wealth share providing $\beta_t^{private}$.

Unfortunately, official estimates of $\beta_t^{private}$ are not available due to the absence of aggregate household balance sheets and private wealth data for Hong Kong. To overcome this problem, we estimate the private wealth income ratio in Hong Kong using the following procedure. First, we estimate net private housing wealth as a fraction of national income in Hong Kong ($\beta_t^{housing}$). Second, we estimate the share of net housing wealth in private wealth ($A_t^{housing}$), with which we are able to estimate the level of private wealth in Hong Kong. Thus:

$$\beta_t^{private} = \frac{\beta_t^{housing}}{A_t^{housing}}$$

Private housing stock and housing prices (market value) are published regularly by the Rating and Valuation Department of Hong Kong[35] and can be used to estimate the market value of private housing in Hong Kong. Outstanding mortgage loans are published by the Hong Kong Monetary Authority.[36] Net private housing wealth is equal to the market value of private housing minus outstanding mortgage loans. We provide estimation details in Appendix E.[37] **Figure 9,** panel A, presents the evolution of net private housing wealth in Hong Kong and other major world economies. Hong Kong's $\beta_t^{housing}$ started at a relatively low level compared to other economies in the 1980s. Driven by the soaring asset prices, it rose to 340% of national income in 1997. In 2002, during the Asian financial crisis, it dropped to 109% of national income, and has risen dramatically since then, with $\beta_t^{housing}$ reaching 416% in 2018.

Since 2012, Citibank has been releasing survey-based studies on multimillionaires in Hong Kong.[38] They indicate that housing makes up a particularly large share in

[35] https://www.rvd.gov.hk/
[36] https://www.hkma.gov.hk/gb_chi/data-publications-and-research/data-and-statistics/monthly-statistical-bulletin/.
[37] See Sheet AX10
[38] For instance, the "Hong Kong Affluent Study 2019/2020" by Citigroup Inc., released September

wealth portfolios in the city, and that the share has been rising over the last decade: In 2012, housing wealth accounted for 68% of multimillionaires' total net wealth, and by 2018, it accounted for 75%. Since wealthy people are more likely to hold more financial assets, the share of housing wealth in the top wealth group can been seen as the lower bound of the housing share in total private wealth ($A_t^{housing}$). Panel B compares housing shares in total private wealth among other economies, and again, the level in Hong Kong is exceptionally high.

*Figure 9 about here*

**Table 2** presents the estimation of the top 0.001% wealth share in Hong Kong and compares it with Russia, China, the United States, and France.[39] Results show that in 2018, the lower bound of the top 0.001% wealth share is 11.2%, which exceeds that of Russia[40], is more than twice that in the United States and China, and 10 times the level in France. [41]

*Table 2 about here*

In brief, expressed as a fraction of national income, billionaire wealth and top 0.001% wealth in Hong Kong are far higher than any other country in the world. Expressed as a fraction of aggregate private wealth (due to the lack of data, we have to measure this imperfectly), top 0.001% wealth shares in Hong Kong exceed those in Russia and are far higher than in all other countries.

23, 2020. Multimillionaires are defined as those with total net assets of HK$10 million or more and liquid assets of at least HK$1 million.

[39] Data for other economies are obtained from the World Inequality Database.

[40] Estimation of the top 0.001% wealth share in Russia is provided by Novokmet et al. (2018). When using Russian Forbes rich lists to estimate the wealth share at the very top, Novokmet et al. (2018) treat each billionaire family as one adult. Relaxing the assumption on the size of billionaire families (i.e., five adults) will significantly increase the population base and decrease the estimation of the wealth share. For example, under the same assumption, in 2015, the top 0.005% (not 0.001%) wealth share in Russia is 9.8%. Thus, the top 0.001% wealth share for Russia reported in Table 2 should be treated as the upper bound of the estimation.

[41] Due to the lack of data, the top 0.001% wealth share in China and Russia starts in 2015, and in France in 2014.

### 6.2. Saving, Asset Prices, and the Evolution of Wealth Concentration

Now we move to the evolution of wealth accumulation and concentration in Hong Kong. Following the accounting framework adapted from Piketty and Zucman (2014), Saez and Zucman (2016), and Kuhn et al. (2020), we are able to decompose the change in wealth share (as a percentage) of fractile *i* into an asset price effect and a savings effect with the following equation:

$$\frac{\Delta\omega_t^i}{\omega_t^i} = \frac{q_t}{1+q_t+\ r_t * \frac{s_t}{\alpha_t}} * \left(\varphi_t^{q,i} - 1\right) + \frac{r_t}{1+q_t+\ r_t * \frac{s_t}{\alpha_t}} * \left(\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i} - \frac{s_t}{\alpha_t}\right) \quad (11)$$

Here, $\omega_t^i$ denotes the wealth share of fractile *i* at time *t*, and $\Delta\omega_t^i$ denotes the change of fractile *i*'s wealth share between *t* and *t*+1. $q_t$ denotes the contribution of capital gain to the growth of private wealth, that is, $q_t * W_t$ represents the capital gains received by the total population between *t* and *t*+1. $s_t = S_t/Y_t$ denotes the aggregate savings rate of total population. $r_t$ denotes the average rate of return. $\alpha_t = \frac{r_t W_t}{Y_t}$ denotes capital share of national income at time *t*. By analogy, we define $q_t^i$, $s_t^i$, $\alpha_t^i$ as the corresponding variable for fractile *i* between *t* and *t*+1. We denote as $\varphi_t^{q,i} = \frac{q_t^i}{q_t}$ the relative the asset price premium of fraction *i* at time *t*, and $\varphi_t^{r,i} = \frac{r_t^i}{r_t}$ the relative rate of return premium of fraction *i* at time *t*. We define $Y_t^i$ as the income of fractile *i* between *t* and *t*+1, $W_t^i$ as the wealth fractile *i* at time *t*, net private wealth $W_t = \sum_{i=1}^{I} W_t^i$, and national income $Y_t = \sum_{i=1}^{I} Y_t^i$. $\frac{q_t}{1+q_t+\ r_t * \frac{s_t}{\alpha_t}} * \left(\varphi_t^{q,i} - 1\right)$ represents the asset price effect, and $\frac{r_t}{1+q_t+\ r_t * \frac{s_t}{\alpha_t}} * \left(\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i} - \frac{s_t}{\alpha_t}\right)$ represents the savings effect. The derivation of above equation is provided in Appendix D.

Based on the decomposition results, when holding aggregate parameters (i.e., $q_t, r_t, s_t, \alpha_t$) constant, the asset price effect in the change of the wealth share is positively correlated with fractile *i*'s relative asset price premium, $\varphi_t^{q,i}$, while the savings effect is positively correlated with $\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i}$. Following the decomposition,

we conduct simulations on the evolution of wealth shares. Due to the lack of information on key parameters for the period before 1996, the simulations focus only on the post-handover period (1996 to 2016).

*Table 3 about here*

The aggregate level parameters, namely $r_t$, $\alpha_t$, $s_t$, and $q_t$, are presented in **Table 3**. $r_t$ represents the real rate of return in Hong Kong for total private wealth, which is equal to the weighted average real rate of return on different types of private assets. Since we do not have detailed data on the rate of return by assets or shares of assets, here we use the prime rate[42] in real terms[43] as a proxy for $r_t$. From 1996 to 2016, the accumulated rate of return is 164% (yearly rate 5.0%). $\alpha_t$ is the average capital share in national income over the period, obtained from our estimation of the capital share. $s_t$ represents the average private savings rate from 1996 to 2006, estimated based on Hong Kong's national accounts. $q_t$ is the contribution of capital gains to wealth growth, which can be expressed as weighted capital gains of various assets (e.g., housing, equity, and savings), $q_t = \sum_j^J q_t^j A_t^j$, where $A_t^j$ represents the share of asset *j* in net private wealth at time *t*. National-level capital gains in housing and equities are estimated based on the housing and stock index[44] (see **Figure 10,** panels A and B). We assume $q_t^{savings}$ equal to zero.

To estimate $q_t$, we have to make assumptions about the share of different assets in net private wealth ($A_t^j$). After comparing Hong Kong's housing share with that in other economies, we assume that $A_{1996}^{houisng}$ in Hong Kong is 50%.[45] We then split the rest of private wealth between equity wealth and non-equity financial wealth.

[42] The prime rate is the interest rate that commercial banks charge their most creditworthy corporate customers.
[43] Deflated by the consumer price index (CPI).
[44] Data are published by Census and Statistics Department of Hong Kong and Hong Kong stock market price index (HIS). All indices are deflated by the consumer price index.
[45] Based on **Figure 9** Panel B, in 1996 the share of housing in net private wealth is below 40% in most rich countries. Due to the rising price of housing before the Asian financial crisis (see **Figure 10** Panel A), it is very likely that the housing share in Hong Kong is higher than in other countries in 1996.

Under this assumption, the contribution of capital gains to wealth growth $q_t$ is equal to 51% (see **Table 3**). This assumption is, to some extent, arbitrary, since we do not have further information on the portfolio of private wealth in Hong Kong, but after experimenting with different assumptions in the simulation, we find that our different assumptions result in a very similar evolution of wealth inequality.

We now simulate the evolution of the wealth share for the wealth groups at the bottom and at the top. We define the bottom groups as households that do not own any property or equity ($\varphi_t^{q,i} = 0$) and do not save ($\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i} = 0$). We believe that this definition represents the financial reality for the bottom 50% households in Hong Kong relatively well. **Figure 10** (panel A and B) shows that in 1996, more than 50% of households do not own an apartment and less than 20% of adults owned any stocks. Poon and Hon (2015) show in addition that in 2014, the bottom 50 income group had less than 5% of total household savings. Simulation results show a 50% decrease in the wealth share of the bottom group during the period 1996–2016, while the price effect and the savings effect being almost equally responsible for the decrease (price effect = -26% vs. savings effect= -24%).

We now move to the top wealth groups (namely the super-rich). We adopt a moderate assumption by assuming the asset portfolio consists only of equity ($A_t^{equity} = 100\%$) and there is no capital gain premium on assets. The rate of capital gains of the super-rich is therefore equal to the market rate of capital gains ($q_t^i = 26\%$). We also adopt a moderate assumption by assuming that the savings rate of top group A ($s_t^i$) is 40%.[46] We assume that the relative rate of return premium ($\varphi_t^{r,i}$) is equal to 150% and the capital share ($\alpha_t^i$) is equal to 80%. Under this assumption, the total wealth share of the top wealth group rises 26%, which can be decomposed into a -12% price effect and a 38% savings effect. Due to our moderate assumption, these results can be seen as the lower bound of the

[46] Saez and Zucman (2016) show that the savings rate of the top 1% wealth group in the United States is between 30% and 45% for the period 1975 to 2012; Spaeth and Schmidt (2016) show that the savings rate of the top 1% wealth group in Germany is 25% in 2013.

estimation. Increasing the capital gain or savings rate, or decreasing the capital share in income will increase the wealth share of the top wealth group.

Our simulation also shows that the rise in the equity price relative to the rise in the housing price has a direct impact on the wealth share of the super-rich by way of the price effect, since the share of equity in the wealth portfolio of the super-rich is often higher than the share of properties. By the same token, when housing prices rise faster than equity prices, the wealth share for the middle class (homeowners) will increase, driven by the price effect. This kind of race between the stock market and the housing market and its impact on the evolution of wealth inequality have been discussed at length by Kuhn et al. (2020) using US data. However, such a race only matters for the people who own property or equity. For those who do not own any real assets and only have low nominal savings, their wealth share will decrease when asset prices increase.

## 7. The Institutional Roots of Rising Inequality and Political Cleavages in Hong Kong

In the previous sections, we documented the rising income and wealth inequality in Hong Kong over recent decades. In this section, we examine the relationship between Hong Kong's political structure and the rising inequality. We argue that the failure of Hong Kong's government to stop the widening income and wealth gap in the city stems from its own electoral politics. Under the partial democratic political structure, business elites carry disproportionate weight in the Legislative Council. Thus, they are able to block policies that would limit their political influence or harm their economic interests—for instance, redistributive policies.

Using the unique opinion survey conducted biannually from 2016 to 2021 by the Hong Kong Public Opinion Research Institute (PORI), we test the following hypotheses.[47]

[47] Compared to CSES data used by Durrer and Gethin (2021), the PORI survey not only provides the latest political opinion data (up to 2021) with a larger sample size but also more detailed

*A. Compared to the rest of society, business elites are more likely to vote for the pro-establishment camp to preserve or reinforce their political privileges.*

*B. The 2019 Hong Kong protests, which aimed to abolish the political privileges of business elites, have deepened existing political cleavages.*

The survey provides information on the political inclinations as well as the socio-economic characteristics of the interviewees, including income class (self-perceived), gender, age, education, occupation, and place of birth. We use the upper income class (roughly top 5%) as a proxy for business elites. **Figure 11,** panels A and B, presents the evolution of the distribution of political inclinations and income class among the interviewees from 2016 to 2021. Appendix F[48] reports the summary statistics for all the variables. To ensure that the opinion survey data are representative for Hong Kong, we compare the summary statistics on socio-economic variables, such as gender, age, education, occupation, and place of birth, between the opinion survey and the Hong Kong census for the year 2016. We find that overall, the opinion survey is consistent with the census.

To test the hypotheses, our baseline model is as follows:

$$BJ_{i,t} = \sum_{j=1}^{C} \alpha_{j,pre2019} * D_{pre2019} * C_{i,t}^{j} + \sum_{j=1}^{C} \alpha_{j,post2019} * D_{post2019} * C_{i,t}^{j} + X_{i,t}'\beta + d_t + e_{i,t} \quad (1)$$

Here $BJ_{i,t}$ is the political inclination dummy for the pro-establishment camp. $C_{i,t}^{j}$ is an income class dummy, which is equal to 1 if the interviewee *i* belongs to income class *j* in year *t*. C is the set of income classes, including middle class, lower middle class, and lower class. The upper class is treated as the base group and is therefore excluded from C. $D_{pre2019}$ is the time dummy for the years before the 2019 Hong Kong protests, while $D_{post2019}$ is the dummy for the post-2019 period. $X_{i,t}$ is a vector of controls including interviewees' gender, age, education,

categories of the political inclination, namely the pro-establishment, the pro-democracy, the centrist, and the apolitical. Durrer and Gethin (2021) neglects the last two fractions, which account for about 50% of the population of Hong Kong (see **Figure 11,** panel A).

[48] See Sheet AT2.

occupation, and place of birth. $d_t$ is the year fixed effects. $e_{i,t}$ is the error term. Since the dependent variable $BJ_{i,t}$ is binary, we apply a logit model for estimation. The odds ratios of the coefficients of interest $\alpha_{j,pre2019}$ and $\alpha_{j,post2019}$ measure the possibility of income class j voting for the pro-establishment camp comparing with the upper class before and after the 2019 Hong Kong protests. They can be interpreted as a proxy for the political cleavages between the upper class and other income classes. To support our hypothesis, we expect that the odds ratios of $\alpha_{j,pre2019}$ and $\alpha_{j,post2019}$ are smaller than 1 and significant, while the gap between $\alpha_{j,post2019}$ and $\alpha_{j,pre2019}$ is negative and significant.

Regression results are presented in **Table 4**, column (1). All coefficients and standard errors are reported in odds ratios. Standard errors are clustered at the income class level.[49] To better visualize the findings, we present the main results in **Figure 12,** panel A. The black curve represents the odds ratios for each income class before 2019, while the red curve represents the odds ratios after 2019. Dashed lines mark the boundary of the 95% confidence intervals. As shown in the table and figure, in the period before the 2019 Hong Kong protests, the upper class was the most likely of all of the income classes to vote pro-establishment. The probability of the middle class voting pro-establishment, for example, is 81.3% of the probability for the upper class. The odds ratios also decrease across income groups. After 2019, the odds ratios decrease substantially, indicating widening political cleavages between the upper class and other income classes. To test whether the changes in the odds ratios before and after 2019 are significant, we estimate the following modified model:

$$BJ_{i,t} = \sum_{j=1}^{C} \alpha_j * C_{i,t}^{j} + \sum_{j=1}^{C} \alpha_{j,\Delta} * D_{post2019} * C_{i,t}^{j} + X_{i,t}'\beta + d_t + e_{i,t} \quad (2)$$

where $\alpha_{j,\Delta}$ measures the changes in the likelihood of income class *j* voting pro-establishment camp before and after 2019. Results are provided in Appendix F.[50]

[49] This is because our sample is at the individual level, while the key variable $C_{i,t}^{j}$ is a dummy at the income class level.
[50] See Sheet AT4.

All the estimations of $\alpha_{j,\Delta}$ are significantly negative, indicating that odds ratios decreased significantly for the middle class, lower middle class, and lower class voting pro-establishment after 2019. Our regression results provide strong supportive evidence for the hypotheses.

To gain a fuller picture of voting dynamics in Hong Kong, we apply the same model to estimate the determinants of voting for the centrist camp, pro-democracy camp, and for being apolitical. Regression results and corresponding graphs are presented in **Table 4,** columns 2, 3, and 4, and **Figure 12,** panels B, C, and D. Three remarks are in order. First, before 2019, the upper class was less likely to vote centrist and more likely to vote pro-democracy. Second, since the 2019 Hong Kong protests, the rest of the society has been moving toward the centrist and pro-democracy camp—in contrast to the upper class. Third, the results are mixed for apolitical voters: The upper class is more likely to be apolitical than the middle and lower middle class, and has been becoming more apolitical since 2019. The lower class is more likely to be apolitical than the upper class, and this tendency has been increasing since 2019.

Furthermore, we also find that the inclination to vote pro-establishment increases with age, while the inclination to vote pro-democracy increases with education. People who were born in mainland China are more likely to vote pro-establishment and less likely to vote pro-democracy. Women are more likely to be apolitical than others, as are homemakers and retired people.

## 8. Conclusion

In this paper we combined and compared and confronted several data from multiple sources to analyze the evolution of income, wealth, and electoral inequality in Hong Kong. We obtained several important findings. First, wage inequality has risen significantly in Hong Kong over the last four decades. The upward trend became even more pronounced after the handover of Hong Kong in 1997. These results are confirmed by various robustness checks. Our analysis

based on the recentered influence function (RIF) of the Gini index (Firpo et al., 2009, 2018) suggests two major driving forces behind the rise in wage inequality: first, the expansion of higher education, and second, the transformation of Hong Kong's industrial structure from manufacturing to the financial and service sector. Interestingly, the latter factor is the only dominant force after the handover of Hong Kong, due mainly to its wage structure effects. We should stress that our results are not causal and should therefore only be seen as suggestive evidence.

Second, we constructed Hong Kong's first capital share series from 1993 to 2019 by combining corporate tax data and national accounts. Based on our benchmark estimates, the capital share in Hong Kong has increased dramatically since the beginning of the century. Today, Hong Kong's capital share is much higher than that of major high-income economies. Even when applying the lower bound of the estimation (estimating the capital share based on labor income), this result still holds.

Additionally, we provide the first set of internationally comparable wealth concentration estimates based on Forbes rich lists. Our main findings suggest that top 0.001% wealth (normalized by national income) has increased substantially in Hong Kong since the end of the 1980s. Today, billionaire wealth and top 0.001% wealth are far higher in Hong Kong than in other economies, while in 2018, top 0.001% wealth shares in Hong Kong exceeded those in Russia, were more than twice those in the United States and China, and were 10 times those in France. Additionally, our simulations based on wealth accumulation model confirm that wealth inequality has been increasing in Hong Kong since 1996.

Due to the lack of data, our key results on Hong Kong's top wealth concentration are derived based on some strong assumptions, two of the most important of which are the size of billionaire families and the share of housing assets in total private wealth. Increasing the size of billionaire families or decreasing the share of housing assets will lead to a lower estimation of top wealth (normalized by national income) and top wealth shares. Based on existing direct and indirect evidence, we argue

that both assumptions will lead to an underestimation of Hong Kong's top 0.001% wealth concentration, and that our findings should therefore be seen as the lower bound of the wealth concentration estimation.

Finally, we argue that the partial democratic political structure in Hong Kong is the institutional root of the rising inequality and political cleavages in Hong Kong. Our evidence suggests that compared to the rest of the society, business elites (the upper class), who carry disproportionate weight in the Legislative Council, are more likely to vote for pro-establishment camp to ensure that policies are enacted that will protect their political and economic interests. Such political cleavages have become even wider since the 2019 Hong Kong protests.

We should stress again that our study has many limitations, in particular due to the lack of adequate data access. We hope that more data will become available in the future to enable a better understanding of the evolution of income and wealth inequalities as well as political cleavages in Hong Kong.

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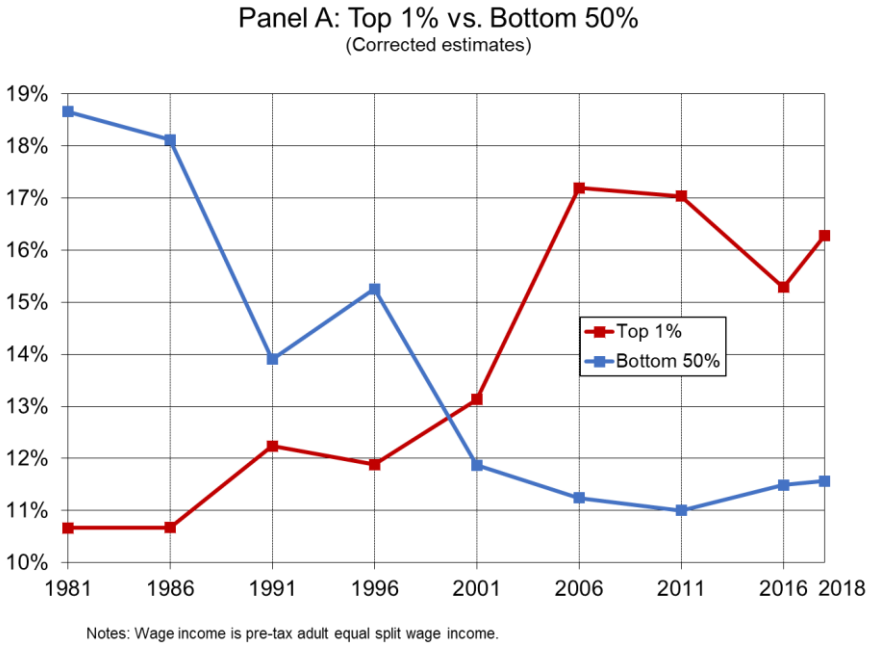
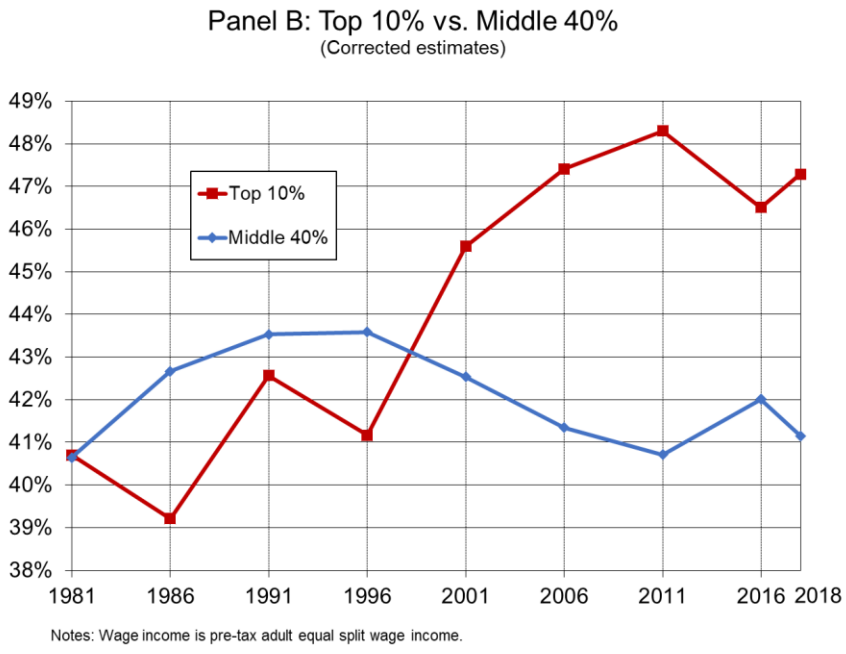
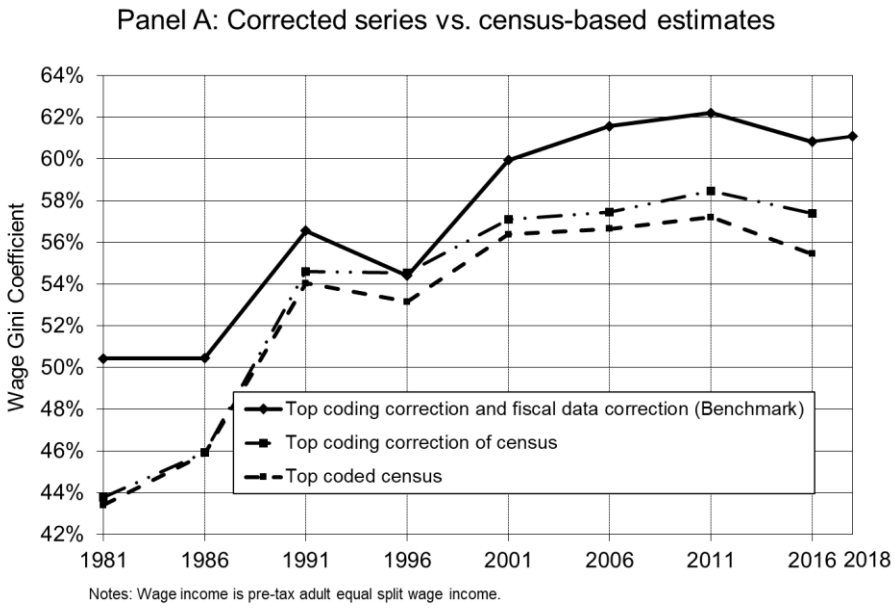
## Figure 1: Rising Wage Inequality in Hong Kong, 1981-2018

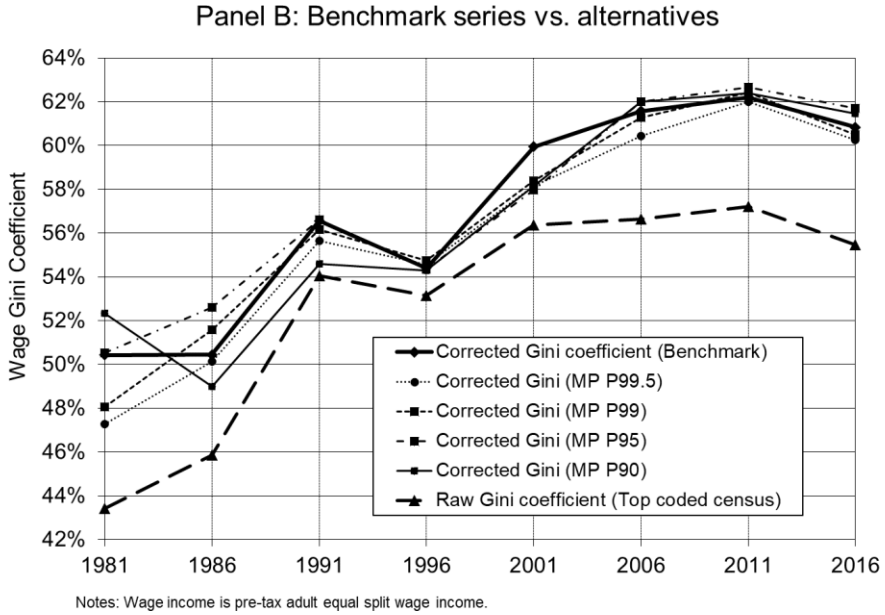


## Figure 2: Wage Gini Coefficients in Hong Kong, 1981-2018

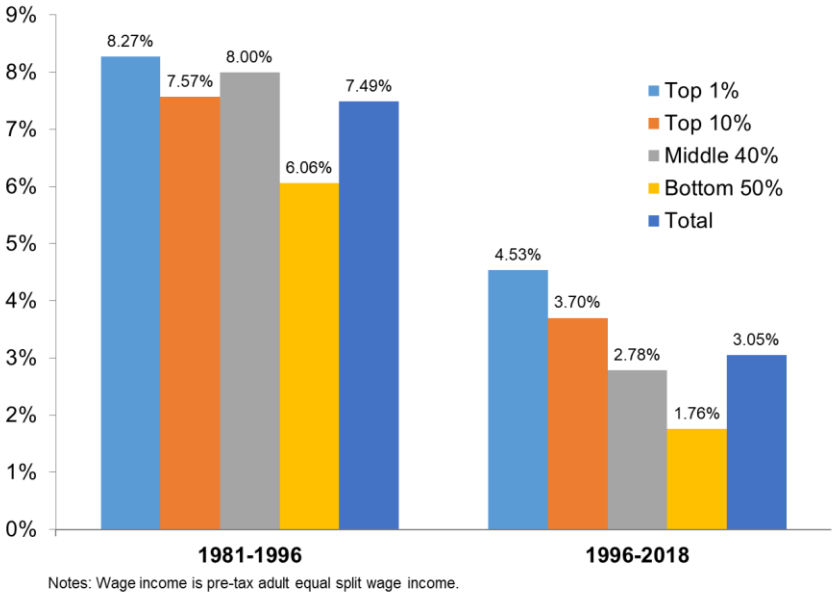



Notes: Wage income is pre-tax adult equal split wage income.




Notes: Wage income is pre-tax adult equal split wage income.

## Figure 3: Real Growth Rate of Wage Income per Adult in Hong Kong




Notes: Wage income is pre-tax adult equal split wage income.

## Figure 4: Overall Effects on the Change in the Wage Gini by Economic Drivers

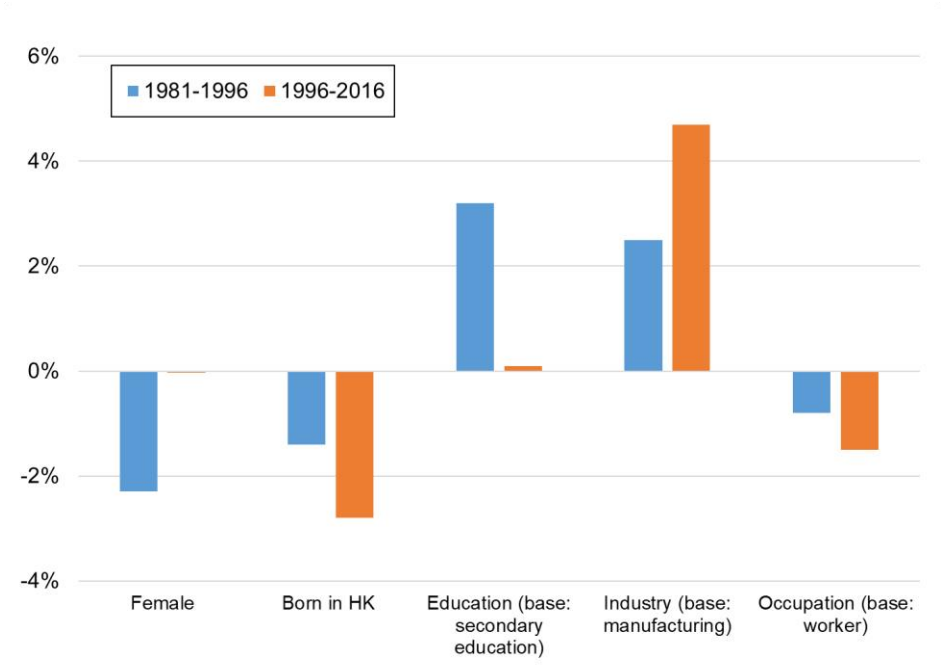
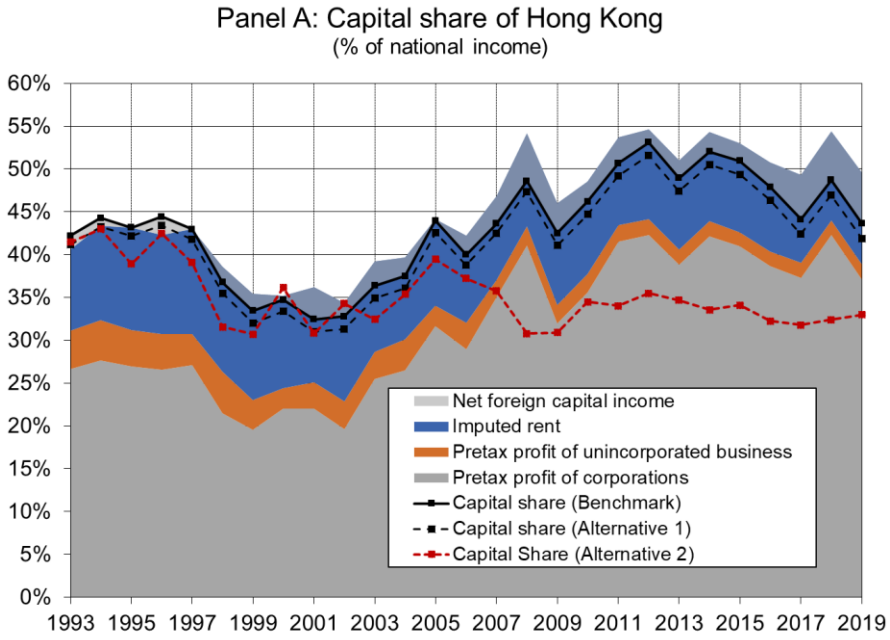


**Figure 5: Estimation of Capital Shares and Corporate Profits in Hong Kong, 1993-2019**



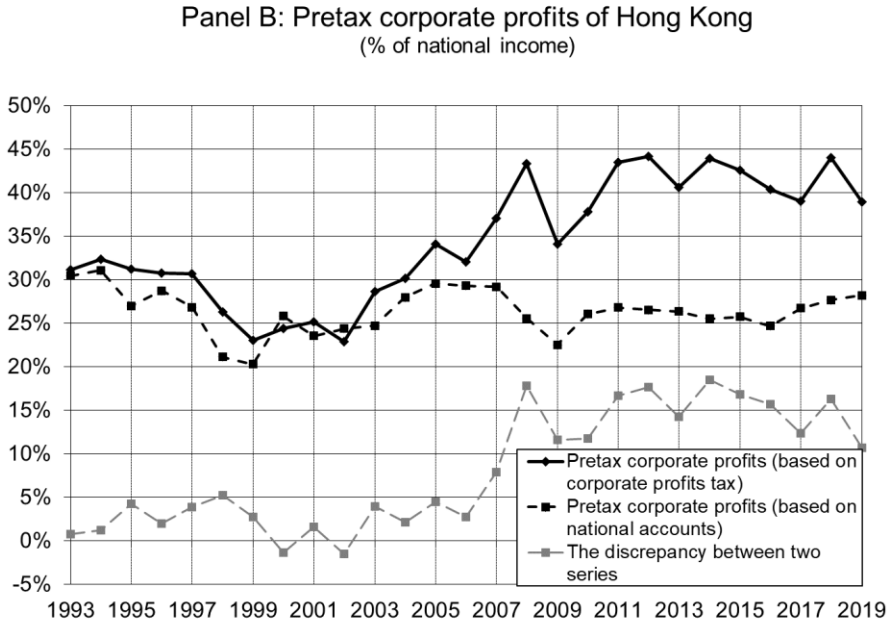
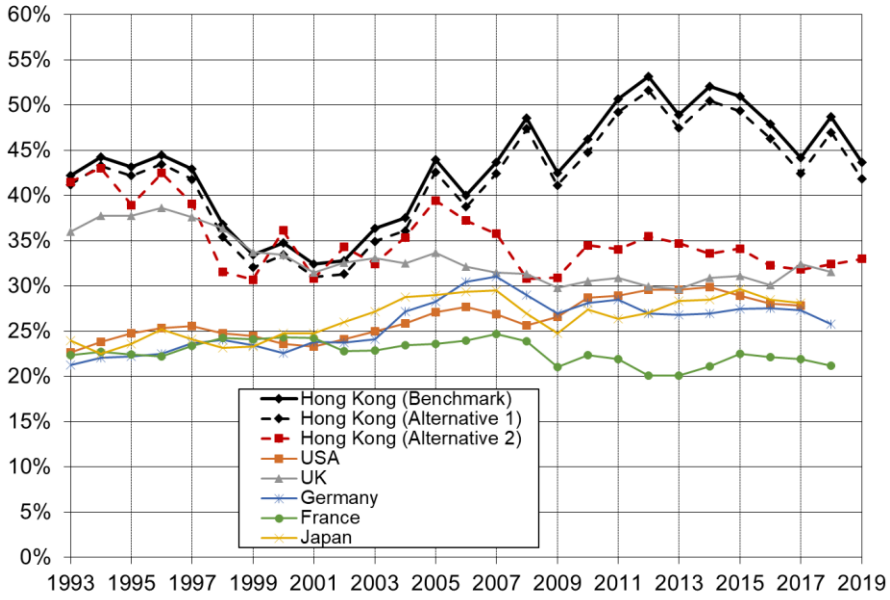
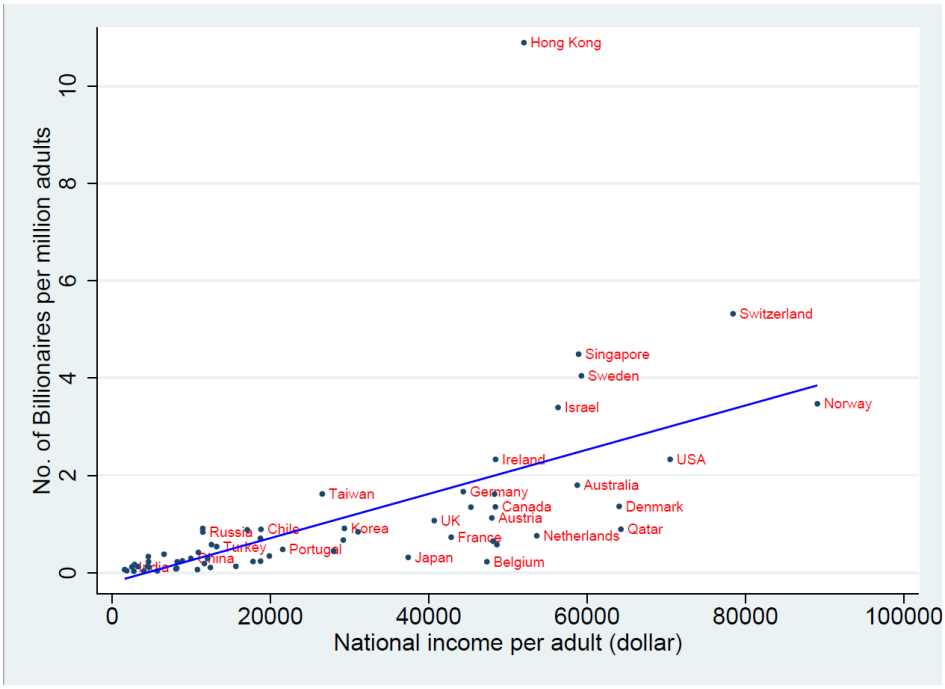



**Figure 6: Evolution of Capital Shares: Hong Kong vs. High-Income Countries, 1993-2019**



## Figure 7: Density and Wealth of Billionaires in 2017

### Panel A: No. of billionaires (per million adults)




### Panel A: Net wealth of billionaires (% of national income)

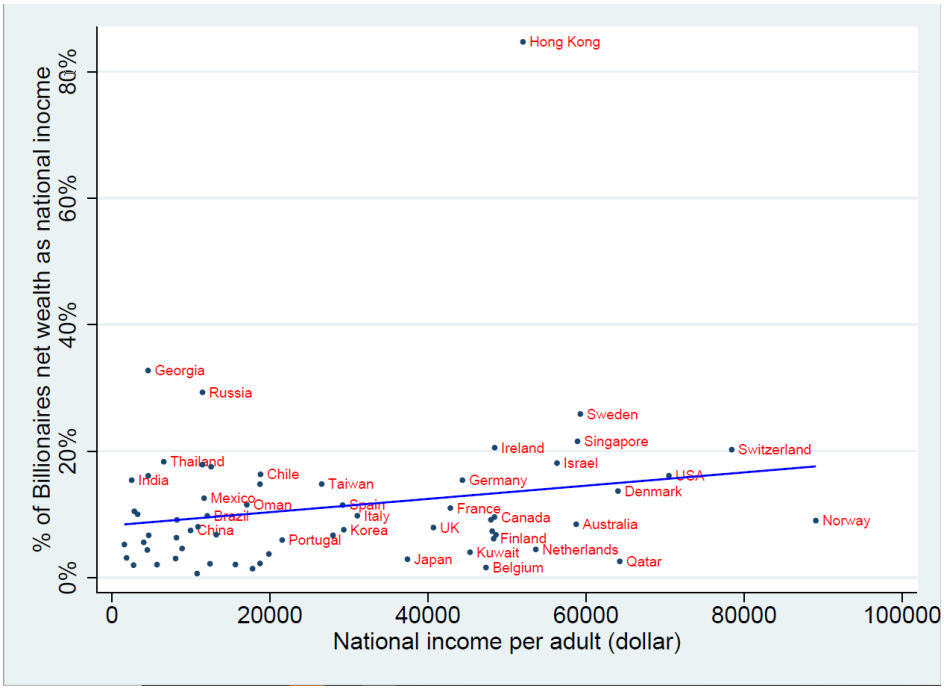


**Figure 8: Top 0.001% Wealth (as % of National Income), 1987-2020**

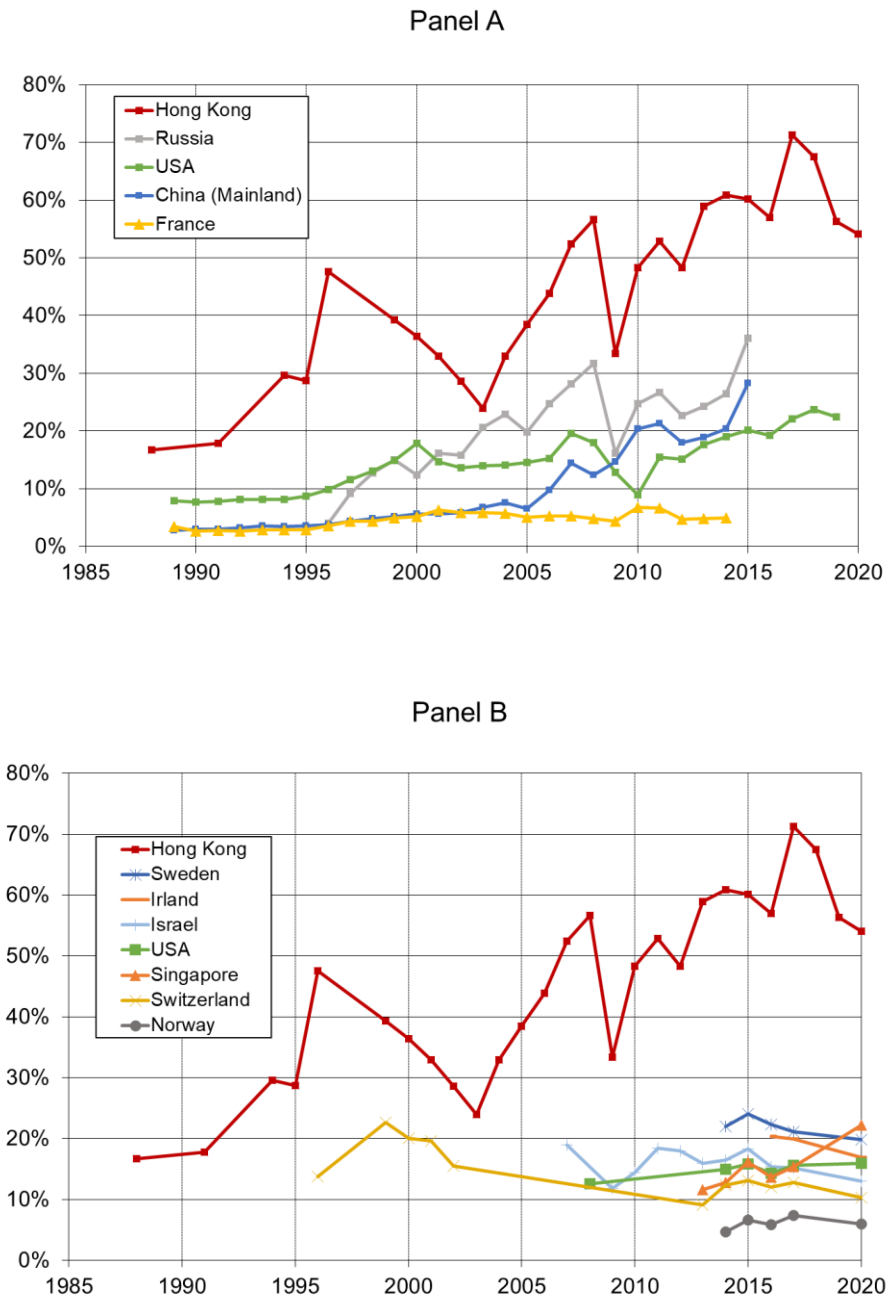
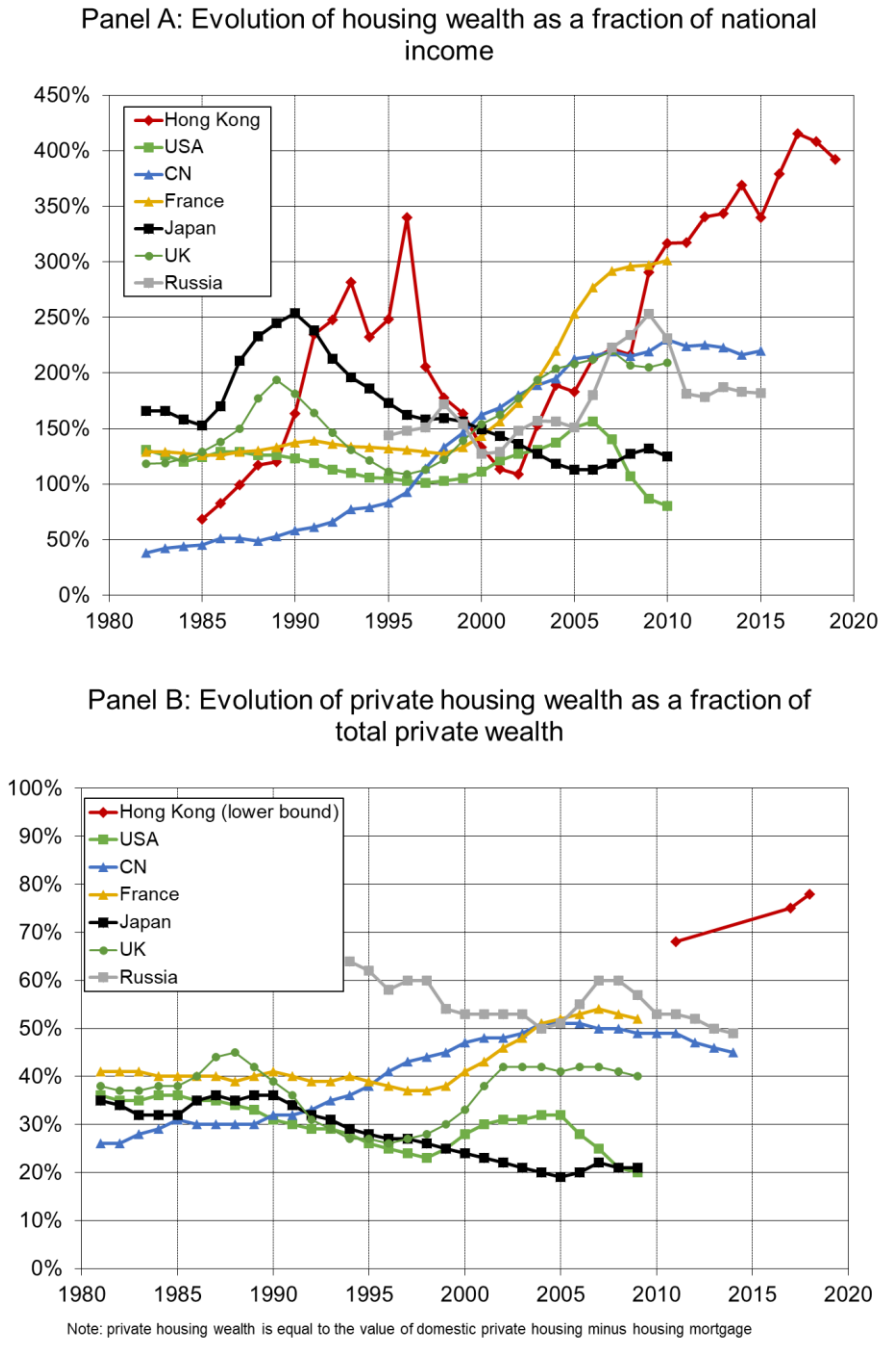


**Figure 9: Evolution of Private Housing Wealth in Hong Kong and Other Major Economies (1985-2019).**



## Figure 10: Evolution of Assets Price and Ownership (1981-2016)

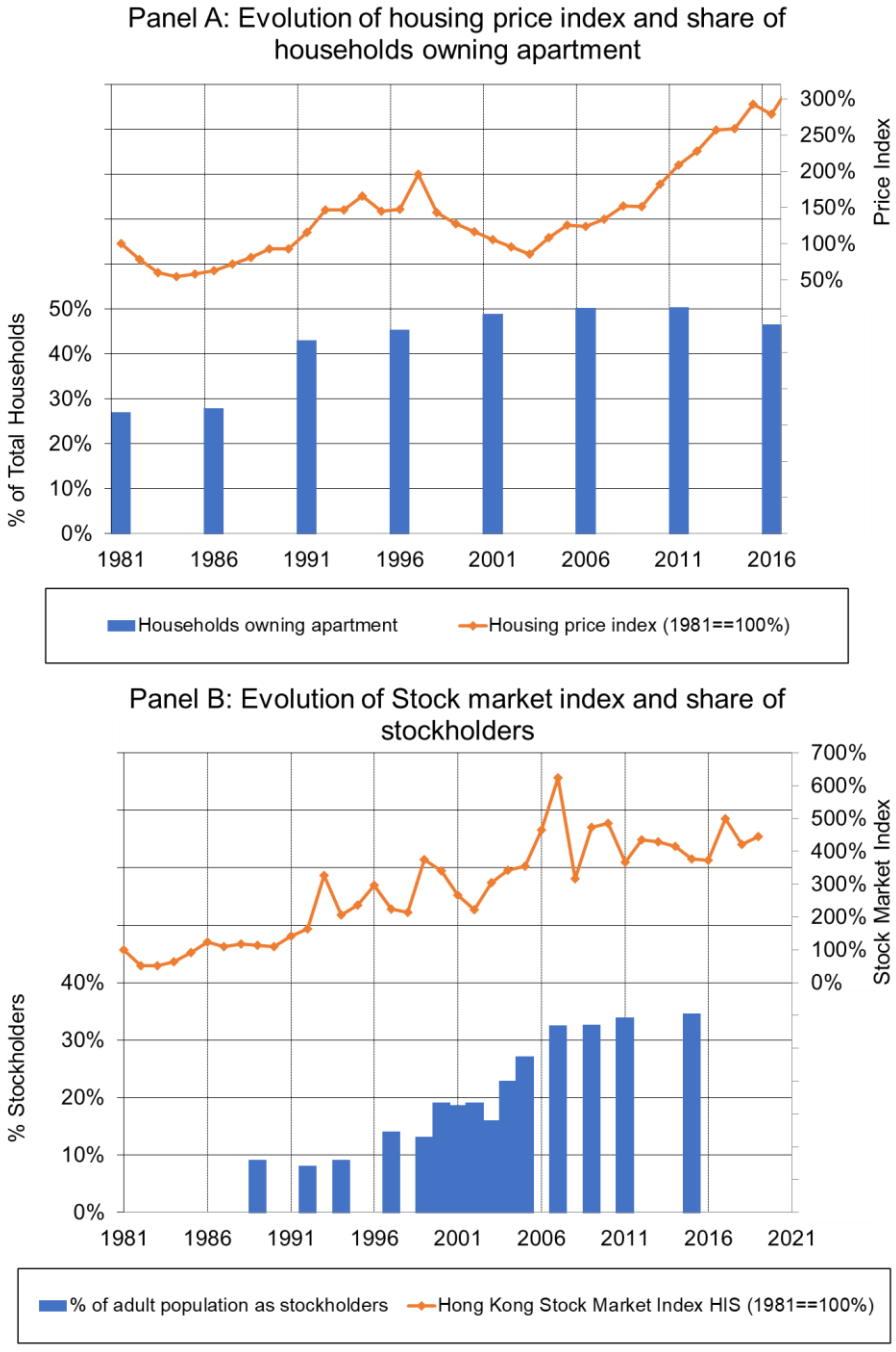
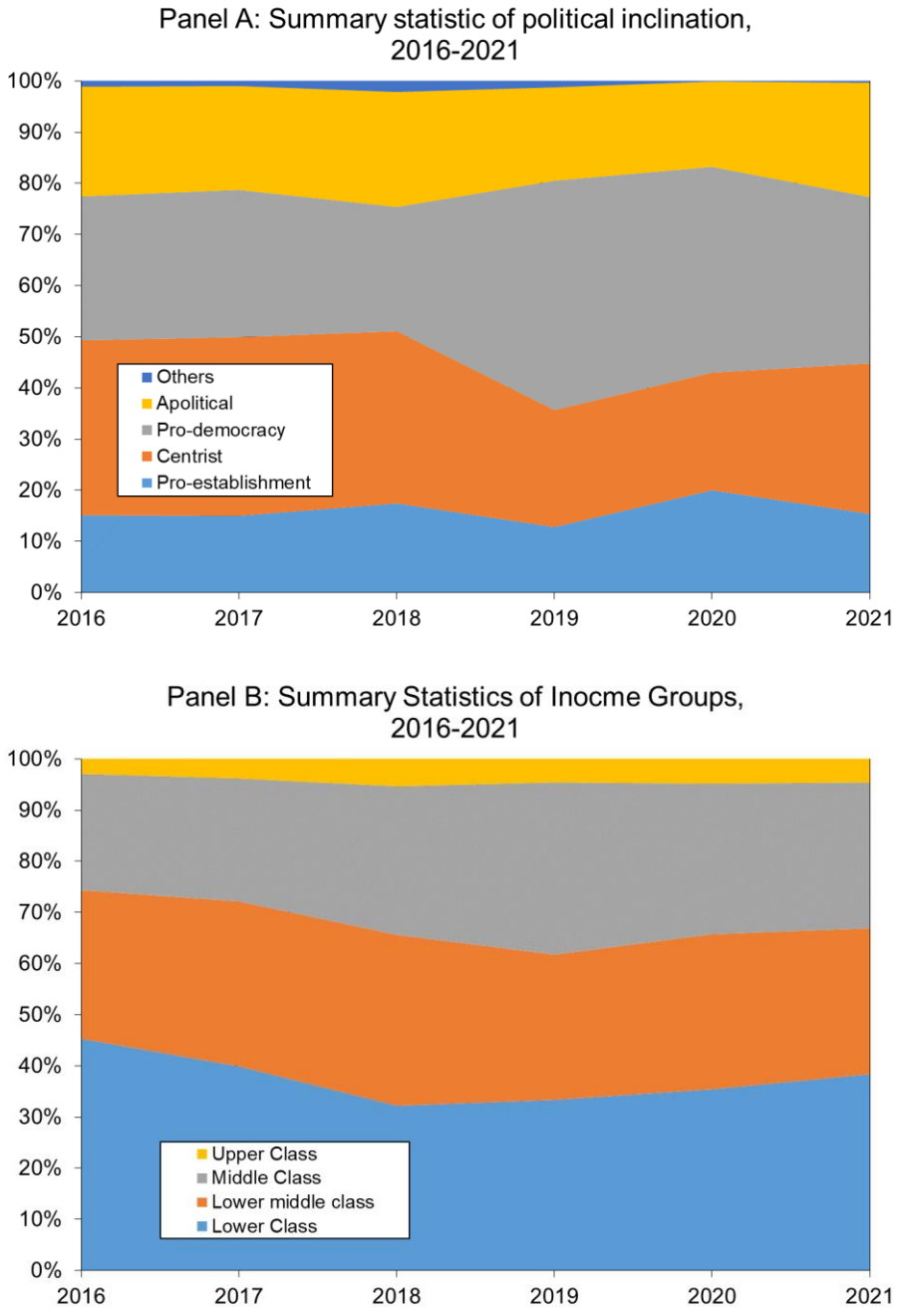
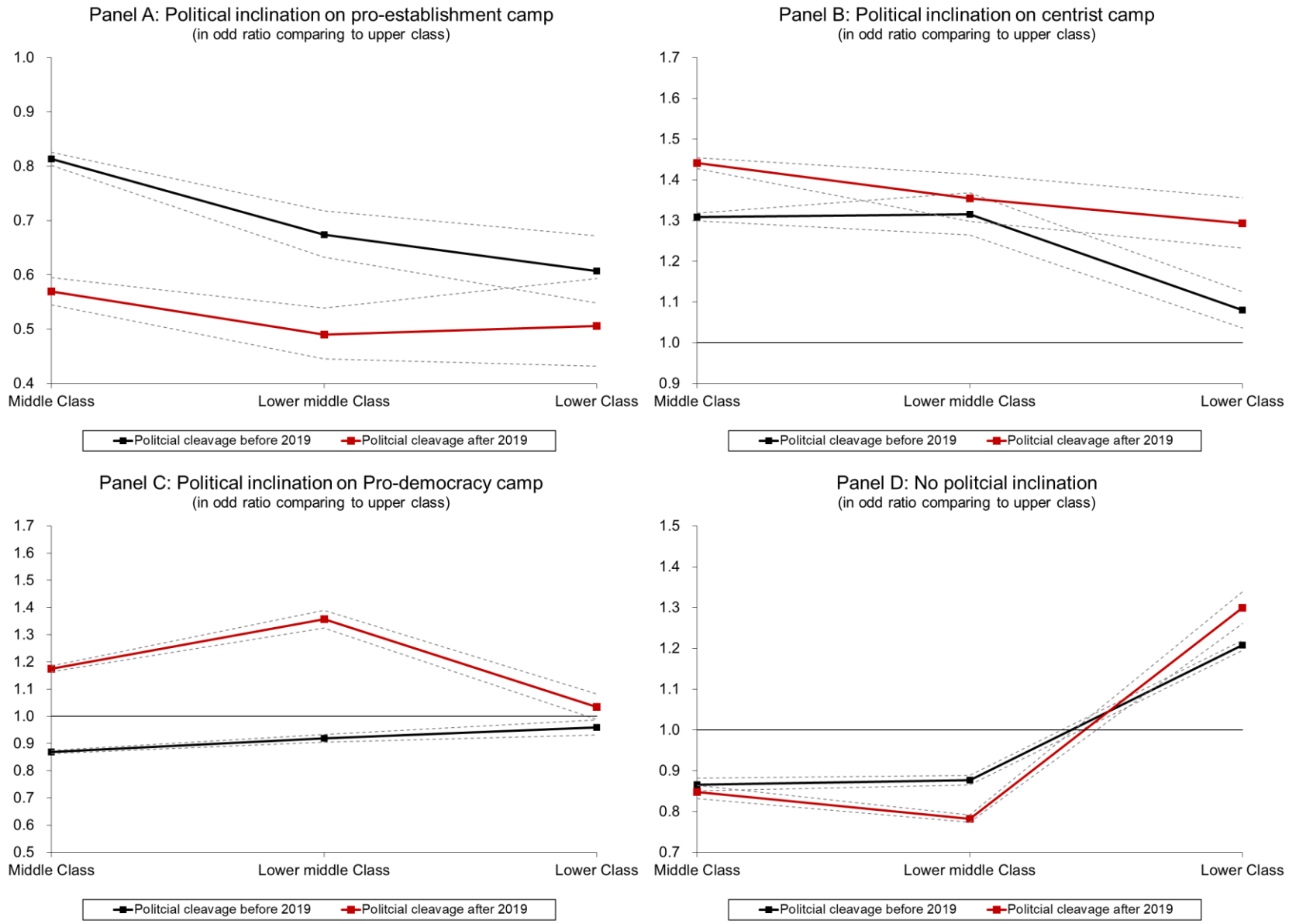


**Figure 11: Summary Statistics of Political Inclination and Income Groups in Hong Kong (2016-2021)**



## Figure 12: Political Inclination



## Table 1: Summary Statistics, RIF Regression on Gini, and Blinder-Oaxaca Decomposition for the Change in the Gini

| | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] |
|---|---|---|---|---|---|---|---|---|---|---|
| | Employee Share | | | Wage Gini Coefficient | | | OB decomposition of Wage Gini Coefficient | | | |
| | | | | 32.7% | 41.3% | 42.8% | 1981 vs. 1996 | | 1996 vs. 2016 | |
| | | | | | | | 8.6%*** | | 1.5%*** | |
| | | | | | | | Composition effect | Wage structure | Composition effect | Wage structure |
| | 1981 | 1996 | 2016 | 1981 | 1996 | 2016 | 14.1% *** | -5.5% *** | 6.9% *** | -5.4% *** |
| **Gender (base: Male)** | | | | | | | | | | |
| Female | 36% | 39% | 48% | 0.072*** | 0.008 | 0.005 | 0.2% *** | **-2.5%** *** | 0.1% | -0.1% |
| **Place of Birth (base: Not born in HK)** | | | | | | | | | | |
| Born in Hong Kong | 48% | 68% | 72% | 0.034*** | 0.004 | -0.035*** | **0.7%** *** | **-2.1%** ** | 0.0% | **-2.8%** *** |
| **Education (base: Secondary education)** | | | | | | | | | | |
| Primary education | 48% | 19% | 9% | -0.009 | 0.024*** | 0.011*** | 0.3% | **0.6%** *** | -0.3% *** | -0.1% ** |
| Higher education | 7% | 22% | 44% | 0.324*** | 0.208*** | 0.112*** | **4.8%** *** | **-2.5%** *** | **4.7%** *** | **-4.2%** *** |
| **Industry (base: Manufactory)** | | | | | | | | | | |
| Construction | 10% | 9% | 9% | -0.031*** | -0.008 | 0.01 | 0.0% ** | 0.2% * | 0.0% | 0.2% * |
| Wholesale and Retail | 9% | 15% | 19% | -0.066*** | -0.034*** | 0.004 | -0.4% *** | **0.5%** * | -0.1% *** | **0.7%** *** |
| Restaurant and Hotel | 6% | 8% | 9% | -0.090*** | 0 | 0.038*** | -0.1% *** | **0.7%** *** | 0.0% | 0.3% *** |
| TSC | 8% | 11% | 13% | -0.056*** | -0.030*** | 0.007 | -0.2% *** | 0.3% * | -0.1% *** | **0.5%** *** |
| Finance | 6% | 16% | 21% | -0.018 | 0.036*** | 0.095*** | -0.2% | **0.8%** * | 0.2% *** | **1.2%** *** |
| Service | 16% | 21% | 24% | -0.033** | 0.017** | 0.084*** | -0.2% ** | **1.1%** *** | 0.1% ** | **1.6%** *** |
| Other | 1% | 1% | 1% | -0.024 | -0.018 | 0.101*** | 0.0% | 0.0% | 0.0% | 0.1% *** |
| **Occupation (base: Worker)** | | | | | | | | | | |
| Professionals | 6% | 22% | 31% | 0.209*** | 0.003 | -0.053*** | **3.2%** *** | **-4.5%** *** | 0.0% | **-1.7%** *** |
| Administrtion and Management | 3% | 9% | 10% | 0.628*** | 0.277*** | 0.312*** | **3.8%** *** | **-3.1%** *** | 0.2% *** | 0.3% |
| Clerical | 14% | 19% | 17% | -0.053*** | -0.046*** | -0.072*** | -0.3% *** | 0.1% | 0.1% *** | -0.4% *** |
| **Marriage (total effect)** | | | | | | | 0.2% * | 1.3% *** | 0.0% | 0.1% |
| **Age (total effect)** | | | | | | | 1.3% *** | -4.9% *** | 2.5% *** | -13.9% *** |
| **Districts (total effect)** | | | | | | | 0.9% * | -2.9% ** | -0.5% *** | -11.2% *** |
| **Constants** | | | | 0.364*** | 0.477*** | 0.718*** | | 11.3% ** | | 24.1% *** |
| **R-squared** | | | | 0.2018 | 0.0752 | 0.1078 | | | | |
| **No. of Obs** | | | | 16324 | 116254 | 138772 | | | | |
| **Share of employees in total population** | 53% | 50% | 43% | | | | | | | |

**Table 2: Top Wealth Share, Wealth Income Ratio, and Normalized Top Wealth: Hong Kong vs. Other Economies**

| Country | Year | Top 0.001% share in private wealth | Top 0.001% Wealth / National income | Private wealth national income ratio | Private housing national income ratio | Share of housing assets in aggregate private wealth |
|---|---|---|---|---|---|---|
| | | $Share^{top\ 0.001\%}$ | Normalized Top 0.001% Wealth | $\beta_t^{private}$ | $\beta_t^{housing}$ | $A_t^{housing}$ |
| Russia | 2015 | 9.8% | 36% | 371% | | |
| China | 2015 | 5.8% | 28% | 487% | | |
| USA | 2018 | 4.3% | 24% | 543% | | |
| France | 2014 | 0.9% | 5% | 558% | | |
| | | Lower Bound | | Upper bound | | Lower Bound |
| Hong Kong | 2018 | 11.2% | 61% | 545% | 408% | 75% |

## Table 3: Simulation for Evolution of Wealth Inequality in Hong Kong (1996-2016)

| | **Simulation Parameters** | | | | | | | | | | | **Simulation Results** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rate of return | Capital share | Private saving rate | Capital gain on different assets | | | Asset portfolio | | | Capital gain on all assets | Relative capital gain premium | Relative rate of return premium | Price effect | Saving effect | Total effect |
| | | | | *Capital gain on housing* | *Capital gain on equities* | *Capital gain on savings* | *Share of housing* | *Share of equities* | *Share of savings* | | | | | | |
| | $r_t$ | $\alpha_t$ | $s_t$ | $q_t^{housing}$ | $q_t^{equity}$ | $q_t^{savings}$ | $A_t^{housing}$ | $A_t^{equity}$ | $A_t^{savings}$ | $q_t$ | $\phi_t^{q,i}$ | $\phi_t^{r,i}$ | | | |
| National | 164% | 29% | 12% | *89%* | *26%* | *0%* | *60%* | *20%* | *20%* | 59% | | | | | |
| Top | | 80% | 40% | | *26%* | | *0%* | *100%* | *0%* | 26% | 45% | 150% | -14% | 23% | 9% |
| Bottom | | 0% | 0% | | | | *0%* | *0%* | *100%* | 0% | 0% | 100% | -26% | -31% | -56% |

## Table 4: Logit Regression on Political Inclinations (Coefficients Reported in Odds Ratios)

| Political inclination | Logit Regression on Political inclination | | | |
|---|---|---|---|---|
| | Pro-establishment Camp [1] | Centrist [2] | Pro-democracy Camp [3] | Political Indifference [4] |
| **Income class pre2019 (baseline: Upper class)** | | | | |
| Middle class | 0.813*** | 1.309*** | 0.869*** | 0.866*** |
| | (0.006) | (0.005) | (0.003) | (0.008) |
| Middle lower class | 0.674*** | 1.315*** | 0.919*** | 0.877*** |
| | (0.022) | (0.027) | (0.007) | (0.006) |
| Lower class | 0.607*** | 1.080*** | 0.959*** | 1.207*** |
| **Income class post 2019 (baseline: Upper class)** | | | | |
| Middle class | 0.569*** | 1.441*** | 1.175*** | 0.848*** |
| | (0.013) | (0.007) | (0.006) | (0.008) |
| Middle lower class | 0.490*** | 1.355*** | 1.356*** | 0.783*** |
| | (0.024) | (0.030) | (0.016) | (0.005) |
| Lower class | 0.506*** | 1.292*** | 1.034 | 1.299*** |
| | (0.041) | (0.031) | (0.024) | (0.020) |
| **Occupation (baseline: executives and professionals)** | | | | |
| Clerical and workers | 1.102 | 1.041 | 0.925* | 1.060 |
| | (0.106) | (0.073) | (0.038) | (0.093) |
| Students | 0.691 | 0.948 | 1.305*** | 0.551* |
| | (0.253) | (0.210) | (0.065) | (0.195) |
| Housemakers, retirees and others | 1.143 | 0.917 | 0.892 | 1.306*** |
| | (0.137) | (0.124) | (0.109) | (0.134) |
| **Age (basline: 60+)** | | | | |
| **18-29** | 0.195*** | 0.764*** | 2.185*** | 1.025 |
| | (0.022) | (0.068) | (0.247) | (0.192) |
| **30-39** | 0.449*** | 1.036 | 1.325** | 1.226 |
| | (0.075) | (0.068) | (0.183) | (0.233) |
| **40-59** | 0.615*** | 1.309*** | 0.948 | 1.232 |
| | (0.082) | (0.030) | (0.150) | (0.226) |
| **50-59** | 0.844* | 1.161*** | 1.040 | 0.940 |
| | (0.085) | (0.017) | (0.043) | (0.162) |
| **Female** | 0.806 | 0.937 | 0.925** | 1.572*** |
| | (0.117) | (0.062) | (0.034) | (0.158) |
| **Education (basedline: Secondary educaiton)** | | | | |
| Primary education | 0.816** | 0.928** | 0.723*** | 1.628*** |
| | (0.070) | (0.030) | (0.026) | (0.062) |
| Tertiary education | 0.869 | 0.981 | 1.402*** | 0.620*** |
| | (0.084) | (0.081) | (0.050) | (0.053) |
| **Place of birth (basedline: Hong Kong)** | | | | |
| Mainland | 1.961*** | 0.980 | 0.579*** | 1.214** |
| | (0.100) | (0.031) | (0.017) | (0.119) |
| Other places | 1.394*** | 0.716*** | 0.812 | 1.661*** |
| | (0.170) | (0.067) | (0.125) | (0.053) |
| Constants | 0.279*** | 0.434*** | 0.526*** | 0.147*** |
| | (0.026) | (0.077) | (0.063) | (0.015) |
| Observations | 9,341 | 9,341 | 9,341 | 9,341 |
| Log pseudolikelihood | -3572 | -3572 | -3572 | -3572 |
| Year fixed effect | Y | Y | Y | Y |
| Cluster at income class level | Y | Y | Y | Y |

# Income and Wealth Inequality in Hong Kong, 1981-2020: The Rise of Pluto-Communism?

# Appendix A to D

Thomas Piketty and Li Yang[51]

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## Appendix A: Data Description

Our study relies on the five main data sources below:

1. HK Salaries Tax Assessments (1973–2018) and HK Corporate Profit Tax (1989-2018)
2. HK Census Microdata for 1981, 1986, 1991, 1996, 2001, 2006, 2011, 2016.
3. HK Rich List (1996 – 2020)
4. HK National Accounts (1980-2020)
5. HK Pre-Nomination Survey for the 2016 Legislative Council Election

Below we will explain each data source in detail.

### 1. Hong Kong Salaries Tax Assessment (1973-2017) and HK Corporate Profit Tax (1989-2018)

Both data sets are provided by the HK Inland Revenue Department Annual Report. HK Salaries Tax Assessments cover only salary income (including the employer's contribution to retirement schemes). Both total income and chargeable income are reported. Hong Kong's corporate profits tax covers profits from both domestic and

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foreign corporations as well as domestic and foreign unincorporated businesses in Hong Kong. Unincorporated businesses do not have a separate legal identity from its owner(s). The owner(s) bear full liability for any action or inaction of the business: They may sue and be sued for business activity or inactivity. Unincorporated enterprises include sole proprietorships, partnerships, and family trusts. For details, please see https://www.ird.gov.hk/eng/paf/pam.htm#stpa.

**2. Hong Kong Census**

The microsample data set can be purchased from Census and Statistic Department. For the 1981 and 1986 waves, the sample data set covers 1% of the census. For the rest of the waves, the sample data set covers 5% of the census.

**a. Sampling Approach**

The sampling approach has been changed periodically. Caution is required when comparing statistical results across different waves.

1981, 1986, 1991: de facto enumeration approach.

1996: de jure enumeration approach.

2001, 2006, 2011, 2016: resident population approach.

**b. Income Variables**

The census income variables have two constraints:

First, both household income and individual income are top-coded. Taking individual income from employment as an example, monthly income above 99,998 HKD is top-coded in waves 1981 to 1991; monthly income above 150,000 is top-coded in waves 1996 to 2016. The share of the population with top-coded income varies from 1% to 2.5%. Nationally, on option to correct such census data is to apply the top correction using salary tax data.

Second, there are only two income sources for individual income:

*Income from employment*: for employers or self-employed persons, this is the amount earned excluding expenses incurred in running their main business; for employees, this is the total amount earned from their main employment including salary or wages, bonuses, commissions, overtime, housing allowances, tips, and other cash allowances.

*Income from other sources*: rent income, interest, dividends, education grants (excluding loan), regular/monthly pensions, social security payments, old age allowances, disability allowances, comprehensive social security assistance, scholarships, regular contributions from persons outside the household, contributions from charities.

One could potentially use the information contained under employment status to split income from employment into wage income and business income.

**3. Hong Kong Rich List (1988 – 2019)**

Wealth data in HK is very limited. Our rich list is retrieved from Forbes magazine. Before 2007, HK data come from the world billionaires list. From 2008 to 2012, the data are from Hong Kong's 40 Richest. Since 2013, data are from Hong Kong's 50 Richest.

**4. HK National Accounts (1980-2016)**

Our data are from the Census and Statistics Department of Hong Kong. The National Accounts of Hong Kong are highly aggregated. Only decomposition of primary income accounts and external accounts for the total economy are available. For details, please see Appendix E: HKG_NA.xlsx

**5. Hong Kong Opinion Survey on People's Ethnic Identity (2016-2021)**

The survey is conducted by-annually by the Hong Kong Public Opinion Research Institute (PORI).

The sample size is around 1000 (successful cases) for each survey. To ensure the

representativeness of the survey, a two-step procedure is used for sampling. First, the household is selected randomly by the telephone number using known prefixes assigned to telecommunication services providers under the Numbering Plan provided by the Office of the Communications Authority (OFCA). Invalid numbers are then eliminated based on computer and manual dialing records to produce the final sample. Second, after successful contact is made with a target household, one member of the household is selected among those present using the "next birthday" rule.

For more details on both surveys, please see https://develo.pori.hk.

## Appendix B: Technical Notes on Constructing Wage Inequality Series

**Step 1**. We first estimate the raw wage distributional series (**svy_wage**)[52] from 1981 to 2016 using a sample data set from the Hong Kong population census.[53] There are two following concerns with census-based series:

First, wage income in the census is top-coded (see **Table 1**), which will generate a downward bias at the top of the wage distribution.

**Table 1. Top-Coding in Hong Kong Population Census**

| Year | Sample Size | Threshold of wage income per | **Individual Wage Income** | |
|---|---|---|---|---|
| | | | % obs. | No. of obs. |
| | person | HKD | % | |
| 1981 | 30,546 | 99,998 | 0.00% | 1 |
| 1986 | 42,954 | 99,998 | 0.00% | 1 |

[52] Including wage and pension income.
[53] For waves 1981 and 1986, the sample data set covers 1% of the full census; for waves 1991, 1996, 2001, 2016, 2011, and 2016, the sample data set covers 5% of the full census.

| | | | | |
|---|---|---|---|---|
| 1991 | 194,161 | 99,998 | 0.07% | 128 |
| 1996 | 231,851 | 150,000 | 0.19% | 442 |
| 2001 | 255,500 | 150,000 | 0.19% | 482 |
| 2006 | 273,072 | 150,000 | 0.15% | 409 |
| 2011 | 299,868 | 150,000 | 0.29% | 873 |
| 2016 | 307,986 | 150,000 | 0.35% | 1,090 |

Second, due to misreporting and small sample bias at the top, even census data could fail at tracking developments of the top tail of the distribution.

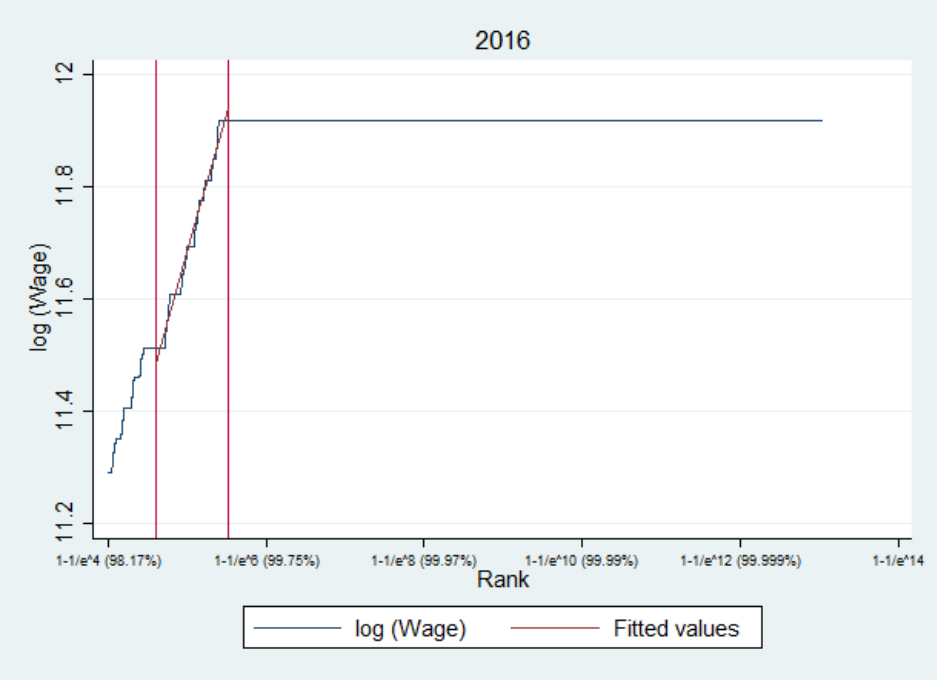
**Step 2**. We then correct the observations with top-coded income, assuming that the top of the wage distribution follows a Pareto distribution.

$$F(x) = 1 - (c/x)^{\alpha}, \text{ for } x>c>0$$

A property that characterizes the Pareto distribution is that the average income of individuals above any income threshold, divided by that threshold, is constant and equal to the inverted Pareto coefficient $b = \alpha/(1-\alpha)$. Using the observations near the top-coding threshold,[54] we can estimate the inverted Pareto coefficient $\hat{b}$ (see Blanchet et al. 2018 and Blanchet et al. 2022). **Figure 1** presents the log (wage) and its fitted value in the range between the top 1% and top 0.35% wage earners in 2016. By applying the estimated inverted Pareto coefficient $\hat{b}$ to the threshold, we can estimate the average wage for the observations above the top-coding threshold and assign the average wage to each observation. Finally, we estimate the wage distributional series (**uncoded_svy_wage**) based on the top-coding-corrected survey.

**Figure 1. Estimating the Inverted Pareto Coefficient $\hat{b}$**

[54] For example, using the observations with wage income between the top 1% and the top-coding threshold.




**Step 3.** To overcome the problem of missing survey data for top incomes, researchers have been increasingly turning to fiscal data. This idea can be traced back to the seminal work of Kuznets (1953). Piketty and Saez (2003) and Piketty (2003) have contributed to this literature by applying a similar method to more recent data for France and the United States. However, fiscal data also have limitations. They usually only cover the top of the distribution. In the case of Hong Kong, the salary tax data cover 10% adult population in 1981 and 30% of the adult population in 2016. Additionally, fiscal data include at best a limited set of covariates for the taxpayers. In the case of Hong Kong, salary tax data provide tabulations of salary income,[55] containing information on the number and declared income of individuals by income bracket.

In order to compensate for the weakness of the different data sources, there has been an ongoing effort to combine surveys with tabulated fiscal data. There are essentially two methodological approaches for doing this in the literature. The first uses reweighted survey observations. A recent study on Brazil by Medeiros et al. (2018) uses tabulated fiscal data to reweight the census population by income

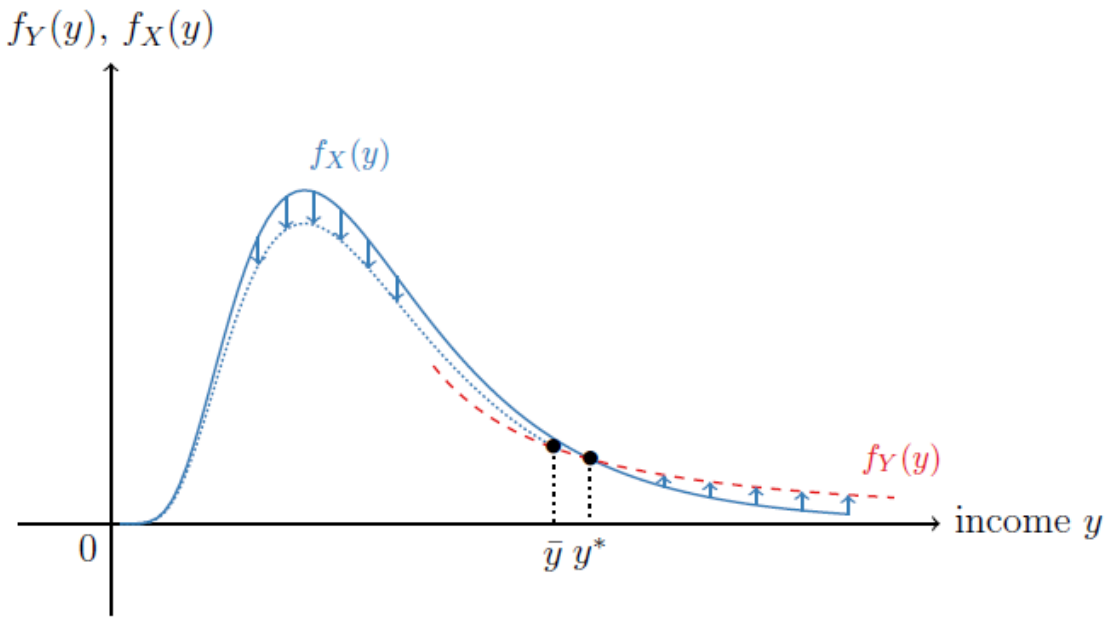
[55] Incomes from any employment and pension arising in or derived from Hong Kong.

intervals above a specified merging point. The second approach uses incomes from fiscal data to replace the survey incomes above the merging point. For example, the cell means in the survey distribution of income are replaced by those from the tax distribution for the same-sized cells (i.e., fractiles) of equivalent rank in the population (see Burkhauser et al. 2016; Piketty et al. 2019; Alvaredo 2011). However, in both approaches, the merging point above which the fiscal data are applied to adjust the survey data is not determined endogenously, but chosen by the authors as the most relevant point beyond which the fiscal data present a more concentrated distribution. Sometimes such choices may be arbitrary.

To address this issue, Blanchet et al. (2019) proposes an innovative method to endogenously determine a single merging point. The basic idea of their method is to adjust the weight of the survey using fiscal data in a non-parametric manner that preserves the continuity of the density of income. **Figure 2** illustrates the intuition behind the method. By conducting simulations of the method and applications to real data (from France, Norway, the United Kingdom, Brazil, Chile), Blanchet et al. (2018) demonstrate that their method produces estimates that are consistently closer to true values with lower variance than other available survey correction methods using external data. For a more complete description of the process and detailed robustness checks of the method, see the appendix in Blanchet et al. (2018).

In our research, we apply the method proposed by Blanchet et al. (2018) to correct the census using salary tax tabulation. **Table 2** presents the endogenously determined merging point for each census year. We then we estimate the adjusted wage distributional series (**adjusted_svy_wage**).

**Figure 2. The Intuition Behind Reweighting**




The solid blue line represents the survey density $f_X$. The dashed red line represents the tax data density $f_Y$. Above the merging point $\bar{y}$, the reweighted survey data have the same distribution as the tax data (dashed red line). Below the merging point, the density has been uniformly lowered so that it still integrates to one, creating the dotted blue line. (Blanchet et al. 2018)

**Table 2. Merging Point of Survey and Fiscal Data**

| Survey Year | 1981 | 1986 | 1991 | 1996 | 2001 | 2006 | 2011 | 2016 | 2018 |
|---|---|---|---|---|---|---|---|---|---|
| Percentile | P95 | P92 | P97 | P97 | P82 | P88 | P85 | P86 | P81 |

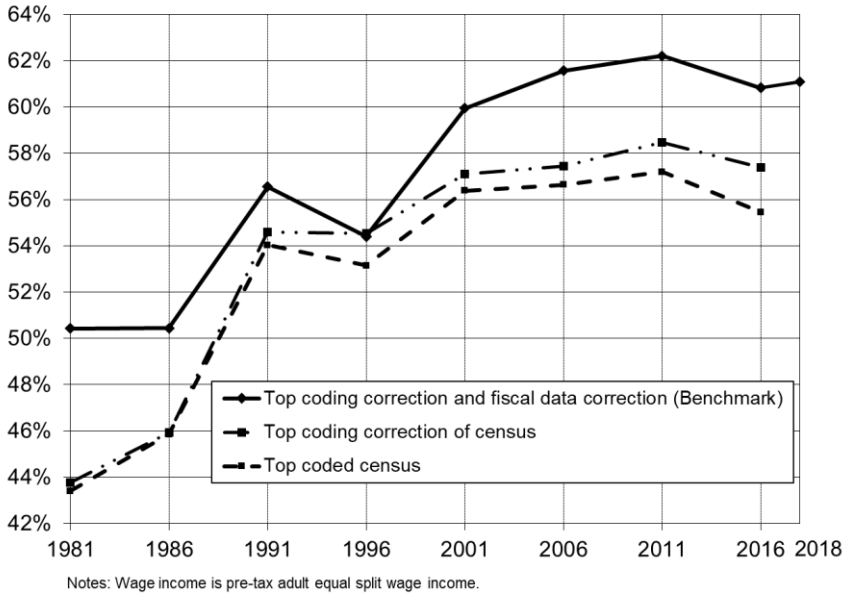
Unfortunately, census data are not available for the year 2018. In order to estimate corrected wage inequality in 2018, we first interpolate the 2018 raw wage distribution using 2016 census and national accounts data by assuming a constant

growth rate of wage for all individuals, then apply the same correction using the 2018 Salaries Tax Assessment.

**Step 4.** In this step, we convert the individual adult wage into the adult equal-split wage within the household in the raw survey, the top-coding-corrected survey, and fiscal-data-adjusted survey, and then estimate the corresponding wage distributional series **svy_wage_eq**, **uncoded_svy_wage_eq**, and **adjusted_svy_wage_eq**. We choose adult equal split series estimated based fiscal data adjusted survey (**adjusted_svy_wage_eq)** as our bench mark series. **Figure 3** presents wage Gini coefficients before and after correction.

**Figure 3. Wage Gini Coefficients in Hong Kong, 1981-2018**

(Corrected Series vs. Census-Based Estimates)




Notes: Wage income is pre-tax adult equal split wage income.

## Appendix C: Technical notes on Blinder-Oaxaca-Type Decomposition Based on the RIF

The simplest version of the *RIF* decomposition approach assumes that the conditional expectation of the *RIF* of Gini index $G$ for income $y$, $RIF(y;G)$, can be

modelled as a linear function of the explanatory variables, given by matrix $X$, such that the $\beta$ coefficients can be estimated by OLS:

$$E(RIF(y;G)\,|X) = X'\beta$$

Then, by the law of iterative expectations:

$$G = E\big(RIF(y;\,G)\big) = E_X\,[E(RIF(y;G)|\,X] = E(X)\beta$$

This allows us to estimate the unconditional partial effects of the socio-economic characteristics. The $\beta$ coefficients can be interpreted as the marginal impact of a small change in $E(X)$ on the Gini index. Following the above equation, we can then write the difference between the Gini of the reference and target distribution, in our context different time periods, (with superscripts 0 and 1) as:

$$G^1 - G^0 = \bar{X}^{1\prime}\beta^1 - \bar{X}^{0\prime}\beta^0$$

Let us consider the counterfactual situation in which we give individuals in the target distribution the average characteristics of the reference distribution, while keeping their own coefficients. By adding and subtracting the inequality level in this counterfactual, $G_1^0 = \bar{X}^{0\prime}\beta^1$, and re-arranging terms, we can rewrite the inter-distributional differential in income inequality as:

$$G^1 - G^0 = (G^1 - G_1^0) + (G_1^0 - G^0) = (\bar{X}^{1\prime} - \bar{X}^{0\prime})\beta^1 + \bar{X}^{0\prime}(\beta^1 - \beta^0)$$

With this standard Blinder-Oaxaca decomposition, we are able to decompose the changes in inequality into two parts: mechanical changes in workforce composition (**composition effect**) and a **wage structure effec**t, which reflects changes in skill prices. It is important to stress that the decomposition ignores general equilibrium effects, as it is based on the assumption that changes in quantities do not affect changes in prices.

## Appendix D: Technical Notes on the Wealth Accumulation Model

Consider a simplified law of motion for wealth of fractile *i* at time *t*:

$$W_{t+1}^i = \left(1 + \ q_t^i + \sigma_t^i\right) W_t^i$$

with $q_t^i$ capturing the contribution of capital gains to wealth growth, and $\sigma_t^i = s_t^i Y_t^i / W_t^i$ capturing the contribution of savings to wealth growth. $s_t^i = S_t^i / Y_t^i$ is the savings rate of fractile *i* at time *t*.

Define net private wealth as $W_t = \sum_{i=1}^{I} W_t^i$, national income as $Y_t = \sum_{i=1}^{I} Y_t^i$, and the wealth share of fractile *i* in period *t* as $\omega_t^i = W_t^i / W_t$. Then the law of motion for the wealth share $\omega_t^i$ is:

$$\frac{\omega_{t+1}^i}{\omega_t^i} = \frac{1 + q_t^i + \sigma_t^i}{1 + q_t + \ \sigma_t}$$

$$\Rightarrow \frac{\omega_{t+1}^i - \omega_t^i}{\omega_t^i} = \frac{q_t^i - q_t + \sigma_t^i \ - \sigma_t}{1 + q_t + \ \sigma_t}$$

Where $q_t = \frac{\sum_{i=1}^{I} q_t^i W_t^i}{W_t}$, $s_t = \frac{\sum_{i=1}^{I} s_t^i Y_t^i}{Y_t}$, $\sigma_t = \frac{s_t Y_t}{W_t}$

Let $\omega_{t+1}^i - \omega_t^i = \Delta\omega_t^i$

$$\Rightarrow \frac{\Delta\omega_t^i}{\omega_t^i} = \frac{q_t^i - q_t + \sigma_t^i \ - \sigma_t}{1 + q_t + \ \sigma_t}$$

Let $r_t$ denote the average rate of return and $\alpha_t = \frac{r_t W_t}{Y_t}$ denote capital share of national income at time t. By analogy, we define $\alpha_t^i = \frac{r_t^i W_t^i}{Y_t^i}$ as the capital share of fraction i at time t.

$$\Rightarrow \sigma_t = \frac{s_t Y_t}{W_t} = \frac{s_t r_t}{\alpha_t}, and\ \sigma_t^i \ = \frac{s_t^i Y_t^i}{W_t^i} = \frac{s_t^i r_t^i}{\alpha_t^i}$$

$$\Rightarrow \frac{\Delta\omega_t^i}{\omega_t^i} = \frac{q_t^i - q_t}{1 + q_t + \ \sigma_t} + \frac{\frac{s_t^i r_t^i}{\alpha_t^i} - \frac{s_t r_t}{\alpha_t}}{1 + q_t + \ \sigma_t}$$

We denote as $\varphi_t^{q,i} = \frac{q_t^i}{q_t}$ the relative the asset price premium of fraction i at time t, $\varphi_t^{r,i} = \frac{r_t^i}{r_t}$ the relative rate of return premium of fraction i at time t.

$$\Rightarrow \frac{\Delta\omega_t^i}{\omega_t^i} = \frac{q_t}{1 + q_t + r_t * \frac{s_t}{\alpha_t}} * \left(\varphi_t^{q,i} - 1\right) + \frac{r_t}{1 + q_t + r_t * \frac{s_t}{\alpha_t}} * \left(\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i} - \frac{s_t}{\alpha_t}\right)$$

This equation decomposes the change in wealth share (in percentage) of fractile *i* into the asset price effect $\frac{q_t}{1+q_t+ r_t*\frac{s_t}{\alpha_t}} * \left(\varphi_t^{q,i} - 1\right)$, and the savings effect $\frac{r_t}{1+q_t+ r_t*\frac{s_t}{\alpha_t}} * (\frac{s_t^i}{\alpha_t^i} * \varphi_t^{r,i} - \frac{s_t}{\alpha_t})$. Based on the decomposition results, when holding aggregate parameters (i.e., $q_t, r_t, s_t, \alpha_t$) constant, the asset price effect in the change of wealth share is positively correlated with fractile *i*'s relative asset price premium $\varphi_t^{q,i}$, while the savings effect is positively correlated with *i*'s saving rate $s_t^i$, relative rate of return premium $\varphi_t^{r,i}$, and the reciprocal of the capital share in its income. The above decomposition also makes it possible to conduct simulations of the evolution of wealth shares.

## Appendix E: Income and Wealth Dataset

Click here to download the Appendix E (.xlsx file).

## Appendix F: Main Figures and Tables

Click here to download the Appendix F (.xlsx file).