

Public Housing and Spatial Mismatch in China's Hong Kong: Is Public Housing Concentration Related to Weaker Local Income

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Abstract. Public housing is a major policy instrument addressing housing affordability and socioeconomic inequality in Hong Kong. However, whether the spatial concentration of public housing promotes socioeconomic integration or reinforces the concentration of low-income households remains unclear. This study examines the relationship between public housing concentration and income distribution across the 18 districts of Hong Kong, using district-level data from Hong Kong and an OLS regression. The analysis focuses on whether districts with higher shares of public rental housing (PRH) display systematically different income outcomes. The results show a significant negative relationship between PRH household share and median monthly household income. Districts with higher PRH shares also have significantly higher proportions of low-income households, while robustness checks using alternative measures of income and public housing produce consistent results. Further analysis finds no significant regional heterogeneity between the urban core and New Territories. Overall, the findings suggest a negative association. Future research can combine quantitative analysis with qualitative evidence to better identify the mechanisms underlying this relationship.

Keywords: Public housing, income segregation, spatial redistribution, Hong Kong, Housing inequality

1. Introduction

Income segregation is a very serious problem in Hong Kong, which is cramped and densely populated. Hong Kong's public housing plays two core roles: on the one hand, as a social security system, it provides affordable housing for the people; on the other hand, it alleviates the problem of income stratification at the residential level through spatial redistribution of residents.

Housing in Figures 2025 from the Housing Authority shows that public housing accommodates nearly half of the population in Hong Kong [1]. More than half of the public housing communities

are built in the New Territories, and only a small number of public housing units are distributed on Hong Kong Island. This layout will move low - and middle-income families out of the city center with high housing prices, but the median household income in public housing-concentrated areas is still lower than the average level in Hong Kong.

The existing government report lists various descriptive statistical data separately and does not explore the relationship between the proportion of public housing, population aging, labor force status, and regional income segregation. Therefore, whether decentralized public housing can realize the mixed living of different income groups or just transfer the poor groups to the suburbs has not yet been answered.

This study fills this research gap by analyzing the official data of 18 Hong Kong administrative regions from 2021 to 2025. The study uses the least squares regression model, takes the median household income of each district as the explanatory variable, the proportion of public housing households as the core explanatory variable, and adds the population and economic control variables to evaluate the actual effect of the public housing space redistribution policy in alleviating income segregation in Hong Kong.

2. Literature review

Income segregation refers to the tendency for people of similar income status to live in the same area, and it has an adverse effect on social integration in urban settings. Affordability of housing is one of the factors that influence income segregation because poor families normally occupy low-cost neighborhoods, whereas rich families occupy high-cost areas. The rent-to-income ratio is a common tool used to gauge housing cost burden among households. However, spatial inequality does not necessarily mean that there will be adverse social effects [2].

This research is also connected to the spatial mismatch hypothesis. According to this hypothesis, the relocation of disadvantaged people to peripheral suburban areas can have a negative effect on their employment because of the increased distance between the places where they live and the jobs located in the city center. In the case of Hong Kong, the public housing estates are usually built in the New Territories. Does the resettlement of people to public housing create spatial-mismatch effects?

The Hong Kong housing system is part of the productivist welfare regime, where public housing acts as a supplement to a family-centered welfare regime [3]. Changes to housing policy after 1997 have impacted housing inequality in the city, where home ownership policies have increased housing disparities among different social classes [4].

Prior studies indicate that there is spatial inequality in terms of housing affordability in Hong Kong due to the interplay between market factors and government intervention in housing policies [5]. While the concept of urban-rural dichotomy may not be able to explain current residential segregation, segregation does exist in Hong Kong districts [6].

However, there are still some gaps in the research that should be mentioned. Firstly, the data provided by the government gives descriptive statistics regarding housing and income, but it is rarely applied to perform quantitative testing of the correlation between the concentration of public housing and local income. Secondly, most of the literature provides information at the city level and does not conduct any comparative quantitative analysis across all 18 administrative districts. Although there are no longitudinal studies in the field for the period of 2021–2025 post-pandemic, this paper will focus on cross-sectional district-level data from the 2021 census. Thirdly, many housing studies use administrative data provided by the government for governance purposes. The

problem of measurement mismatch between the indicator and the concept is never addressed. Lastly, regression analysis may find correlations but not causation.

In the context of such research, this paper provides empirical data at the district level for all 18 districts of Hong Kong. It bridges the gap in current literature by exploring the relationship between the distribution of public housing and income segregation in cities.

Table 1 presents the descriptive statistics for all variables used in the empirical analysis.

Table 1. Descriptive statistics

	N	Mean	SD	Min	Max
Median monthly household income (HKD)	18	29733.889	6998.329	21490.000	45040.000
PRH household share (pp)	18	26.935	16.735	2.725	59.277
Broad public housing share (pp)	18	41.019	22.792	3.224	80.921
Public housing population share (pp)	18	40.296	22.378	3.473	80.064
Low-income household share (pp)	18	36.860	5.915	26.476	46.255
High-income household share (pp)	18	22.705	8.877	12.125	41.612
Population density	18	20132.222	19004.448	1020.000	59700.000
Population aged 65+ (pp)	18	19.457	2.574	14.732	23.358
Unemployment rate (pp)	18	6.484	1.381	3.833	8.322
Median rent-to-income ratio (pp)	18	18.583	5.769	11.400	32.000
Same-district work share (pp)	18	16.577	6.156	8.032	33.126

Notes: The sample covers Hong Kong's 18 districts in 2021. Share variables are measured in percentage points.

3. Empirical strategy

3.1. Data and sample

Our study employs all 18 districts in Hong Kong. This period falls in the post-pandemic stage, which precludes the influence of external factors, such as public health, and establishes the interconnections between income segregation and public housing. All data are retrieved from official Hong Kong government sources, including district-level unemployment rate, PRH household share, and median monthly household income (HKD) from the Census and Statistics Department, with other factors from the 2021 Hong Kong Population Census [7].

3.2. Variables

The main dependent variable is median monthly household income (HKD) obtained from the 2021 Hong Kong Population Census. It gives the median value of monthly household income for each district, and we adopt its logarithmic form in regression analysis. This indicator reflects typical income levels among local households. Using median values can reduce bias caused by a small number of high-income households, so it serves as our primary outcome indicator.

Our independent variable is PRH household share (pp). Data for this indicator are from the 2021 Hong Kong Population Census, published by the Census and Statistics Department. It represents the share of households living in public rental housing within a district, measured in percentage points.

This is our key explanatory variable. It captures the scale of public-housing tenants across different districts, and our study examines its relationship with household income at the district level.

Control variables include demographic and economic factors. In terms of demographic factors, first, population density, which is derived from the 2021 Population Census published by the Census and Statistics Department. It counts the number of residents per square kilometre in each district. Second, population aged 65+ (pp). This data comes from the 2021 Hong Kong Population Census. It measures the percentage of people aged 65 and above in the district's total population, measured in percentage points. Third, low-income household share and high-income household share (pp). These indicators are obtained from the 2021 Population Census published by the Census and Statistics Department. They stand for the proportions of low-income and high-income households in all local households, in percentage points.

For economic factors, the first is the unemployment rate (pp). Data come from the 2021 Hong Kong Population Census. It shows the percentage of unemployed people in the local labour force (in percentage points). It reflects local labour market conditions. Second is the median rent-to-income ratio (pp). Its data are from the 2021 Hong Kong Population Census. It stands for the median share of rental costs in total household income (in percentage points). Finally comes the same-district work share (pp). Data are from the 2021 Population Census. It calculates the percentage of workers who work in the district where they live (in percentage points).

3.3. Model specification

We employ a regression model to investigate the impact of public housing provision (X) on median household income (Y), as specified in Equation (1):

$$Y_{it} = \beta_1 X_{1,it} + \beta_2 X_{2,it} + \varepsilon_{it} \quad (1)$$

Where $Y_{1,it}$ means the dependent variable for district i in year t ; $X_{1,it}$ represents the independent variable, namely the PRH household share; $X_{2,it}$ means district-level control variables. The term ε_{it} stands for the error term. The coefficient β_1 captures the marginal effect of public housing provision on household income, which is the main interest of this study. We estimate Equation (1) using ordinary least squares (OLS).

4. Empirical findings

The estimated results of Equation (1) are reported in this section in Table 2-5. This section will analyze the baseline relationship between the variables, robustness results, heterogeneity analysis, and an exploratory employment channel. Together, these will provide empirical evidence on the relationship between public housing provision and regional income disparities in Hong Kong.

4.1. Baseline relationship

Table 2 estimates Equation (1) and presents the relationship between PRH household share and Median monthly household income. Column (1) shows that the association between PRH household share and median monthly household income is significantly negative without controlling for regional characteristics. Column (2) adds the control variables, namely aged population share and population density. The association is still significant, with an estimated coefficient of -0.010,

indicating that a 1 percentage point increase in PRH is related to a 1% decrease in median monthly regional household income, holding other district characteristics constant.

Table 2. Baseline results

	(1) Log income	(2) Log income	(3) Low-income share	(4) Low-income share
PRH household share (pp)	-0.009*** (0.003)	-0.010*** (0.003)	0.246*** (0.070)	0.248*** (0.071)
Log population density		-0.044 (0.076)		1.603 (1.926)
Population aged 65+ (pp)		0.026 (0.029)		-0.529 (0.721)
Constant	10.528*** (0.112)	10.443*** (0.339)	30.229*** (2.659)	25.509** (9.516)
Observations	18	18	18	18
R-squared	0.508	0.555	0.485	0.542

Notes: HC3 robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Columns (3) and (4) replace median monthly household income with the share of low-income households as the dependent variable to further examine whether public housing provision is associated with spatial income segregation. Column (3) shows that the PRH household share is significantly and positively related to the share of low-income households without controlling for other variables. Column (4) further controls for population density and the share of the aged population. The estimated coefficient is 0.246, remaining high and positive. This indicates that a 1 percentage point increase in the PRH household share will bring a 24.6 percentage point increase in the proportion of low-income households.

Overall, the baseline results consistently show that regions with a higher share of PRH households tend to have lower median household income and a higher concentration of low-income households. These findings provide initial evidence that public housing provision is associated with spatial differences in income distribution across Hong Kong.

4.2. Robustness analysis

Table 3 examines the robustness of the baseline results by using alternative measures of the variables while retaining the same empirical strategy. Column (1) shows a strong negative relation between the PRH household share and Income, which is measured directly in Hong Kong dollars. The coefficient of -318.767 indicates that a 1 percentage point increase in the share of PRH households will lead to an approximately HKD 319 reduction in district-level median household income. The result is consistent with the baseline findings in Table 2, which suggests that the negative relationship does not depend on the logarithmic transformation of income.

Table 3. Robustness analysis

	(1) Income (HKD)	(2) Log income: broad PH	(3) Log income: PH population	(4) High-income share
PRH household share (pp)	-318.767** (118.310)			-0.443*** (0.124)
Log population density	-1106.988 (2519.725)	-0.083 (0.057)	-0.080 (0.056)	-0.392 (2.700)
Population aged 65+ (pp)	839.827 (980.699)	0.037 (0.029)	0.034 (0.028)	0.903 (1.051)
Broad public housing share (pp)		-0.008*** (0.002)		
Public housing population share (pp)			-0.008*** (0.002)	
Constant	32305.210*** (10724.401)	10.640*** (0.351)	10.670*** (0.338)	20.718 (16.122)
Observations	18	18	18	18
R-squared	0.530	0.582	0.591	0.615

Notes: Column (1) uses income in HKD; (2) uses broad public-housing household share; (3) uses public-housing population share; (4) uses high-income share as the outcome. Columns (2) and (3) retain log income. HC3 standard errors in parentheses. * p<0.10, **

$p < 0.05$, *** $p < 0.01$.

Broader public housing household share and the public housing population share, respectively, are used in Columns (2) and (3) to replace PRH household share. The coefficients remain negative, showing that the baseline relationship is not sensitive to the measurement of the independent variable.

After replacing the dependent variable with the share of high-income households in Column (4), the estimated coefficient indicates a strongly negative relationship. -0.443 shows that a 1 percentage point increase in PRH household share is associated with a 44.3 percentage point decrease in the proportion of high-income households.

Overall, these findings complement the negative relationship between the PRH household share and the median monthly household income presented in Table 2, suggesting the robustness of the baseline results.

4.3. Heterogeneity analysis

In order to investigate whether there is any significant difference in the impact of the proportion of PRH households on median household income across geographic zones, an interaction effect between the independent variable and the regional dummy (urban core vs. New Territories) is introduced in columns (1) and (2) of Table 4.

Table 4. Heterogeneity: urban core versus new territories

	(1) Log income	(2) Low-income share
PRH household share (pp)	-0.005 (0.004)	0.134 (0.131)
Urban core	0.255 (0.221)	-5.963 (6.284)
PRH share x Urban core	-0.005 (0.006)	0.119 (0.156)
Log population density	-0.082 (0.079)	2.479 (2.023)
Population aged 65+ (pp)	0.020 (0.031)	-0.382 (0.768)
Constant	10.731*** (0.271)	19.038** (8.655)
Observations	18	18
R-squared	0.591	0.569

Notes: Urban core comprises Hong Kong Island and Kowloon; the New Territories are the reference group. The interaction tests whether the PRH association differs by area. HC3 standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The coefficient of the interaction effect does not achieve statistical significance. The findings indicate that the inverse relationship between the proportion of public housing and district household income remains consistent across urban core and New Territories regions. A one percent increase in the proportion of PRH households exerts an equally strong depressing impact on local median household income regardless of whether the district falls into the urban core or suburban regions.

These findings suggest that the relation between concentration of public housing and regional income level lacks significant regional variation in Hong Kong.

4.4. Mediation test: unemployment channel

Table 5. Exploratory employment channel

	(1) Unemployment	(2) Unemployment	(3) Log income	(4) Log income
PRH household share (pp)	0.054*** (0.017)	0.066*** (0.016)	-0.010*** (0.003)	0.000 (0.002)
Log population density		0.238 (0.433)	-0.044 (0.076)	-0.008 (0.023)
Population aged 65+ (pp)		-0.293* (0.162)	0.026 (0.029)	-0.019* (0.010)
Unemployment rate (pp)				-0.153*** (0.023)
Constant	5.033*** (0.659)	8.196*** (1.994)	10.443*** (0.339)	11.701*** (0.235)
Observations	18	18	18	18
R-squared	0.426	0.586	0.555	0.940

Notes: Columns (1)-(2) test whether PRH share predicts unemployment. Columns (3)-(4) compare the log-income equation before and after adding unemployment. These cross-sectional associations are exploratory and are not causal mediation estimates. HC3 standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

In Table 5, stepwise regression analysis is conducted to assess if regional unemployment acts as a mediator. While Column (1) establishes the original finding of the significant negative relationship between PRH household share and median household income, Column (2) provides us with the observation of the positive relationship between an increase in PRH household share and the unemployment rate in the region. By adding the variable of unemployment rate into Column (3), we find that the coefficient of PRH share becomes smaller. Overall, the findings are consistent with our hypothesis since increased PRH household share increases the regional unemployment rate and, in turn, decreases the regional median household income.

5. Evaluation

When evaluating the paper, there are three considerations worth mentioning. First, the appropriateness of the data. Since most district-level statistics we used in this research are official

datasets from the Hong Kong government, mainly collected for administrative use, some indicators cannot perfectly match the relationship we aim to measure, creating partial mismatches. Second, our methodological scope focuses on quantitative OLS analysis. This is appropriate for identifying statistical relationships, but qualitative methods such as interviews could complement our findings by providing more insight into the mechanisms behind spatial redistribution. Finally, the causal connection between the main variables may not be fully confirmed. Our results identify significant associations rather than definitive causal effects.

6. Conclusion

Based on the official statistics and regression analysis of each district, this paper explores whether the spatial layout of public housing in Hong Kong can alleviate the phenomenon of cross-regional income segregation. The data confirm that the government has scattered a large number of public housing estates in the new territories and moved low-income families out of the high-income core urban areas. However, such spatial allocation cannot eradicate income segregation, because the median income of families in regions with a high proportion of public housing is generally low, and there are problems such as population congestion, serious aging, instability of the local labor market, and so on. The regression results further show that after controlling for population and economic variables, the higher the proportion of regional public housing, the lower the income level of the corresponding region.

In general, Hong Kong's public housing policy can alleviate residential stratification to a certain extent. The policy provided affordable housing for nearly half of the citizens, but failed to achieve a balanced income mix. It concentrated low-income groups in the suburbs, forming a new isolated area.

At the policy level, the government should balance the distribution of public housing in various administrative regions, launch targeted employment assistance and pension security plans for public housing clusters, and make the construction of affordable housing compatible with the supply of local jobs. Future research can expand the data time span, carry out cross-city comparisons, and further explore the relationship between public housing and income segregation.

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