Like Father Like Son?

Social Engineering and Intergenerational Mobility in Housing Consumption

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Abstract

Using Singapore's large-scale public housing program as a quasi-natural experiment, we demonstrate that affordable public housing promotes intergenerational mobility in housing consumption for disadvantaged families. We match 147,560 parent-child pairs with housing transaction prices from 1995 to 2018 and observe three mobility trends: upward for children in lower-class families, downward for children in middle-class families, and high persistence for children in upper-class families. Utilizing the launch of a new public housing scheme to develop a Difference-in-Differences estimator, we show that affordable public housing frees up budget constraints for disadvantaged families, increasing human capital investment in children and promoting upward mobility. Our results provide insight into a new pathway to promote intergenerational mobility through affordable housing.

Keywords: housing consumption, intergenerational mobility, social engineering programs, affordable housing, human capital investment

JEL Codes: J62, H4, E24, J68

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1 Introduction

To address rising inequality and unaffordable housing prices (Piketty, 2000; Krueger, 2012; Diamond and McQuade, 2019), governments around the world have enacted various policy interventions, such as building affordable public housing, imposing restrictions to cool down the market, or providing subsidies (Chetty et al., 2016; Chyn, 2018; Diao et al., 2019; Pollakowski et al., 2022). These policies have long-term effects, as housing is the largest household consumption good and can significantly affect the household resource allocation, not only within one generation but also across generations. In this paper, we examine the impact of public housing on intergenerational mobility in housing consumption.

Most existing studies investigate how economic well-being is transmitted across generations as measured by income (Corak, 2004, 2013; Fan, 2016; Fan et al., 2021; Emran et al., 2019) or wealth (Charles and Hurst, 2003; Boserup et al., 2013; Adermon et al., 2018; Fagereng et al., 2021; Black et al., 2020a). While consumption is more directly connected to consumers' utility and material well-being (Charles et al., 2014), few studies have examined intergenerational correlations in consumption, due to an absence of micro-data on expenditure records of parents and children. We try to fill this literature gap and focus on housing consumption, as it is not just the largest necessity good; households grow wealth when housing values appreciate. To our best knowledge, this study is the first to use a large sample of *ex-post* housing transaction data matched with personal demographic data to test intergenerational correlations in housing consumption. Compared to the Move to Opportunity (MTO) experiment which involved 4,604 low-income families (Chetty et al., 2016) or the Hope VI program in which 160 public housing projects were demolished (Haltiwanger et al., 2020), Singapore's social engineering program in public housing provides a valuable institutional setting by covering more than two million residents to generate large variations in housing costs. It also provides a social laboratory to test the impact of public housing on intergenerational mobility by reallocating household resources under budget constraints. Specifically, we hone in on the substitution effects between housing consumption and human-capital investment in offspring, which is an important channel influencing intergenerational transmission (Mogstad, 2017).

By matching housing transactions to a unique dataset on personal demographics from Singapore, we identify real housing consumption expenditures by tracking housing movements of parent-children pairs using transaction records from 1995 to 2018. Our individual-level matched data comprises

147,560 non-co-residing parent-child pairs, removing the co-residence bias commonly encountered in intergenerational mobility studies. We overcome the lifecycle bias (Haider and Solon, 2006; Nybom and Stuhler, 2016) by using housing transactions from the first observed wave for parents and the last observed wave for children, with a minimum age for children set at 30 years to be at the mid-life stage. Our housing consumption dataset is unlikely to be subject to attenuation bias (Solon, 1989, 1992) because housing is not frequently traded and has no excessive price fluctuations.

We assign ranks for housing consumption between 0 and 100 for children and parents of the same generation and regress the children's ranks on the parents' ranks. The resulting rank-rank slopes show three significant but non-monotonic patterns in intergenerational mobility: an upward trend for children born to families in the bottom half, a declining trend for middle-class families, and high persistence for wealthy families. Specifically, children born to parents ranking in the bottom 50 percentile ranks of housing consumption have an intergenerational persistence (mobility) estimate as low (high) as 0.06. The estimate for those born to middle-class parents in the 50-80 percentile ranks is 0.11, driven by downward mobility compared to their parents. Children with wealthy parents in the top 20 percentiles have the highest intergenerational housing rank correlation of 0.9.

We then demonstrate how affordable public housing can promote intergenerational mobility, particularly for disadvantaged families, by easing budget constraints and enabling investment in children's human capital. Singapore's government offers affordable housing to over 80% of residents with generous subsidies, offering a valuable institutional setting to test this mechanism. Financially constrained parents receive proportionally more grants from the public housing program. The mechanism is expected to work better in lower-income families with a lower correlation in intergenerational housing consumption than in wealthier ones. We find that children from the lower housing consumption spectrum (i.e., those who live in public/non-centrally-located housing) have higher mobility than children from the upper housing consumption spectrum (i.e., those who live in private/centrally-located housing).

We conduct a difference-in-differences (DiD) estimation to examine the causal effect of public housing on intergenerational mobility and test the trade-off between public housing and investment in children's human capital. To do this, we use the launch of the Build-to-Order (BTO) scheme, with the first batch of new public housing flats completed in 2005, as a quasi-natural experiment. It eases demand-supply imbalances in the public housing market and provides affordable new flats with subsidies to first-time Singaporean buyers. Our findings indicate significant upward mobility for children growing up in public housing after the BTO scheme. Specifically, the probability of surpassing their parents' housing ranks is as high as 11.2%, with an absolute increase of 6 ranks, controlling year, building, and year-postal sector fixed effects. Using the credit and debit card data from a leading bank in Singapore, we also show that the education expenditure increases by 17.4-29.4% among married public housing owners after the BTO scheme. However, we find no trade-off between housing consumption and household consumption other than education. Finally, by linking intergenerational mobility with cross-class marriage rates at the subzone level, we show that the intergenerational mobility promoted by the social engineering programs is likely reinforced by the increasing cross-class marriage rates.

This study contributes to two strands of literature. The first strand investigates intergenerational mobility in income and wealth (Solon 1992; Corak, 2004; Fan, 2016; Adermon et al., 2018; Fagereng et al., 2021; Black et al., 2020a; Fan et al., 2021), and extends to financial behaviors such as consumption, investment, and savings (Waldkirch et al., 2004, Charles et al., 2014, Black et al., 2017, 2020b; Bruze, 2018). In the context of housing, studies find that parental homeownership influences the growing-up housing environment of a child and has carryover effects on intergeneration mobility (Chiteji and Stafford, 1999; Helderman and Mulder, 2007; Blanden et al., 2021). Black et al. (2020a) examine the relationships between wealth inequality based on the imputed market value of housing and intergenerational transmission. We contribute to this set of literature by demonstrating a non-monotonic intergenerational correlation in housing consumption across different families. To the best of our knowledge, this is the first study to document such a correlation using *real* housing consumption, complementing the existing literature that relies on homeownership indicator or imputed housing values.

The second strand of literature examines various mechanisms behind intergenerational transmission in socioeconomic status. Many studies find the nurture channel has a stronger impact than nature on intergenerational mobility, via school finance (Biasi 2023), human capital investment (Mogstad, 2017; Fagereng et al., 2021; Li et al., 2018; Smith et al., 2019), child neighborhood quality (Chetty, Hendren, and Katz 2016; Chetty and Hendren, 2018a,b), redistribution preferences (Alesina et al., 2018), or differential fertility (Yu et al., 2023). In this paper, we provide the first set of empirical evidence on a new environmental pathway through which affordable public housing can relax the budget constraints of disadvantaged parents in their children's human capital investment, promoting upward mobility.

Singapore's experiences in using public housing to raise intergenerational mobility provide new insights into how large-scale social engineering programs could create intergenerational mobility for different segments of society. Our findings suggest that children from lower-housing spectrum (lower-income families) benefit the most from affordable public housing, which shows the strongest upward mobility across generations in housing consumption. However, the impact on middle-class or wealthier families, which exhibit downward or persistent intergenerational mobility in housing consumption, is less noticeable. These findings have policy implications for other countries seeking to emulate public housing policies to promote intergenerational mobility and call for policies that address declining trends in the middle class and persistence in the upper class of families.[1]

The rest of the paper is organized as follows: Section 2 provides an overview of social engineering programs in public housing in Singapore. Section 3 describes the three datasets used in the study. In Section 4, we outline our empirical strategies. Section 5 presents and analyzes the empirical results, while Section 6 discusses the mechanism behind the findings. Section 7 concludes the paper.

2 Singapore's Social Engineering Programs in Public Housing

Singapore's government makes large-scale public housing programs available and accessible to families over the city-state. The unique institutional setting of Singapore provides a natural laboratory to empirically study the effect of large-scale social engineering programs on intergenerational mobility in housing consumption. The Senior Minister, Mr. Tharman Shanmugaratnam, commented that "*these tasks cannot be left to the market, which on its own tends to amplify initial disadvantages and advantages through assortative mating, better-educated parents investing more time and resources in their kids, different peer influences shaping different aspirations as kids grow up, and top employers hiring people based on education or social pedigree"*.[2]

Singapore's Housing Market and Homeownership Rate Singapore has a dual-structured housing

1 "Social mobility is stubbornly low in many countries, median income growth negligible for a decade or longer, younger people see fewer prospects of getting good jobs and owning a home, and inequalities have widened. It is much easier to promote relative social mobility, when you have absolute mobility, where everyone is progressing. We must ensure this moving escalator continues. When the escalator slows or stops moving, those in the middle cannot be faulted for becoming more anxious not just about those who might catch up from behind." Singapore's Senior Minister Tharman Shanmugaratnam commented at a forum in UK in June 2019.

[2] This is extracted from a speech on social mobility, trust in the government and institutions delivered by Singapore's Senior Minister Tharman Shanmugaratnam in the UK in June 2019.

market consisting of a private and a public market. The private housing market offers diverse choices for homebuyers, including landed houses (terraces, semi-detached and detached houses) and non-landed houses (condominiums and apartments). The public housing market is divided into a primary and a secondary market. The primary market is a regulated market selling housing flats at subsidized prices to Singaporean citizens subject to meeting the eligibility criteria (Sing et al., 2006). Foreigners cannot buy public housing flats; they can only buy non-landed properties in the private market.[3]

Singapore faced acute housing shortage problems in the 1960s, with people living in crowded squatters without proper sanitation and clean water supply. In 1964, the government introduced the "Home Ownership for the People Scheme" to encourage families to own their homes. The Housing & Development Board (HDB) was set up in 1960 as the national housing agency to carry out large-scale public housing construction programs to build affordable housing to meet the nation's housing needs. Between 1960 and 1990, HDB completed nearly 667,575 housing flats and was instrumental in attaining the country's high homeownership rate of 87% by 1990, and stabilizing at around 90% as of 2022. Figure A1 portrays the geographic distribution of different generations of HDB public housing blocks. Most large-scale of public housing blocks at the later stages are located at the outskirts of the city state. We classify the regions into Core Central Region (CCR) and non-CCR to facilitate heterogeneous analysis in Section 5.

Build-To-Order System and Allocation of Public Housing HDB implemented different flat allocation systems over the years. Before 2001, HDB used a queue system known as the Registration for Flats System (RFS) to allocate new flats under construction. The RFS system could not quickly respond to changing market conditions, causing over-construction after the 1997 Asian Financial Crisis. The new Build-To-Order (BTO) system was implemented in April 2001 to replace the RFS system. Under the new BTO system, HDB will only commence construction of new public housing projects after 70% of the project's units have been registered. New HDB flats built under the BTO

[3] In 2017 and 2018, the average private residential property price was SGD1,183,375 (USD880,000), whereas public housing flats sold for an average SGD439,792 (USD327,000) in the resale housing market. In the new (primary) sale by the HDB, new housing flat prices are heavily subsidized, ranging from SGD86,000 (USD63,950) for a two-room flat to SGD415,000 (USD398,600) for a five-room flat in non-mature towns, and from SGD117,000 (USD87,000) for a two-room flat to SGD562,000 (USD418,000) for a four-room flat in mature towns. The Residential Property Act (Chapter 274) prohibits foreigners from owning vacant residential lands and landed houses without prior approval from the Controller of Residential Property, with the exception of landed developments in designated locations in Sentosa, a tourist island to the south of Singapore. We use the exchange rate of USD1: SGD0.74 as in 2023 for the conversion throughout the paper.

system after 2001 were called “BTO projects”. The typical time taken from flat allocation to completion and taking possession of BTO flats ranges from four to five years and the first BTO project was completed in 2005.

To apply for a BTO Flat, applicants must form a family nucleus made up of spouses, parents, children, or siblings. Unmarried couples could apply for new HDB flats under the Fiancé/Fiancée program. At least one of applicants must be Singaporean citizen, and at least one other is a Singapore citizen or permanent resident. Singles can apply for BTO flat when reaching 35 years of age. Applicants cannot own any other property and must have a household income of no more than SGD14,000 (USD10,400) for families or SGD7,000 (USD5,200) for singles.[4]

Housing Grants and Subsidy Programs Eligible first-time buyers are given housing grants of up to SGD80,000 (USD59,490) to ensure primary HDB flats are accessible to low-to-medium-income families.[5] BTO applicants are also eligible for housing loans offered by HDB, which consists of a downpayment equal to 10% of the loan value, and at an interest rate pegged to 0.1% above the interest rate of the national pension scheme—typically around 2.5%, that lasts up to a maximum of 25 years (HDB, 2022). Alternatively, applicants can choose to take up loans from private financial institutions. Housing grants are also provided for eligible buyers when buying public housing flats in the secondary (resale) market. Applicants for resale HDB flats may also subscribe to loans, should they meet the eligibility criteria on income ceiling.

Singapore government introduced various priority allocation schemes to promote intergenerational family bonding, such as the Married Child Priority Scheme (MCPS) and the Multi-Generation Priority Scheme (MGPS).[6] The schemes encourage married children to live near their parents and facilitate caregiving support within families. If married couples buy flats from the resale market, they will receive the Proximity Housing Grants (PHGs) of SGD30,000 (USD22,000) from the government if they live with their parents in the resale flat or SGD20,000 (USD15,000) if a resale flat is within 4 km

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4 To reflect the growth in national income, the income ceiling has been raised three times in 8 years to reflect growth in national income from SGD8,000 to SGD10,000 in August 2011, SGD12,000 in 2015, and to SGD14,000 in September 2019.

5 First-timer families who buy housing flats from the HDB can receive the Enhance Central Provident Fund (CPF) Housing Grant (EHG) of up to SGD80,000, which is tiered based on the income of first-time buyers, subject to the income cap of SGD9,000 (USD6,660) per month.

6 Under the MGPS, parents and their married children can make a joint application for two flats, which may include either studio apartments, two-room Flexi or three-room flats in a BTO project. If balloted, both parents and married children are given the opportunity to choose flats on the same floor or elsewhere in the BTO project.

of their parents' flats.[7]

3. Data Sources and Summary Statistics

We construct parent-child pairs from a large dataset of residents with social demographic characteristics and histories of residential addresses. Conventional household survey data do not track the movements of household members outside of their original families and are subject to small sample size constraints; they are not ideal for studying intergenerational mobility. To address those concerns, we turn to an alternative residential data which survey the demographic information of each Singapore resident at least 20 years old at each residential address. To combine with housing consumption, we merge the parent-child samples with housing transactions in the private and public housing markets. We also use alternative credit and debit card data obtained from a leading bank in Singapore to investigate the impact of housing on other household consumption such as education expenditure.

3.1 Residential Data

We first use a proprietary dataset containing demographic information, such as gender, age, race, home address, and housing type, for a large sample of 2,171,383 Singaporean residents of at least 20 years old from 1996 to 2018.[8] The residential data that capture longitudinally residents' address details in multiple waves allow us to track residents' housing movements based on changes in home addresses between any two consecutive waves of data.

We keep the cohorts to residents born in or after 1965, when Singapore gained independence, and the children's cohorts to those at least 30 years old to capture housing mobility in the mid- to late-life stages when they likely purchase their own homes. The youngest cohort in our sample consists of children born in 1984. We drop residences with more than 10 people in the same residence address. These houses could be rented out and used for worker quarters and other purposes, and people who lived in the houses could be unrelated non-residents. After dropping these residences, we retain 99.2% of the samples by residential address (Figure A2), and the samples are representative of the resident population. Details of the summary statistics will be discussed in Section 3.4.

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7 In 2018, the PHG was raised to SGD30,000 from SGD20,000 for married children, if they buy a resale flat to live with parents. The PHG remains at SGD20,000 if they buy a resale flat to live near their parents. The definition of "near" has been extended from 2km to within 4 km to give buyers more housing options (Chia, 2018).

8 According to 2019 mid-year estimates from the Department of Statistics Singapore, the total population of Singapore is 5,703,600 of which 4,026,200 are Singapore citizens or permanent residents. The total population equal to or above 20 years old is 3,213,000. Approximately 99.4% of the data are from 1996, 1998, 2000, 2005 and 2011.

Our residence database does not reveal information on the relationships of family members. Instead, we identify parent-child relationships based on people who share the same home addresses and have an age gap between 18 and 45 years. We omit those with more than two different parents (13.5%) in the same address, which may be those in the parent-in-law and child relationships. We also omit children with two parents of the same gender, which could be caused by measurement errors (3%). We further restrict parent-child pairs existing in the sample for at least two waves to minimize measurement errors, which reduces it by 10%.

We use the unique personal identity (ID) numbers and home addresses of residents in different years to track whether parents or children have moved and where they moved. We use the residential status in the first and the latest waves to represent the housing status of parents and children, respectively. Like in Charles et al. (2014), we focus on non-co-residing parent-child pairs since the homeownership status could not be observed from the dataset, and the co-residing parents and children share the same housing consumption. Specifically, we could identify a non-co-residence status for children referenced in the first data wave when they move out of the parent's residence. The final dataset of 147,560 non-co-residing parent-child pairs is one of the most comprehensive datasets constructed in Singapore. With the dataset, we conduct a series of empirical tests of patterns and mechanisms in intergenerational mobility of housing consumption.

3.2 Housing Transaction Data

We use two housing transaction price datasets: private housing transaction records from the Real Estate Information System (REALIS) published by the government agency Urban Redevelopment Authority (URA) and public housing transaction records from the HDB website. The REALIS database covers private housing transactions from 1995 to 2018, with information on residential addresses, floor levels, door numbers, transaction prices, floor areas, and sale dates. We match the residence address records to the latest private housing transaction price (in or before the observed data waves) by parents and children in the paired sample.

The public housing dataset contains resale transactions in the secondary market between 1997 and 2012, which include information on building addresses, room types (number of rooms), transaction prices, floor areas, and sale dates.[9] The resale market is a *laisser-faire* market where prices are

[9] Due to data limitations, we do not have complete details for the HDB resale transaction data after 2012 or first-time public housing purchase prices with generous government subsidies. Taking this into account, our estimate likely provides

determined and negotiated by willing buyers and willing sellers. The floor level and unit number of each transacted housing unit are not disclosed for privacy reasons. The floor level is instead reported by categories of 5 floors, such as floors 1-5, 6-10, etc.

We thus match the nearest public housing transaction records in or before the observed data waves in the same buildings with the same floor divisions and room types paid by parents and children, respectively. The measurement errors in the matching process are considered immaterial because public housing flats are highly homogenous. We drop the parent-child pairs with multiple public housing transactions by the same floor category, room type, and year, which account for 1.3% of the samples. All transaction prices are adjusted to 2014 Singapore dollars.

3.3 Credit and Debit Card Data

To portray a complete picture of household consumption, we supplement the housing data with a proprietary dataset of 187,249 debit and credit card members between 2010:04 and 2012:03 obtained from a leading bank in Singapore (Agarwal et al., 2020). The dataset covers information on other non-housing consumption by parents and children, which includes detailed transaction-level records on credit cards, debit cards, and cash withdrawals. It also contains a rich set of demographic and socioeconomic information, including age, gender, ethnicity, marriage status, residence type (owner or renter, public or private housing), and property address (at building level).

We restrict the sample to married homeowners between 25 and 55 years old, who likely have children. Based on the transaction date, amount, and merchant category in the records, we sum up individual consumption expenditure by month from all identified categories: education, transportation, supermarkets, entertainment, apparel, dining, travel, services, durables, bill payments and others from credit and debit cards. To facilitate channel analysis, we generate narrowly and broadly defined education consumption, where the former refers to the classification of "education" under debit and credit card consumption while the latter refers to "education" and "books and news". The final sample consists of 23,634 individuals with non-zero monthly education consumption under broad definition.

One potential caveat is that data on credit and debit card accounts for customers from other banks are unavailable. However, given the large market share of the bank, the dataset will be representative of average consumption behaviors by typical cardholders in Singapore. The expenditures computed

a lower bound of the true degree of intergenerational mobility in housing consumption.

from the bank's database are not likely to be subject to large measurement errors (Agarwal et al., 2020).

3.4 Summary Statistics

Table 1 presents the summary statistics for the sample of 147,560 non-co-residing parent-child pairs from residential data, with children born in 1965-1984 cohorts. By matching the resident samples to the housing transactions, we estimate the average housing price of children in the latest wave is SGD498,944.8 (USD369,219.2), which is approximately 30% higher than the average housing price of SGD385,121.5 (USD285,067.8) for parents in the first wave. The average age of children and parents is 39 and 58 years, respectively, representing the mid to late-life stages which are least subject to lifecycle bias (Nybom and Stuhler, 2016). The gender of children is balanced with 52% male. The proportion of children living in public housing flats is 83%, which is lower than 95% for their parents. The average number of children is 2.65 per household indicating multiple parent-child pairs from one family.

4. Empirical Strategies

This section describes empirical challenges in examining intergenerational mobility in housing consumption and our strategies to overcome those challenges and explore possible mechanisms.

4.1 Empirical Challenges

Co-residence bias is one major concern in intergenerational mobility studies based on household surveys. Conventional survey data usually cannot track individuals who move out of the households but maintain a close economic relationship, such as adult children. In this case, there is a selection bias if individuals self-select to remain at home. To overcome this empirical challenge, we use a large sample of residential data which track histories of changing residence status of parents and children over the years, as detailed in Section 3.1. We focus on non-co-residing parent-child pairs and by restricting children to be at least 30 years old in the main analysis—and using 35 in the robustness check—the non-co-residence status is likely to be stable, which is less likely to be affected by the co-residence bias at early stage of life.

Other than co-residence bias, two potential biases: lifecycle bias and attenuation bias, were also found in many empirical studies of intergenerational mobility. Lifecycle bias is caused by the correlations between the current and lifetime earnings or consumption that vary systematically over time. The current consumption of children, especially in an early stage, can produce inconsistent estimates of intergenerational mobility (Haider and Solon, 2006; Grawe, 2006). We eliminate this bias in the following four steps: first, we restrict a child's age to at least 30 to be at the mid to late-life stages which are least subject to lifecycle bias (Nybom and Stuhler, 2016), and explicitly control the age polynomials; second, we use the housing consumption of parents and children from the first and last observed data wave, as proxy for the their lifetime housing consumption respectively; third, we use a robust intergenerational rank correlation—rather than intergenerational elasticity (IGE) or intergenerational log-correlation (Nybom and Stuhler, 2016; 2017)—to measure intergenerational mobility in housing consumption; and fourth, we adopt a set of robustness checks, such as restricting children's age to 35 years and above and including additional control variables on gender and ethnicity.

Attenuation bias arises from transitory fluctuations in income or consumption in a specific year (Solon, 1989, 1992; Mazumder, 2005). The literature addresses this bias by either taking the average income or consumption over multiple years (Mazumder, 2005; Lee and Solon, 2009) or generate predicted values with instrumental variables (Gong et al., 2012). In the context of housing consumption, the attenuation bias is not likely material as housing is not traded frequently and housing prices are unlikely to fluctuate excessively. In addition, we use the transaction prices in the nearest years as proxy of housing consumption to further mitigate the attenuation bias.

4.2 Estimate of Intergenerational Mobility in Housing Consumption

We use the intergenerational rank correlation, i.e., the rank-rank slope, as our main estimate of intergenerational mobility in housing consumption. Nybom and Stuhler (2017) argue that the rank correlation is a more robust measure for intergenerational mobility than other measures, such as IGE and intergenerational log-correlation. We estimate the rank-rank slope as follows:

$$y_i^k = \alpha_0 + \alpha_1 x_i^p + Z_i' \alpha_Z + \epsilon_i \tag{1}$$

where y_i^k denotes the housing rank of a child from family i in the last observed wave, and x_i^p denotes the housing rank of their parents in the first observed wave. Specifically, we calculate the percentile rank between 0 and 100 for housing consumption based on the housing transaction prices in the first and last observed survey waves for parents and children, respectively (Dahl and DeLeire, 2008; Chetty et al., 2014). The rank of housing consumption for parents and children measures relative housing consumption in the respective generation. Z is a vector of controls, including parents' and children's age and age squared (Solon, 1989, 1992; Nybom and Stuhler, 2016, 2017). Standard errors are clustered at the family level.

We conduct a battery of robustness checks. First, we include additional control variables such as the ethnicity of parents and children, as well as the gender of children. Second, we restrict children's age to be at least 35 years old and parents' age to be at most 65 years old. Third, we cluster the standard errors at the building level instead. Last, we use alternative measure of intergenerational elasticity of housing consumption, instead of intergenerational rank correlation.

To test the heterogenous effect, we interact the parents' housing ranks with their housing category, type, or location in Eq. (1):

$$y_i^k = \beta_0 + \beta_1 x_i^p + \beta_2 I_i + \beta_3 x_i^p \times I_i + Z_i' \beta_Z + \delta_i \qquad (2)$$

where in the specification of housing category, I_i is a vector of dummy variables indicating that parents are from the bottom 50 housing ranks, middle class (50-80 ranks), or top category (80-100 ranks). In the parents' housing type specification, I_i equals 1 if parents are observed living in the private residence in the first wave; otherwise, it equals 0 indicating parents from public housing flats. In the specification of housing location, I_i is equal to 1 if the parents' first observed residence is in a Core Central Region; otherwise it refers to areas outside of CCR.

The rank-rank slope in Eq. (1) measures the relative mobility of children from families with low versus high housing consumption families. However, we cannot distinguish if the high mobility is driven by upward mobility from children born to parents with lower housing consumption or by downward mobility from children born to parents with higher housing consumption. Thus, we supplement the relative measure with a measure of absolute mobility, defined as the expected housing rank of a child conditional on parents' housing rank (Chetty et al., 2014). It investigates the outcomes of children from families of given housing consumption in absolute terms. We estimate the slope and intercept of the rank-rank relationship by regressing children's housing consumption rank on parents' housing consumption rank without control variables as revised from Eq. (1):

$$y_i^k = \gamma_0 + \gamma_1 x_i^p + \mu_i \qquad (3)$$

Obtaining $\widehat{\gamma_0}$ and $\widehat{\gamma_1}$ from Eq. (3), we then calculate the threshold point below which children's housing rank surpasses parents' housing rank:

$$y^* = \frac{\widehat{\gamma_0}}{1-\widehat{\gamma_1}} \tag{4}$$

where y^* represents the threshold at which child's housing rank equals parents' housing rank.

5. Intergenerational Correlation in Housing Consumption

We present baseline estimate on the average correlation in housing consumption across generations and heterogeneous patterns across housing category, type, and location in this section.

5.1 Baseline Estimate

Panel A of Table 2 presents estimates on the average rank-rank slope in housing consumption using Eq. (1). Columns (1) and (2) report the results without and with age controls for children and parents, respectively. We find high mobility in housing consumption across generations on average, with an estimate of 0.18 with statistical significance at the 1% level in both specifications. It indicates that if parents' housing rank increases by 10 percentile ranks, their child's housing rank will rise by 1.8 percentile ranks. This estimate is close to the intergenerational income correlation of 0.22 as estimated using 40,000 father-son pairs in Singapore by Yip (2019). It is also similar to the intergenerational linkages in home ownership of 0.11 estimated using the US PSID data (Waldkirch et al., 2004). Note that we use detailed transaction prices rather than a dummy variable indicating homeowner. In other words, the estimated intergenerational mobility in housing consumption in Singapore is likely higher than that in the U.S.

Our results survive a battery of robustness checks as presented in Table A1, by including additional demographic controls on the gender of children and ethnicity of parents and children (Panel A), using sub-samples at mid-life stages consisting of children at least 35 years old and parents at most 65 years old (Panel B), and clustering standard errors at alternative building level (Panel C). We also use an alternative measure of intergenerational elasticity in housing consumption which generates a comparable estimate of 0.27 with statistical significance at the 1% level (Panel A of Table A2).

To look for the threshold point below which children's housing rank surpasses parents' housing rank, we follow Eqs. (3)-(4) to calculate y^*. The result is presented in Column (1) in Panel A of Table 2, The threshold point equals 50.07, indicating that children born to parents in the bottom 50 percentile ranks surpass their parents in the absolute terms of housing consumption on average. On the contrary, children born to middle-class parents in terms of housing consumption perform worse than their parents. This motivates our exploration of heterogeneity analyses in the next subsection.

5.2 Heterogeneity Analyses

Graphic evidence Figure 1 shows interesting graphic patterns using the joint density of housing consumption ranks of parents and children. The *x, y,* and *z* axes depict the percentile ranks of parents and children and their joint densities, respectively. We find that in general, the closer the children's ranks to their parents' ranks, the higher the joint probabilities are, as captured by the ridge in the 3D graph. The joint density is the highest for the richest families, implying the highest persistence in housing consumption across generations. However, the joint density decreases with the widening of children's and parents' ranks, as captured by the skirt and base of the 3D graph. It confirms the heterogeneous patterns in intergenerational mobility across families with different housing consumption.

Figure 2 shows the 2D projection of the ridge of Figure 1. It illustrates the nonlinear pattern by plotting the child's average housing rank (y-axis) against that of the parents (x-axis). The 45-degree line indicates that children remain in the same housing rank as their parents, as in the concept of no absolute mobility. The intersection of the plotted line and the 45-degree line indicates the threshold point y^* at the 50.07 percentile rank. Again, the nonlinear pattern visualizes strong upward mobility in housing consumption for children born to bottom-half parents, being worse off than their parents for children born to the middle-class families, and strong persistence in intergenerational housing consumption for children born to upper-class families.

Empirical evidence Panel B of Table 2 displays intergenerational rank estimates conditional on parents' housing categories. Corresponding to the threshold point of 50.07 percentile rank, we divide parents' housing ranks into the bottom half (0-50 ranks), middle class (50-80 ranks), and upper class (80-100 ranks). For children born to parents with housing consumption in the bottom 50 percentile ranks, the estimate is as low as 0.06 and is statistically significant at the 1% level. Such an estimate implies high upward mobility for children born to bottom-half parents; the level of the estimate is comparable to the grandparent-grandchild rank correlation in wealth reported in Sweden (Adermon et al., 2018). The intergenerational rank correlation for children born to middle-class parents is almost twice as high as those born to bottom-half parents, reaching 0.17. This point estimate and the difference with the bottom-half estimate are statistically significant at the 1% level. For children born to parents at the top 20 percentile ranks, the intergenerational estimate is as high as 0.96, indicating high persistence in housing consumption across generations.

To test the robustness of this nonlinear pattern, we replicate Table 2 but using an alternative measure of intergenerational elasticity of housing consumption. The corresponding estimates are presented in Table A2. Again, a similar nonlinear pattern is evident in intergenerational housing consumption across bottom-half, middle-class, and upper-class families.[10]

We further investigate the intergenerational rank correlation by parents' residential type and location, as presented in Panels A and B of Table 3, respectively. The rank-rank estimate is approximately 0.14 for children who grew up in public HDB flats, indicating high mobility in intergenerational housing consumption. In contrast, the estimate is much higher for children who grew up in private housing, reaching 0.91 and indicating high persistence with parents in housing consumption. Both estimates, as well as the differences, are statistically significant at a high 1% level. It echoes the graphic evidence in Figure 2 that while children growing up in public housing enjoy upward mobility in housing consumption compared to their parents, children born to parents at the higher end, most of whom live in private residence, stagnate in the housing status. Similarly, children born to parents living in non-CCR, where most large-scale public housing estates locate, have an intergenerational rank correlation as low as 0.17, compared to an estimate of 0.32 for their counterparts born to families living in CCR with a higher share of private residence. Both estimates and their differences are statistically significant at the 1% significance level.

6. Mechanism Analysis: Impact of Public Housing on Intergenerational Mobility

Why do children growing up in public housing show higher intergenerational mobility than their counterparts from private residence? We hypothesize that one possible channel lies in a relaxed budget

[10] The elasticity estimates for upper-class families are smaller than the corresponding rank estimates, possibly due to larger variation in the housing consumption in levels than ranks, as shown in Figure A3. We also show the results of intergenerational mobility in housing consumption sorted by family size and ethnicity in Table A3, following Eq. (2). The difference in intergenerational mobility in housing consumption is not material among families with different sizes (Panel A). Malay families show the highest mobility in intergenerational housing consumption than Chinese and Indian families (Panel B).

constraint derived from affordable public housing. Parents with financial constraints face a tradeoff between housing consumption and investment in children's human capital. Affordable public housing frees up poorer households' budget constraints; parents are thus able to invest more in their children's human capital, which we posit will promote intergenerational mobility in housing consumption.

6.1 Graphic Evidence

To start, we visualize the correlation between the share of public housing and intergenerational mobility in housing consumption at the subzone level. Specifically, we first divide Singapore into 156 subzones with diagonals of 4km, according to the distance specification under the priority allocation schemes of public housing (Section 2). Figure A4 shows the divisions of subzones and Figure A5 presents the public vs. private housing classification in each subzone. We then calculate the proportion of public housing and intergenerational rank-rank coefficients in each subzone and plot them in the x and y axis of Figure 3, respectively.[11] A statistically significant and negative correlation of -0.2 is presented, affirming a positive association between the share of public housing and intergenerational mobility. The higher the share of public housing in the subzone, the lower the intergenerational rank correlation, and the higher the intergenerational mobility is.

6.2 Empirical Evidence

We then utilize Singapore's large-scale social engineering program in public housing, specifically the launch of BTO schemes as a quasi-natural experiment, to directly test the impact of public housing on intergenerational mobility. As introduced in Section 2, the launch of new BTO public housing flats reduces the demand-supply imbalance in the public housing market. Because of the co-movement between the new and resale public housing markets, the well-absorbed demand by the BTO market tames the resale market where our public housing transaction data come from, leading to affordable public housing in both the new and resale markets. Such affordability of public housing is expected to relax parents' budget constraints in investing child's human capital, resulting in higher housing rank of the child compared to that of the parents. We specify a difference-in-differences strategy to test this hypothesis:

$$y_{it} = \alpha_0 + \alpha_1 HDB_i \times BTO_t + X'_{it}\alpha_X + \varphi_t + \delta_i + \varepsilon_{it} \qquad (5)$$

[11] We exclude subzones with intergenerational rank-rank slope less than 0 or larger than 1, due to measurement errors or small sample bias.

where y_{it} is the outcome variable measured by either an indicator variable equal to 1 if child's housing rank surpasses parents' housing rank, or the rank difference between child and parents. HDB_i equals 1 if the first observed housing of parents is public housing, and 0 otherwise. BTO_t is defined as a dummy variable equal to 1 if the first observed year of parents is in or after 2005 as the first batch of BTO flats were completed in 2005. $X_{it}^{'}$ is a vector of demographic variables which include the age and age squared of parents and children. φ_t and δ_i indicate time and regional fixed effect, respectively. Standard errors are clustered at the family level. In the main analysis, we focus on the period of 1999-2007, to eliminate confounding impacts from the 1997-1998 Asian Financial Crisis and the 2008-2009 Financial Crisis. In robustness checks, we relax the sample restriction to include full time periods, cluster standard errors at alternative building level, and include additional controls such as gender and race of children.

Table 4 presents the DiD estimates using Eq. (5). Columns (1)-(3) display the results using the indicator variable of child surpassing their parents in housing rank as the outcome variable, while Columns (4)-(6) show the results using alternative measure of rank differences. We find that children growing up in the affordable BTO public housing are 16.6% more likely to surpass their parents in housing ranks, compared to counterparts growing up in the private residence, controlling year and postal sector fixed effects (Column (1)). The estimate is statistically significant at a high 1% level. Considering regional variations at a more granular level, we further control postal code (building) fixed effects with results presented in Column (2). The estimate remains positive and statistically significant, with the magnitude of 9.9%. To take the time-varying unobservables into account, we include additional year × postal sector fixed effects in Column (3). Again, the estimate remains robust in magnitude and level of statistically significant. We take this estimate of 11.2% from Column (3) as our preferred one, as it controls granular building fixed effects and unobserved time-varying factors.

Similar results are presented using the rank differences between the two generations. Living in the BTO public housing significantly raises child's rank by 5.99-8.59 compared to their parents, controlling different sets of time and regional fixed effects. All estimates are statistically significant at the 1% level. Our preferred estimate is 5.99 in Column (6), which takes building fixed effects and time-varying unobservables into account. Our results survive a battery of robustness checks as presented in Table A4, using the full sample including Financial Crisis periods, clustering at alternative building level, and controlling additional variables of gender and race of children. The DiD estimates indicate a positive and significant impact of affordable public housing on the upward intergenerational mobility in housing consumption, especially for children born to disadvantaged families with budget constraints.

6.3 Relaxed Budget Constraints and Child's Human Capital Investment

How does affordable public housing promote the upward mobility across generations? We turn to the credit and debit card data and test the hypothesized trade-off between housing consumption and investment in child's human capital. Specifically, we regress education expenditure on parents' housing type as well as its interaction with the BTO timeline. The estimation follows Eq. (5) though the outcome variable is the logarithm of education expenditure. Results are presented in Table 5. Columns (1) and (2) present estimates using narrowly and broadly defined education consumption as the outcome variable, respectively, as introduced in Section 3.3. It is found that before the launch of BTO, growing up in public housing is associated with an increase in education expenditure controlling age, income, year-month and individual fixed effects, though the estimate is not statistically significant. After the BTO scheme, however, the estimate turns to be statistically significant, with increases of 29.4% and 17.4% in the category of narrowly and broadly defined education consumption, respectively. In other words, growing up in public housing flats, especially after the BTO scheme, likely eases parents' budget constraints and boosts investment in child's human capital.

One potential concern is that parents may trade off housing consumption with other non-housing consumption instead of investing in children's human capital. To test this hypothesis, we examine explicitly the effect of parents' residential type on non-housing consumption other than education. Results are presented in Column (3). No statistically significant impact appears, suggesting no evident trade-off between housing and non-housing consumption other than education.

The large-scale public housing program can also help explain the downward mobility in housing consumption of children born to middle-class parents and the high persistence of children born to top-rank parents. Most middle-class parents cannot benefit from the public housing scheme due to income ceilings, resulting in substantial expenditure on housing consumption. This is likely to reduce human capital investment in their children, leading to downward intergenerational mobility in housing consumption. However, parents in the very top wealth bracket, who are subject to weak or no budget constraints, can enjoy high housing consumption without compromising their investment in children's human capital, even if they are not eligible for the public housing scheme.

Is the intergenerational mobility in housing consumption promoted by social engineering programs a snapshot or a movie? To answer this question, we link subzone-level intergenerational mobility with cross-class marriage rate, which equals 1 if the absolute difference in housing ranks between parents of a couple is larger than 50, and 0 otherwise. The correlation is visualized in a 3D graph shown in Figure A6, where darker the color represents higher (lower) rank-rank slope (intergenerational mobility). The height of the bar indicates the cross-class marriage rate. We find a negative and statistically significant correlation between the intergenerational rank-rank slope and the cross-class marriage rate. With a decrease of 0.1 in intergenerational persistence (mobility), the cross-class marriage rate rises by approximately 7.6%. In other words, the intergenerational mobility, as promoted by the public housing scheme, is likely to lead to more cross-class marriages, which in return can enhance the intergenerational mobility.

7. Conclusion

This paper investigates the pattern and mechanism of intergenerational mobility in housing consumption, using Singapore's large-scale public housing program as a quasi-natural experiment. We find heterogenous patterns across housing ranks: upward mobility for children born to bottom-half families, downward mobility for children born to middle-class parents, and high persistence for children born to top-ranked parents. Intergenerational mobility in housing consumption is more pronounced for children growing up in public housing flats and in the non-CCR areas.

By using the launch of the BTO scheme to developer a DiD estimator, we demonstrate that the affordable new public housing significantly promotes upward mobility across generations. Children growing up in the public housing estates have an 11.6% higher likelihood of surpassing their parents' housing ranks, with an estimated magnitude at 17.9 ranks. It is evident that the affordable housing frees up budget constraints for those parents and enables them to invest more in their children's human capital, thereby promoting intergenerational upward mobility. Our results survive a battery of robustness checks and are not subject to the potential contamination from trade-off between housing and non-housing consumption other than education. Finally, we link intergenerational mobility estimates with cross-class marriage rates at the subzone level. We find that high intergenerational mobility can be reinforced by high cross-class marriage rates.

While our evidence comes from Singapore, the findings are applicable to other nations that use social engineering programs in affordable public housing to promote upward mobility, especially for children born to disadvantaged families. Governments in both developed and developing countries are grappling with the reproduction of inequality across generations (Krueger, 2012; Corak, 2013; Fan et al., 2021). We offer a new solution to increase the intergenerational mobility through affordable public housing, which can be reinforced by the cross-class marriages to ensure stability.

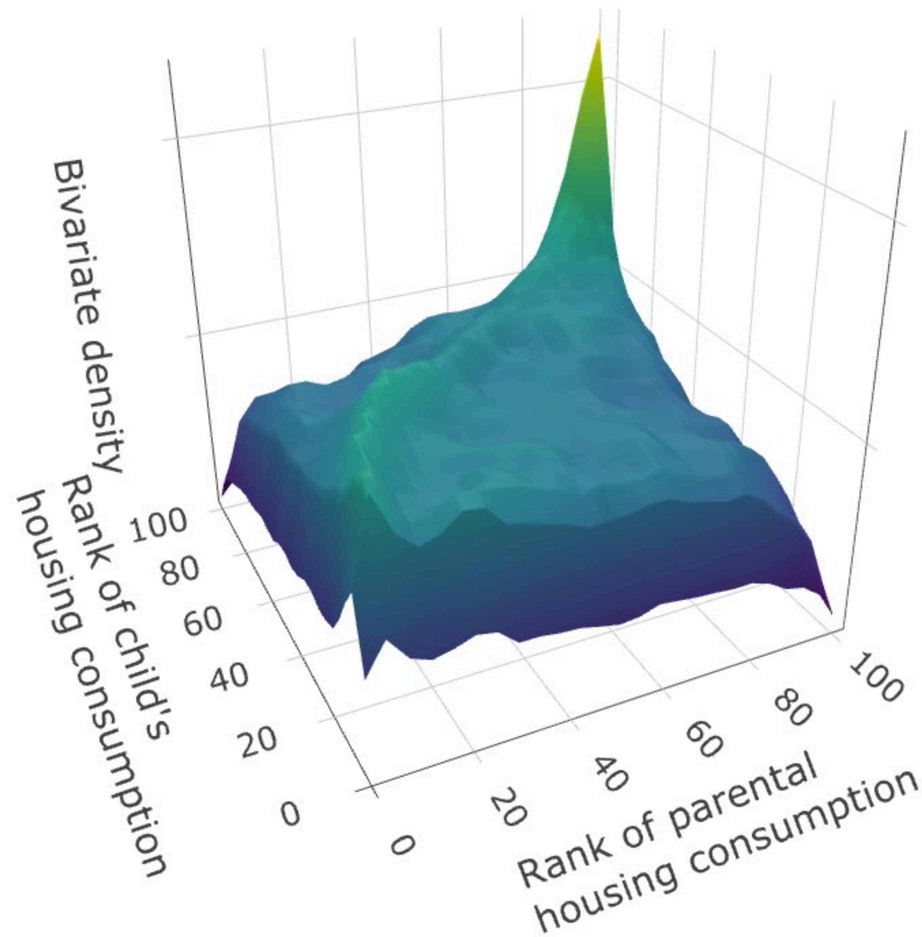

Figure 1: Joint Density of Housing Consumption Ranks of Parents and Children

Note: The x axis shows the percentile ranks of parents' housing consumption, from 0 to 100. The y axis presents the percentile ranks of children's housing consumption, from 0 to 100. The z axis indicates the joint density.

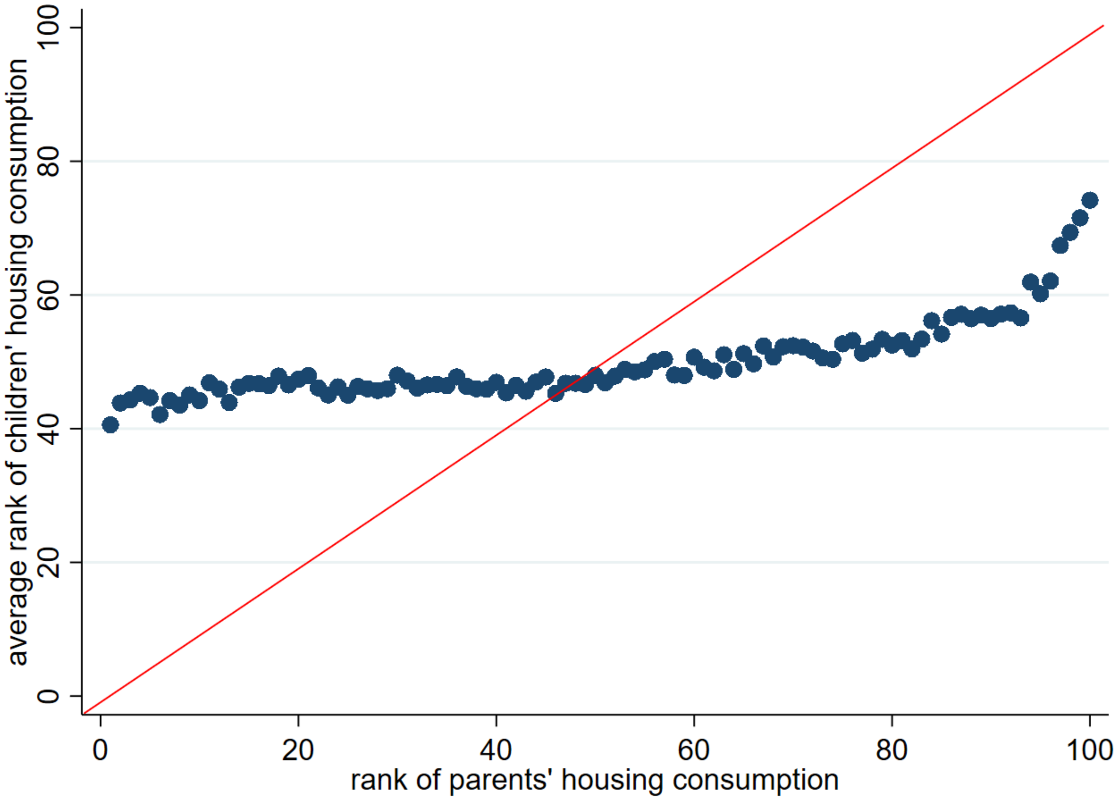

Figure 2: Child's Housing Rank versus Parents' Housing Rank

Note: The x axis shows the percentile ranks of parents' housing consumption, from 0 to 100. On the y axis, we calculate the mean of the corresponding children's housing consumption ranks.

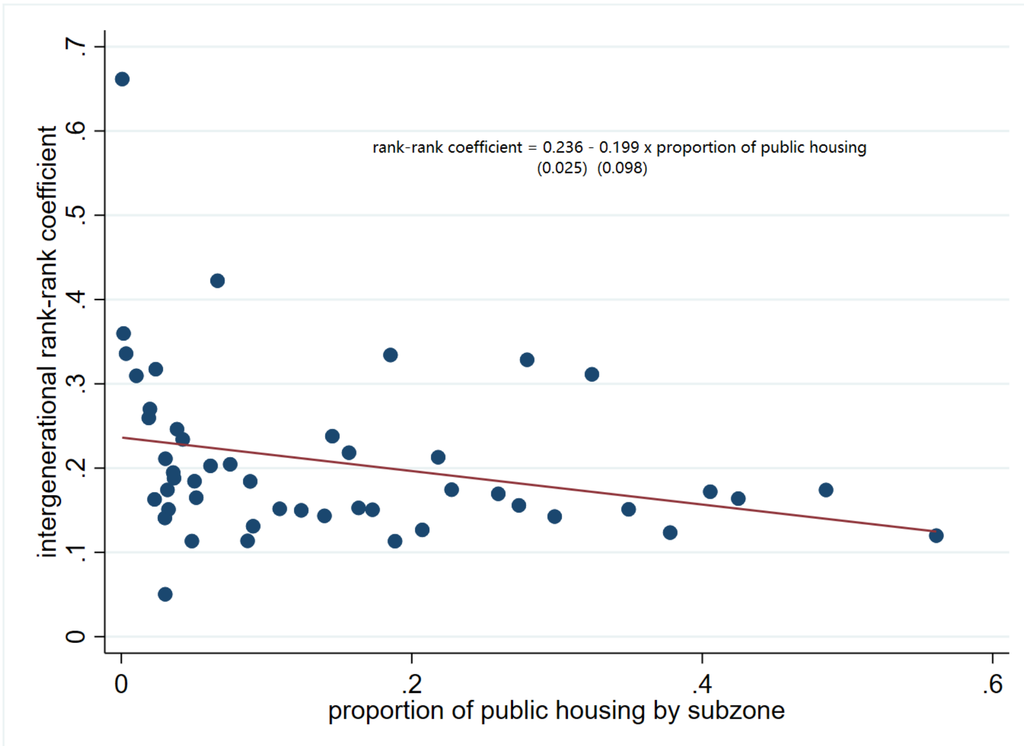

Figure 3: Correlation between Intergenerational Rank-Rank Coefficient and Proportion of Public Housing at Subzone Level

Table 1: Summary Statistics

Variable	**Mean (Standard deviation)**
Housing price of children in the latest wave	498944.8
	(461466.2)
Housing price of parents in the first wave	385226.7
	(362975.5)
Children's age in the last wave	38.92
	(4.24)
Parents' age in the first wave	58.25
	(7.46)
Children’s gender (male=1)	0.52
	(0.50)
Children's type of Residence (HDB=1, other=0)	0.83
	(0.38)
Parents’ type of residence (HDB=1, other=0)	0.95
	(0.22)
Number of children per family	2.65
	(1.20)
Observation	147,560

Note: Children are born in 1965 to 1984 cohorts and are at least 30 years old. Housing prices are adjusted to 2014 prices.

Table 2: Intergenerational Rank Correlation in Housing Consumption

Outcome Variable: Housing Rank of Children		
	(1)	**(2)**
Panel A. Full Sample		
Parents' housing rank	0.175***	0.176***
	(0.00292)	(0.00292)
Constant	41.31***	-
	(0.165)	-
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.031	0.036
Threshold for children's upward mobility (surpassing parents' rank)	50.073	-
Panel B. Parents' Rank in [0, 50], [50, 80], and [80, 100] Categories		
Parents' housing rank	0.0576***	0.0570***
	(0.00796)	(0.00795)
Parents' housing rank × I (parents in ranks 50-80)	0.111***	0.115***
	(0.0190)	(0.0189)
Parent's housing rank × I (parents in ranks 80-100)	0.901***	0.903***
	(0.0334)	(0.0333)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.041	0.046

Note: Additional regressors in Panel B include dummy variables for parents' housing rank categories. Standard errors are clustered at the family level.

Table 3: Intergenerational Rank Correlation in Housing Consumption by Parents' Residential Type and Location

Outcome Variable: Housing Rank of Children		
	(1)	**(2)**
Panel A. Parents in Private vs. Public Housing		
Parents' housing rank	0.136***	0.137***
	(0.00309)	(0.00310)
Parents' housing rank × I (parents in private residence)	0.770***	0.783***
	(0.155)	(0.154)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.040	0.045
Panel B. Parents living in outside core central region vs. core central region		
Parents' housing rank	0.171***	0.172***
	(0.00295)	(0.00295)
Parents' housing rank × I (parents in core central region)	0.146***	0.145***
	(0.0186)	(0.0186)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.033	0.038

Note: Additional regressors include dummy variables for parents' housing type in Panel A and parents' housing location in Panel B. Standard errors are clustered at family level.

Table 4: DiD Estimates on the Impact of BTO Launching on Upward Mobility of Children

	I (child's rank surpasses parents' rank)			child's rank - parents' rank		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
HDB parents × After BTO scheme	0.1662***	0.0985**	0.1120**	8.5913***	6.6131***	5.9903***
	(0.029)	(0.047)	(0.057)	(2.265)	(1.408)	(1.625)
Age of children	0.0558***	-0.0111**	-0.0122**	5.7353***	-0.0408	-0.0655
	(0.006)	(0.005)	(0.005)	(0.446)	(0.163)	(0.152)
Average age of parents	0.0194***	0.0084***	0.0064***	1.4818***	0.3708***	0.1864***
	(0.003)	(0.002)	(0.002)	(0.200)	(0.075)	(0.070)
Age^2 of children	-0.0739***	0.0134**	0.0146**	-7.4819***	0.0472	0.0671
	(0.008)	(0.006)	(0.006)	(0.572)	(0.209)	(0.195)
Average age^2 of parent	-0.0148***	-0.0068***	-0.0052***	-1.1088***	-0.2944***	-0.1406**
	(0.002)	(0.002)	(0.002)	(0.163)	(0.062)	(0.058)
Year FE	Y	Y	Y	Y	Y	Y
Postal sector FE	Y			Y		
Postal code FE		Y	Y		Y	Y
Year * Postal sector FE			Y			Y
Observation	104,341	104,341	104,341	104,341	104,341	104,341
R-squared	0.172	0.674	0.685	0.247	0.931	0.941

Note: Additional regressors include dummy variables indicating after 2005 and housing status of parents. Standard errors are clustered at family level. Years are restricted to be between 1999 and 2007 to exclude impacts from 1997-1998 Asian Financial Crisis and 2008-2009 Financial Crisis. "After BTO scheme" is defined as a dummy variable equal to 1 if the year is later than or equal to 2005, and 0 otherwise.

Table 5: Effect of Public Housing on non-Housing Consumption

	Ln(education consumption) (narrowly defined)	Ln(education consumption) (broadly defined)	Ln(non-housing consumption except education)
	(1)	**(2)**	**(3)**
HDB (=1)	0.0739	0.0534	-0.0222
	(0.0829)	(0.0415)	(0.0462)
After BTO scheme	0.0345	0.0442	0.0369
	(0.105)	(0.0521)	(0.0425)
HDB * After BTO scheme	0.294*	0.174**	0.0546
	(0.162)	(0.0805)	(0.0776)
Age	-1.935	-0.990	-0.915
	(1.821)	(1.062)	(0.935)
Age^2	0.00817	-0.236***	-0.0782
	(0.117)	(0.0607)	(0.0549)
Ln (income)	0.0245	0.0160	0.0529***
	(0.0262)	(0.0147)	(0.0185)
Year-month FE	Y	Y	Y
Individual FE	Y	Y	Y
Observation	138,115	138,115	138,115
R-squared	0.629	0.503	0.644
Mean (SGD)	129.151	185.079	1,677.496

Note: The data are from the debit and credit card consumption records from a leading bank in Singapore from 2010:04 to 2012:03. The sample is restricted to married homeowners between 25 and 55 years old, with non-zero monthly education consumption (broadly defined). The narrowly defined education consumption refers to consumption on the classification of "education". The broadly defined education consumption refers to consumption on the classification of "education" and "books and news". "After BTO scheme" is defined as a dummy variable equal to 1 if the completed date of the HDB building is later than or equal to 2005, and 0 otherwise. Standard errors are clustered at postal code level.

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Like Father Like Son?

Social Engineering and Intergenerational Mobility in Housing Consumption

Online Appendix

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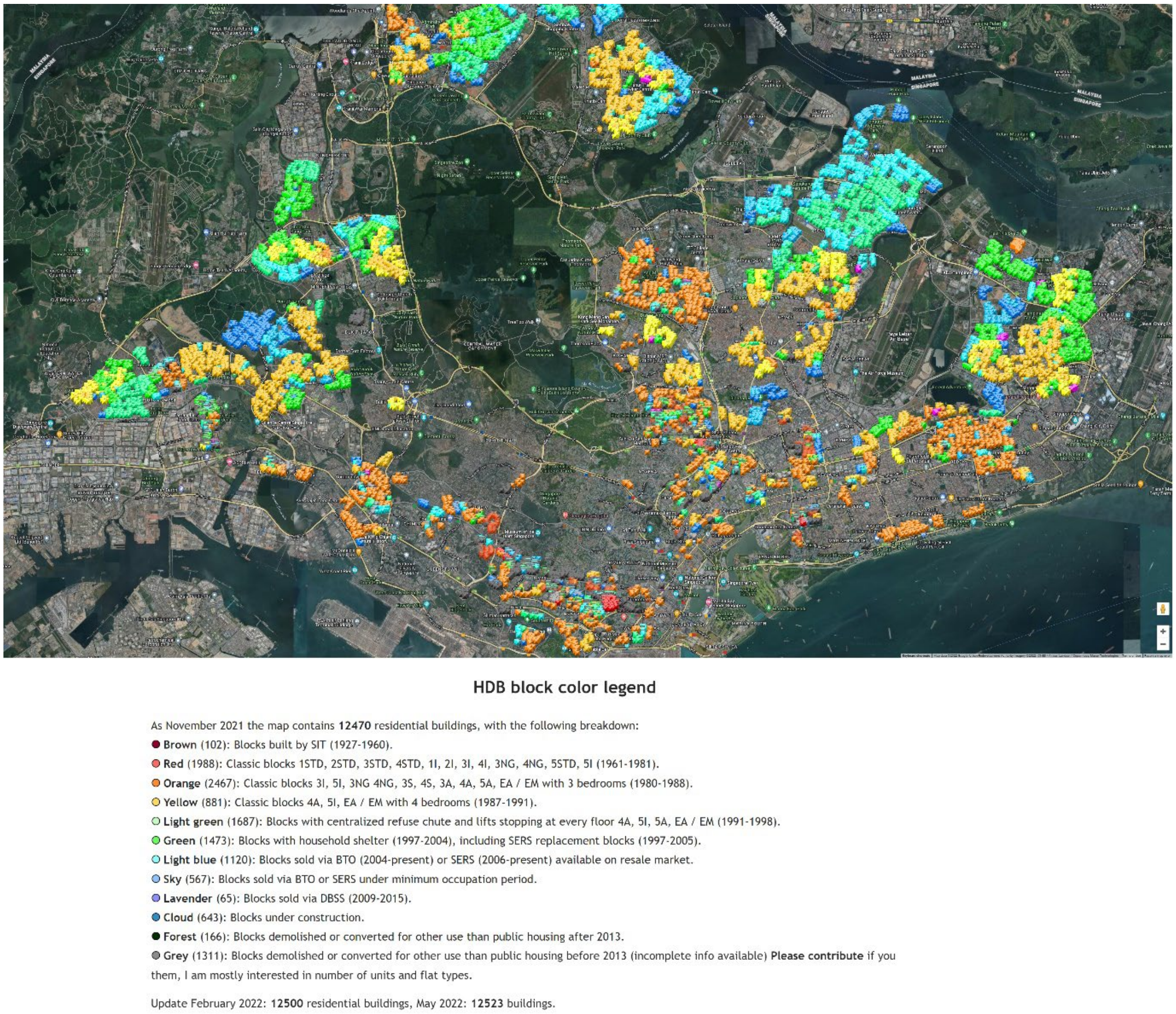


Figure A1: HDB Buildings and Distribution

Note: data are retrieved from Teoalida.com.

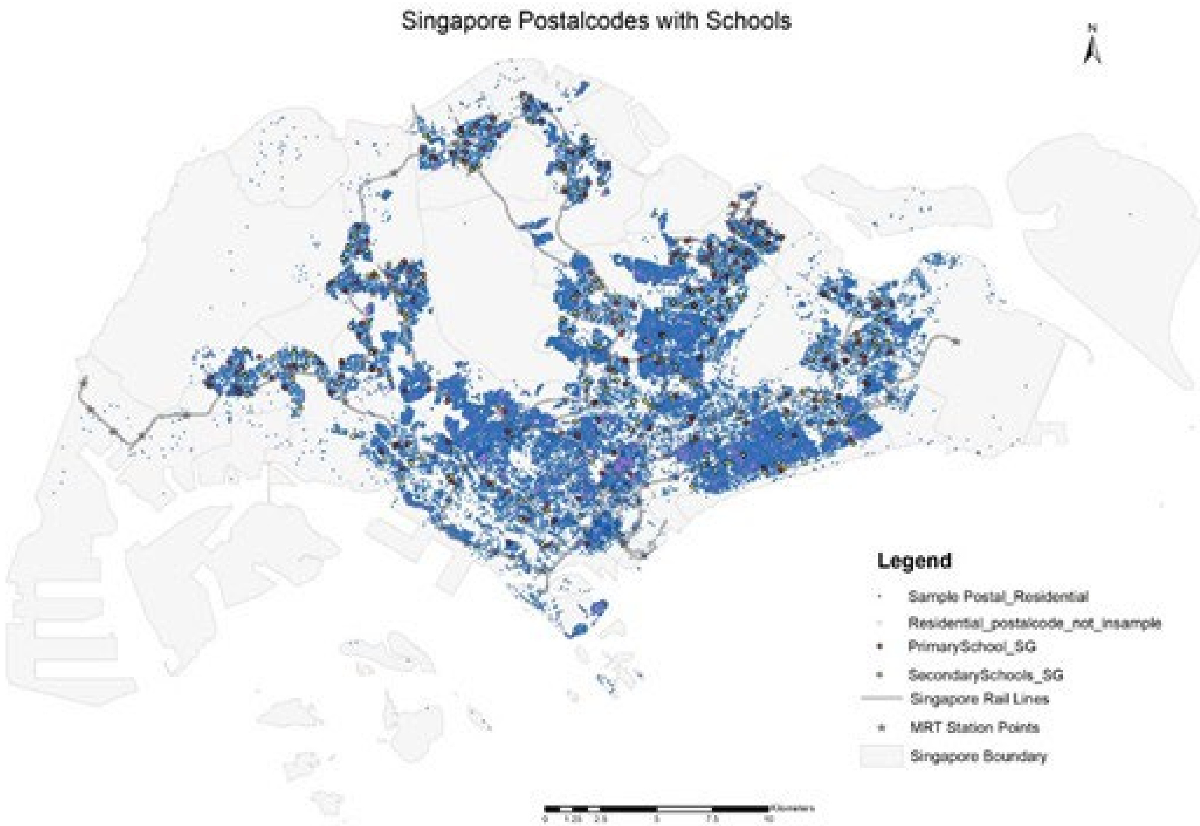


Figure A2: Residential Buildings Covered in the Data (89,624/90,370=99.2%)

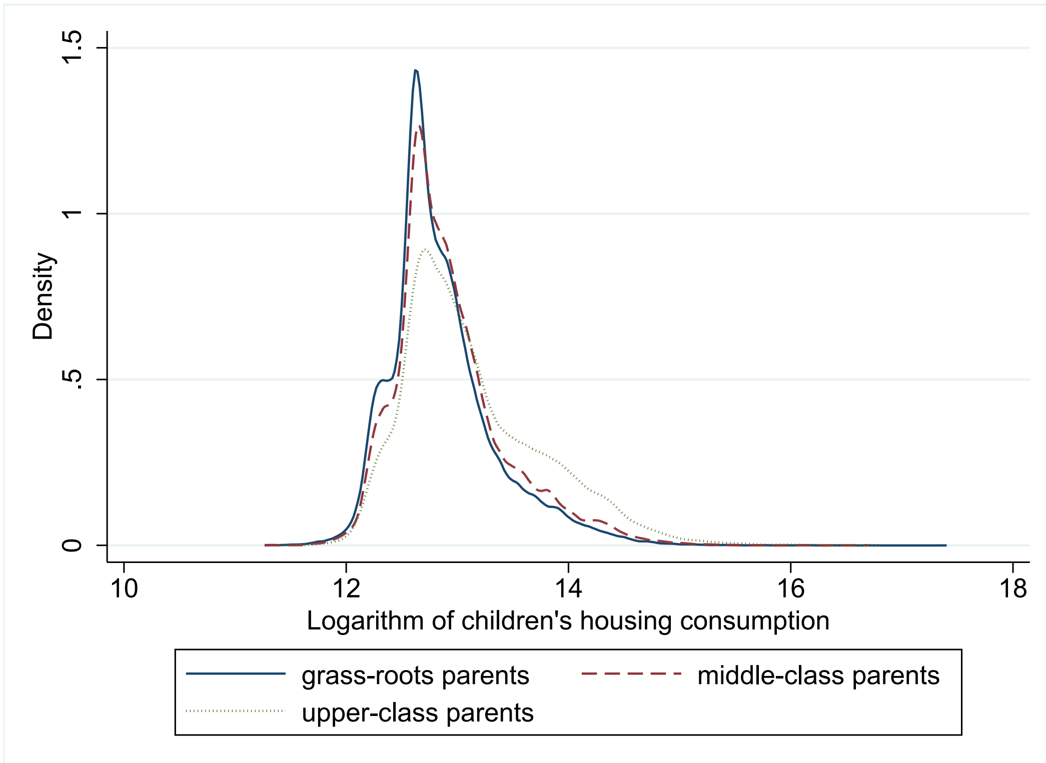


Figure A3: Density Distribution of Log Children's Housing Consumption conditional on Parents' Housing Category

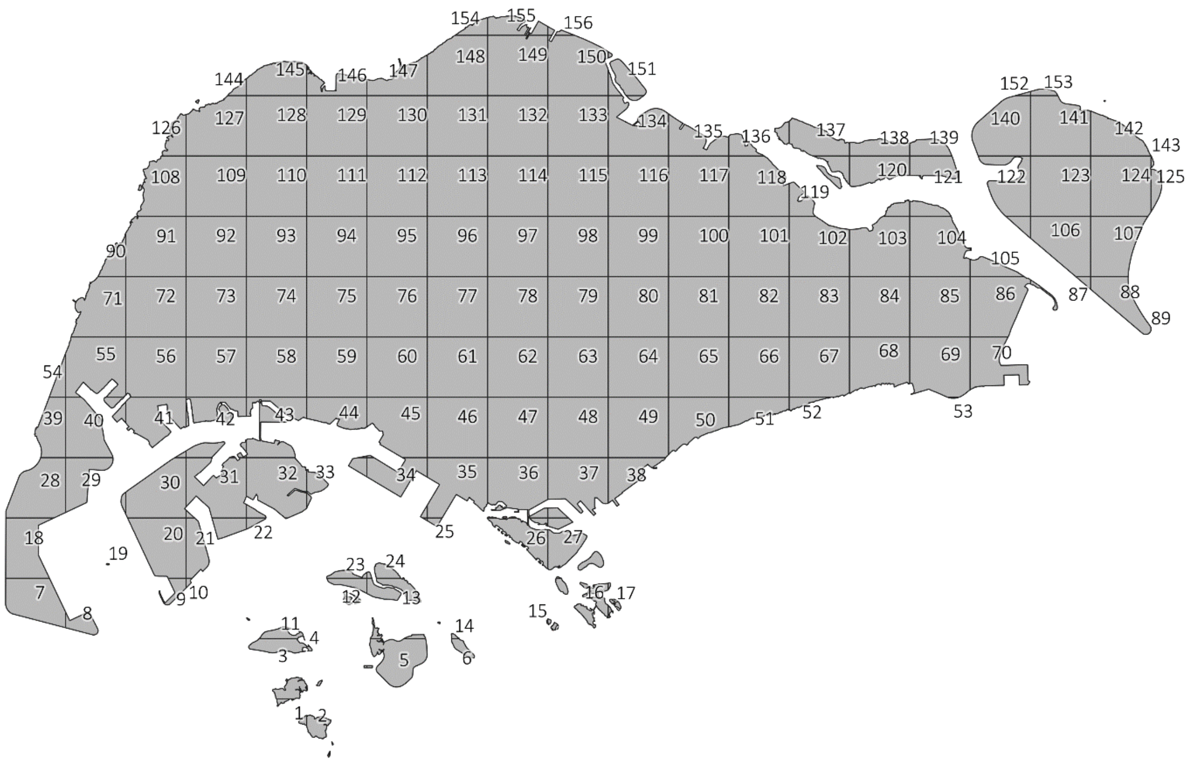


Figure A4: 156 Subzones in Singapore with Diagonals of 4 Kilometers

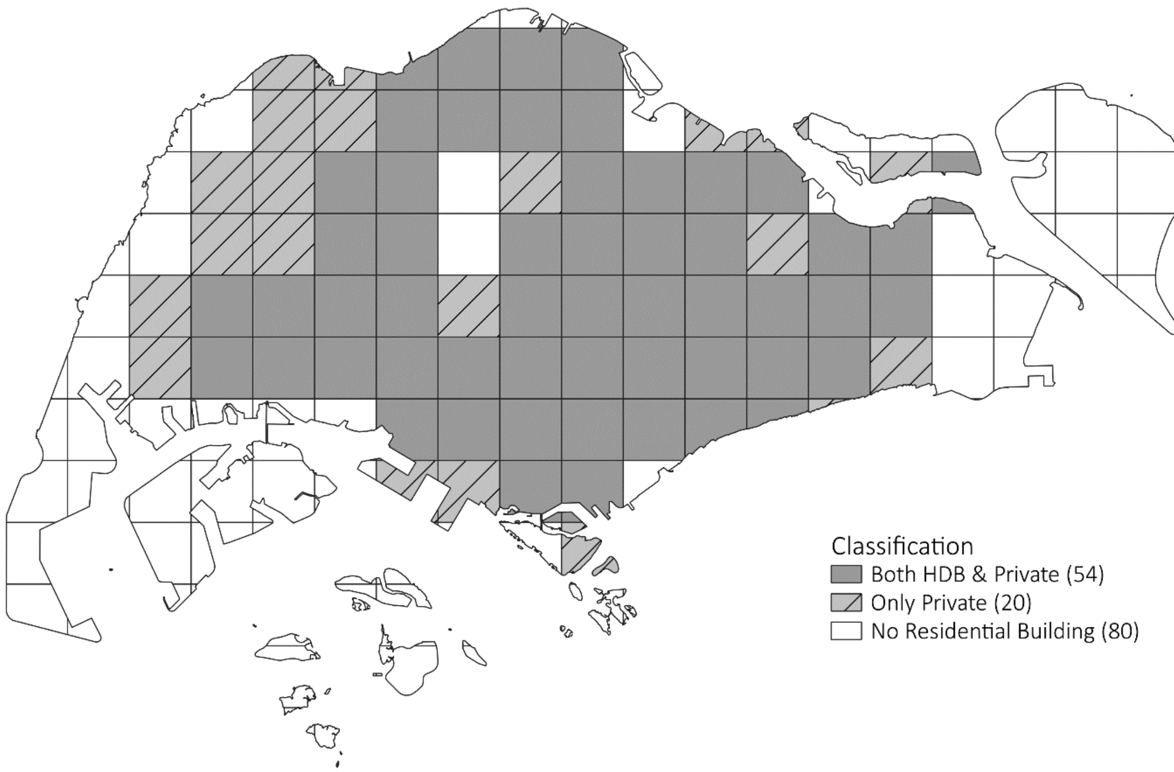
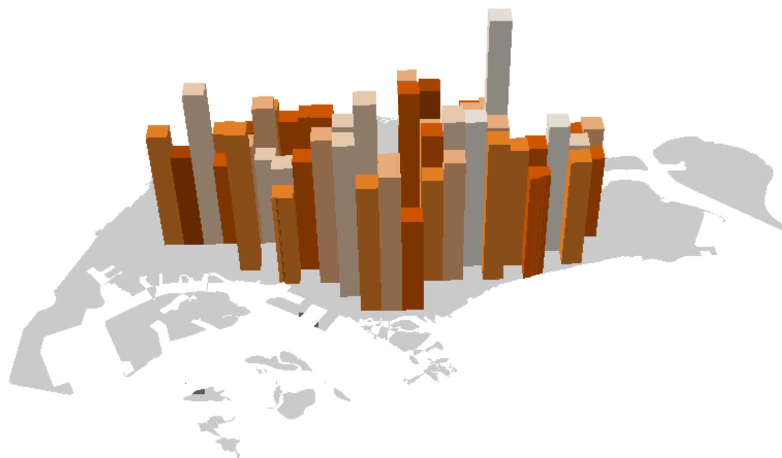


Figure A5: Distribution of Public and Private Housing across Constructed Subzones with Diagonal of 4 Kilometers



Cross-class marriage Rate = 0.65 – 0.76 × intergenerational rank-rank slope
(0.10) (0.17)

Figure A6: Cross-Class Marriage Rate and Intergenerational Rank-Rank Slope

Note: The cross-class marriage rate is defined as a dummy variable equal to 1 if the absolute difference in housing ranks between parents of a couple is larger than 50, and 0 otherwise.

Table A1: Robustness Checks: Intergenerational Correlation in Housing Consumption

Outcome Variable: Housing Rank of Child		
	(1)	**(2)**
Panel A. Robustness Check 1. Including additional demographic controls		
Parents' housing rank	0.176*** (0.00292)	0.164*** (0.00288)
Age polynomial controls for parents and children	Y	Y
Controls on ethnicity of parents and children and children's gender	N	Y
Observation	147,560	147,560
R-squared	0.036	0.061
Panel B. Robustness Check 2. Children at Least 35 & Parents at Most 65 Years Old		
Parents' housing rank	0.178*** (0.00421)	0.180*** (0.00421)
Age polynomial controls for parents and children	N	Y
Observation	67,822	67,822
R-squared	0.032	0.036
Panel C. Robustness Check 3. Standard Errors Clustered at Building Level		
Parents' housing rank	0.175*** (0.00353)	0.176*** (0.00353)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.031	0.036

Note: Standard errors are clustered by family in Panels A and B.

Table A2: Robustness Check: Intergenerational Elasticity of Housing Consumption

Outcome Variable: Log Housing Consumption of Children		
	(1)	**(2)**
Panel A. Full Sample		
Log housing consumption of parents	0.268***	0.271***
	(0.00410)	(0.00411)
Age polynomial controls for parents and children	N	Y
Observation	147,560	149,745
R-squared	0.056	0.060
Panel B. Parents in Grass-roots, Middle-class, and Upper-class Categories		
Log housing consumption of parents	0.0912***	0.0919***
	(0.0101)	(0.0100)
Log housing consumption of parents × I (parents in ranks 50-80)	0.136***	0.145***
	(0.0269)	(0.0269)
Log housing consumption of parents × I (parents in ranks 80-100)	0.316***	0.316***
	(0.0155)	(0.0155)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.062	0.066

Note: Additional regressors in Panel B include dummy variables for parents' housing category. Standard errors are clustered at family level.

Table A3: Heterogeneity in Intergenerational Correlation in Housing Consumption: by Family Size and Ethnicity

Outcome Variable: Housing Rank of Child		
	(1)	**(2)**
Panel A. by Family Size		
Parent's housing rank	0.181***	0.186***
	(0.00680)	(0.00679)
Parent's housing rank × I (family with 2-3 children)	-0.00665	-0.00900
	(0.00778)	(0.00776)
Parent's housing rank × I (family with 4 children or more)	-0.0165	-0.0185*
	(0.0101)	(0.0101)
Age polynomial controls for parents and children	N	Y
Observation	133,350	133,350
R-squared	0.036	0.040
Panel B. by parents' ethnicity		
Parent's housing wealth rank (baseline = Malay parents)	0.132***	0.133***
	(0.00663)	(0.00664)
Parent's housing wealth rank × I (Chinese parents)	0.0391***	0.0375***
	(0.00739)	(0.00739)
Parent's housing wealth rank × I (Indian parents)	0.0334**	0.0306*
	(0.0160)	(0.0160)
Parent's housing wealth rank × I (other parents)	0.0408	0.0379
	(0.0321)	(0.0320)
Age polynomial controls for parents and children	N	Y
Observation	147,560	147,560
R-squared	0.055	0.059

Note: Additional regressors include dummy variables for family size in Panel A and dummy variables for ethnics in Panel B. Ethnicity is defined as father's race. If there is no information on the father's ethnicity, mother's ethnicity is used instead. Standard errors are clustered at family level.

Table A4: Robustness Check: DiD Estimates on the Impact of BTO Launching on Upward Mobility of Children

	I (child's rank surpasses parents' rank)			**child's rank - parents' rank**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Full sample	Cluster s.e. at building level	Gender & race controls	Full sample	Cluster s.e. at building level	Gender & race controls
HDB parents × After BTO scheme	0.1270***	0.1120*	0.1120**	8.2250***	5.9903***	6.0059***
	(0.047)	(0.063)	(0.057)	(1.614)	(1.940)	(1.624)
Age of children	-0.0098**	-0.0122**	-0.0122**	0.0190	-0.0655	-0.0695
	(0.004)	(0.005)	(0.005)	(0.140)	(0.152)	(0.152)
Average age of parents	0.0059***	0.0064***	0.0063***	0.1661***	0.1864***	0.1771**
	(0.002)	(0.002)	(0.002)	(0.063)	(0.070)	(0.070)
Age^2 of children	0.0117**	0.0146**	0.0146**	-0.0122	0.0671	0.0742
	(0.005)	(0.006)	(0.006)	(0.179)	(0.196)	(0.195)
Average age^2 of parent	-0.0047***	-0.0052***	-0.0051***	-0.1301**	-0.1406**	-0.1342**
	(0.001)	(0.002)	(0.002)	(0.052)	(0.058)	(0.058)
Gender of children			-0.0001			-0.0835
			(0.002)			(0.064)
Chinese			-0.0105			0.5940
			(0.013)			(0.457)
Indian			-0.0126			0.3008
			(0.014)			(0.500)
Malay			-0.0141			0.2935
			(0.014)			(0.466)
Year FE	Y	Y	Y	Y	Y	Y
Postal code FE	Y	Y	Y	Y	Y	Y
Year * Postal sector FE	Y	Y	Y	Y	Y	Y
Observation	142,109	104,341	104,341	142,109	104,341	104,341
R-squared	0.664	0.685	0.685	0.929	0.941	0.941

Note: Additional regressors include dummy variables indicating after BTO scheme and housing status of parents. Standard errors are clustered by family if not specified.