

# Housing and Inequality <sup>\*</sup>

Yannis M. Ioannides      L. Rachel Ngai

November 21, 2024

## Abstract

We approach the literature on housing and inequality from two angles. One is the impact of inequality in endowments on inequality in housing consumption and wealth. The second is the associational (or memberships) inequality associated with neighborhoods, that is, households' location in both a geographic and social context. The review elaborates on these two dimensions of inequality, and focuses on three distinctive features of housing: consumption, capital and location. For owner-occupants, consumption and capital are bundled together in a single good. For both renters and owner-occupants, housing consumption, access to good neighborhoods and housing wealth follow from endowments inequality. Housing is a propagation mechanism for inequality through the location-specific returns to human capital investment and, for owner-occupants, the ability to use housing as collateral to finance investments. The paper uses this approach to analyse key aspects of housing and inequality, paying special attention to the impacts of racial discrimination and segregation.

---

<sup>\*</sup>We would like to thank David Romer and four referees for thorough and very insightful comments on earlier versions, and Steven Durlauf who helped us focus on burning issues of housing, assume a broader perspective, and clarify our thinking. We are grateful to Anna Hardman for numerous suggestions, and a very thorough reading and editing. We also thank Dionissi Aliprantis, Jan Brueckner, Morris Davis, Ellora Derenoncourt, Thomas Downes, John Finlay, Laura Gee, Lu Han, Vernon Henderson, Joe Hazell, Ethan Ilzetki, Matt Kahn, Loukas Karabarbounis, John Kennan, Kevin Lang, Soren Leth-Petersen, Ben Moll, Edgar Olsen, Philip Oreopoulos, Henry Overman, Barra Roantree, Elizabeth Setren, Kevin Sheedy, Stijn van Nieuwerburgh, Laura Veldkamp, Etienne Wasmer and Jeff Zabel for helpful suggestions and discussions, and participants at the LSE and CEPR MEF Annual Symposium at Aegina for comments. Yannis Ioannides visited the Department of Geography and Environment at LSE during Fall 2022 and acknowledges its hospitality. He also acknowledges the hospitality of the Department of Economics at LSE. Rachel Ngai gratefully acknowledges support from Imperial College Business School.  
Yannis M. Ioannides: Tufts University;  
L. Rachel Ngai: London School of Economics.

# 1 Introduction

This paper reviews the economics literature to uncover the links between housing and inequality, and argues that those links go in both directions. It identifies three distinctive features of housing. One relates directly to the large and growing consumption expenditure share of housing, especially among poorer households. A second feature is housing as capital for homeowners; housing is the most important form of wealth for most households and the main form of collateral. The third feature is access to schools and job information networks, via neighborhoods, which provides crucial social context that is central to the propagation of income and wealth inequality.

For most households, these three features are bundled together in a single good in the form of their “primary residence”, as real estate holdings other than primary residences are very concentrated. Using the OECD Wealth Distribution Database for over 20 OECD countries, Causa et al. (2019) report that only about 20% of average households own real estate properties other than their main residence (*ibid.*, Figure 17) and that 70% of these other properties are held by those at the top 10% of wealth distribution (*ibid.*, Figure 24).<sup>1</sup> While the primary residence is not a household’s only asset, it differs from financial assets and indeed other real estate assets because it generates consumption services and embodies geographical location and social context. The primary residence also differs from other durables because it embodies the “neighborhoods effect”. As the OECD *Housing and Inclusive Growth* report puts it, “housing can both reflect and reinforce inequalities across socio-economic groups, across generations, and across space,” OECD (2020).

We do not review the large housing literature; instead, we defer to a number of existing extensive surveys on topics not addressed by the present paper. We focus on features that promote or follow from inequality, or both. The existing extensive surveys do not explicitly deal with inequality. For example, Davis and Van Nieuwerburgh (2015) and Piazzesi and Schneider (2016) focus on housing as a financial asset in a macroeconomic context, with an emphasis on how the return to housing asset (mainly house price) is related to its volatility, its correlation with other financial assets, and overall asset

---

<sup>1</sup>According to the US Survey of Consumer Finances in 2019, 65% of families in the US held a primary residence, with an average value of \$399,000; 13% of families held other residential real estate, with an average value of \$468,000; and 7% of families held net equity in non-residential real estate, with an average value of \$435,000 (all in 2022 US dollars).

portfolio choice. Duca et al. (2021) provide an extensive review of house price cycles using international evidence. In contrast, in the current paper we pay particular attention to locational aspects of housing and to those attributes that are most closely related to inequality. Most housing transactions involve search, but the large volume of research on search models of the housing market, ably reviewed by Han and Strange (2015), does not focus on housing and inequality. In this paper we also review exclusions from the housing market in connection with misinformation, foreclosures and evictions, which have a bearing on inequality.

We address two broad aspects of housing and inequality. One is the inequality that results directly from how individuals' endowments map – through housing but also labor and credit markets – into unequal outcomes. This approach also accounts for the direct effects of parents on the welfare of their offspring via transfers as well via their impact on the productivity of their offspring's human capital. Accordingly, we review the observed *endowments*-related housing inequality in the context of the literature. A second strand of mechanisms are *social* and comprise the *memberships* or *associational* theory of inequality, a term that we adopt, along with Graham (2018), from Durlauf (2001). Individuals self-select into associations, broadly construed, which has major consequences for their subsequent access to opportunities through informational links and social interactions. This operates in the social space and articulates a fundamental dimension of the memberships theory, namely, the allocation of housing, which is inherently linked to neighborhood choice. It gives rise to neighborhood income distributions and to residential segregation. It thus accords to housing inequality a role that goes well beyond its role as an element in the consumption bundle.

The remainder of the paper is organized as follow. Section 2 presents a simple conceptual framework for fixing ideas about the three features of housing. It highlights the role of housing as both a source of, and a propagation mechanism for, inequality. Sections 3 to 5 elaborate on these three features of housing, respectively. Section 6 discusses key issues related to racial discrimination and residential segregation, the consequences of which for inequality are particularly salient. Section 7 concludes.

## 2 A Conceptual Framework

To put the research on housing and inequality into perspective, this section sketches a simple conceptual framework that focuses on the three features of housing that are critical for inequality: consumption, capital, and location. These features related to housing and inequality span micro and macro research, and there is no single simple canonical model that includes them. Instead, we seek to lay down a conceptual framework for organizing the discussion of these features.

The long-run evolution of housing prices has provoked much discussion in both the housing literature and the popular press. As Knoll et al. (2017) establish for 14 advanced economies, real house prices fluctuated around a flat trend until the mid-20th century and have since then risen strongly, albeit with substantial cross-country heterogeneity. After controlling for replacement costs, the authors identify the steady growth of land prices as the key factor contributing to this outcome. This confirms that, in spite of the vast expansion of developed land throughout the world, land for urban use is becoming increasingly scarce everywhere. Since the opportunity cost of urban land is its non-urban use, the impact of land scarcity at the national level is transmitted to the value of urban land parcels. The interaction between the location of firms and the location of individuals within urban areas, which drives the density of economic activity within and across urban areas, generates derived demand for urban land parcels in accordance to the urban landscape. Rising real prices of housing underlie the current discussion in the public domain. It is important to understand how they impinge upon our ability to interpret the empirical evidence on the interaction between housing and inequality.

We approach housing and inequality from two angles. One angle addresses how a given distribution of income is reflected in housing outcomes. This encompasses such issues as whether it is the result of mapping of low incomes through the housing market to acutely low-quality housing (such as homelessness) or some other force, such as housing-specific externalities. This is relevant for inequality because it gives rise to public policy concerns. A second angle addresses how housing outcomes feed back into the determination of income and wealth through a number of routes. By way of example, access to mortgage lending may enable the build-up of lifetime wealth. Similarly, phenomena lumped under the term “neighborhood effects”, which encompass contextual as well as endogenous social effects that are associated with the locational aspects of housing, can be critical forces in

the persistence of inequality (Durlauf, 1996, 2001; Graham, 2018).

To formally model housing requires specifying preferences and the constraints that account for the dynamic setting of housing decisions. At any point in time  $t$ , a household's state variables include the level of human capital  $s_{t-1}^i$  and non-housing financial assets  $a_{t-1}^i$ , and a set of the household's current housing attributes, critical among them being housing location  $\ell_{t-1}^i \in \mathcal{N}$ , a set of locations that we specify when appropriate, and tenure status  $\iota^i = r, o$ . If household  $i$  is a homeowner ( $\iota^i = o$ ), then it owns housing capital  $h_{t-1}^i$ . The aggregate state variables considered here are the gross return to non-housing financial assets  $R_t$ , a location-specific house price index  $p_t(\ell)$ , a location-specific rental price index  $q_t(\ell)$ , and the location-specific wage rate  $w_t(\ell)$  in each location  $\ell$ . We assume that there is free mobility of non-housing financial assets across locations so that the return  $R_t$  is equalized across locations.<sup>2</sup> Houses are immobile and therefore house prices and rents are location-specific.

Given the set of aggregate and household-level state variables, a household chooses a new location  $\ell_t^i$ , non-housing consumption  $c_t^i$ , housing services  $h_t^i$ , and investment in human capital  $z_t^i$  in order to maximize the discounted sum of expected life-time utility,  $\sum_{t=0}^{\infty} \beta^t E_0 [u^i(c_t^i, h_t^i; \ell_t^i)]$ , where  $\beta$  is a discount factor. The expectation is taken with respect to shocks such as income, house price and rent. The infinite life-time specification allows for the interpretation that location and human capital choice affect the utility of future generations in a dynastic setting. Per-period utility is defined as:

$$u^i(c^i, h^i; \ell^i) = \frac{\mathcal{L}^i(\ell^i) \left[ \left( \omega \xi_{\iota^i} (h^i - \bar{h})^{\frac{1-\epsilon}{\epsilon}} + (1-\omega) (c^i)^{\frac{1-\epsilon}{\epsilon}} \right)^{\frac{\epsilon}{1-\epsilon}} \right]^{1-\sigma}}{1-\sigma}, \quad (1)$$

where  $\bar{h} \geq 0$  is a minimum amount of housing services required, which affects the income elasticity of housing consumption. The parameter  $\epsilon$  determines the price elasticity of housing consumption. The utility of housing services depends on the tenure status, where  $\xi_o > \xi_r$  is referred to as the *warm glow effect*. The term  $\mathcal{L}^i(\ell^i)$  reflects location-specific preference, such as location-specific amenities.

The period-specific budget constraints for households depend on their tenure status.

---

<sup>2</sup>It is straightforward to allow for different interest rates for borrowers and lenders, with the latter being typically smaller than the former by a wedge that depends on the riskiness of mortgage lending.

For an owner endowed with  $h_{t-1}^i$  units of housing, the period  $t$  constraint is:

$$c_t^i + z_t^i + p_t(\ell_t^i) h_t^i + M_t^i \kappa_t^o + a_t^i = w_t(\ell_t^i) s_{t-1}^i + R_t a_{t-1}^i + p_t(\ell_t^i) h_{t-1}^i; \quad (2)$$

$$a_t^i \geq -(1 - \phi) p_t(\ell_t^i) h_t^i. \quad (3)$$

Constraint (3) states that the housing asset can be used as collateral for borrowing. In contrast, a renter in this model does not own any housing asset and cannot borrow:

$$a_t^i = w_t(\ell_t^i) s_{t-1}^i + R_t a_{t-1}^i - c_t^i - z_t^i + q_t(\ell_t^i) h_t^i - M_t^i \kappa_t^r \geq 0. \quad (4)$$

The indicator  $M_t^i$  represents a moving decision taking the value of 1 in the case of a move, and 0 otherwise. Moving can be motivated by a change in housing size or housing location, i.e.  $M_t^i = 1$  if either  $h_t^i \neq h_{t-1}^i$  or  $\ell_t^i \neq \ell_{t-1}^i$ . The parameters  $(\kappa_t^o, \kappa_t^r)$  capture moving costs for owners and renters. The accumulation of human capital follows:

$$s_t^i = S(z_t^i; s_{t-1}^i, \ell_t^i), \quad (5)$$

which depends on investment in human capital  $z_t$ , location choice  $\ell_t^i$ , and lagged human capital  $s_{t-1}^i$ . For example, access to better schooling in a certain location can contribute to the accumulation of human capital for a given level of investment, or there may exist salient peer effects across individuals' human capital at the location, all of which enter  $S(\cdot)$  via  $\ell_t^i$ .

This setup focuses on two aspects of housing decisions: neighborhood choice  $\ell_t^i$  and housing services  $h_t^i$ . It spells out the three features of housing. First, housing enters utility as a *consumption service* for both renters and owners. Second, housing confers *locational* advantages for both renters and owners, providing amenity utility entering the accumulation of human capital, and defining wage income in budget constraints (2) and (4). Third, housing enters the budget constraint (2) and the collateral constraint (3) as an *investment in housing asset* for owners. The collateral constraint also affects the investment in human capital  $z_t^i$  through the budget constraint (2).

Housing services flow from housing structures that are produced using various inputs, the supplies of which are generally quite elastic except for that of land. While the notion of housing does connote land, our approach here emphasizes the spatial differentiation that land undergoes in urban use. This confers key significance on the actual location of land parcels that host dwelling units that may be rented or owned. Thus, the operation

of the housing market generates derived demand for land that may be developed for urban housing use. Such land does not exist in infinitely elastic supply. Indeed, urban land supply depends on many factors such as land-use regulations and technological improvements.<sup>3</sup>

The return to landowners (who may be individuals, firms, institutions or the government) reflects the institutional structures through which land is owned. Homeowners in many countries own the land on which their homes lie, or a share thereof. However, in some countries, notably the United Kingdom, the use of land may be fully owned via “freehold” leases or it may be traded by means of leases of varying duration (“leasehold”). Multi-dwelling structures may be owned as condominiums, cooperatives, or other forms. While in most countries housing is built by individuals and land developers (private companies), developers are increasingly keeping dwelling units as rental properties.<sup>4</sup> Differences in the institutional complexity of how housing services are supplied make it very difficult to obtain a precise understanding of the market for land around the world. Of course, land is also demanded by firms and governments, and the use to which it is put has important implications for inequality. Firms provide jobs and consumption opportunities. Governments provide numerous services in the form of amenities but also education, which in countries like the US are financed by property taxes that are directly levied on property owners, homeowners and firms. We return to this matter in section 5.3.1.

### 3 Housing Consumption

The fundamental role of housing is to provide shelter. In discussions surrounding housing affordability, patterns of housing expenditure shares over time and across households have garnered significant attention from policymakers and researchers.

---

<sup>3</sup>Recent literature has highlighted the important interaction of technological improvements and the role of land in housing. Using evidence from average commuting speeds in England since mid-19th century, Miles and Sefton (2020) provides a model to explain the hockey-stick pattern of house prices in the long run as a result of changes in the transport efficiency, due to its rapid improvement prior to the mid-20th century and its subsequent slowdown. Borri and Reichlin (2018) and Grossmann et al. (2024) focus on another technological explanation, namely, the slower productivity growth in the construction sector relative to the rest of the economy for the rise in house prices during recent decades.

<sup>4</sup>We do not model the behavior of such actors or of large housing developers. Individuals’ asset portfolios may include shares of such companies. The basic framework nests the case of small landlords, who may own more housing than they themselves consume and rent out the difference, earning asset income (see section 4.4).

### 3.1 Housing Expenditure Share

Using micro data on household expenditure for 20 countries, the OECD (2020) reports that housing is the largest single expenditure item, larger than food, clothing, health, education, leisure and transport.<sup>5</sup> In 2015, the housing expenditure share across households in OECD countries was 37% for households in the bottom quintile, 31% for the middle quintile, and 25% for the top quintile. The average housing expenditure share increased by 6 percentage points from 2005 to 2015; the increase for the bottom income quintile was much higher at 9 percentage points, three times that for the top quintile.<sup>6</sup> Similar patterns of changes in housing expenditure shares have been documented using micro data for individual countries, such as France, Germany, the UK and the US (Accardo et al., 2017; Dustmann et al., 2022; Belfield et al., 2015; Albouy et al., 2016).

The housing expenditure share among renters has received particular attention, as households in the bottom quintile are more likely to rent.<sup>7</sup> Relying on the Affordable Housing Database data for 31 OECD countries from 2014 to 2018, OECD (2020) reports that more than a third of renters in the private market spend over 40% of their income on housing. The 2024 *Economic Report of the President* shows that the shares of renters in the US spending more than 30% or more than 50% of their income on housing have both doubled since the 1960s. In 2022, nearly half of renters were spending more than 30%, and a quarter of renters were spending more than 50%.

The high housing expenditure share among low-income households limits their financial resources for non-housing consumption, saving, or investment in human capital.<sup>8</sup> This situation can contribute to broader and more persistent inequality of the endowment type, especially given the ample evidence of a lack of growth in income for poorer households during recent decades. The 2024 *Economic Report of the President* presents a vivid picture of the financial burden of housing in the US by calculating the number of work hours needed to afford the monthly median rental rate. It reveals an increase

---

<sup>5</sup>Household expenditure data come from national household budget surveys and have been harmonised by the OECD in accordance with the Classification of Individual Consumption according to Purpose (COICOP) developed by United Nations Statistics Division. The consumption of services from an owned house is measured by imputing a rent equivalent.

<sup>6</sup>This differential growth pattern can be discerned as far back as 1995 for 10 countries where the housing expenditure share increased by 13 percentage points for the bottom income quintile, 7 percentage points for the middle, and 3.5 percentage points for the top.

<sup>7</sup>Using the OECD Wealth Distribution Database 2011 – 2016, Causa et al. (2019) document that the homeownership rate among the bottom income quintile is more than 25 percentage points lower than the rate among the top quintile for 20 countries.

<sup>8</sup>High rents in particular also constrain the young generation in saving for a downpayment.



from 55 hours in 2002 to 70 hours in 2022 for median wage earners, and from 110 hours to 180 hours for households earning the federal minimum wage. The rising housing costs have been linked to the incidence of adult children living with their parents. Figure 2.10 in OECD (2020) documents that, on average across 31 OECD countries, about 50% of young adults aged 20-29 were living with their parents in 2017. There is wide variation across countries with the highest shares (above 70%) in Southern European countries (Italy, Greece, Spain and Portugal), compared with 40-50% in the UK and the US, and only 10-20% in the Nordic countries (Norway, Finland and Sweden). This is a transfer in kind across generations, but it could lead to other issues such as limiting job mobility.

The concern over the rising housing expenditures prompts two arguments. First, the increase in housing expenditure may reflect an improvement in housing quality. As documented in Quigley and Raphael (2004), there were substantial improvements in the quality of rental units in the US between 1960 and 2000 due, among other things, to modernizing plumbing and kitchen facilities, and local zoning ordinances reducing density and minimum size requirements. However, this argument might not be as relevant for more recent decades, especially in terms of floor space per person (see Ghent and Leather (2021) for the US and Belfield et al. (2015) for the UK). Moreover, another crucial measure of housing quality is neighborhood quality. Using three scale- and population-invariant measures – the variance in logs, the Gini coefficient and the Theil entropy measure – Aladangady et al. (2017) find that the increase in inequality in house prices and rents in the US between 1930 and 2012 cannot be explained by tangible dwelling characteristics such as plumbing, heating systems, or the number of rooms. Instead, they attribute this trend to variations in location that provide distinct “intangibles,” such as proximity to job opportunities and local amenities. A second argument against this concern is that the patterns of housing expenditure shares could simply reflect changes in preferences for housing consumption. We evaluate this argument by discussing next the significant role of income and price elasticities of housing demand.

### **3.2 Income and Price Elasticities of Housing Demand**

The variations in housing expenditure shares across households and across time are important inputs for understanding the preference structure of housing demand, which, as we discussed below, is important for understanding the relationship between housing and

inequality.<sup>9</sup>

As the housing choice of a homeowner is both a consumption and an investment decision, we defer its discussion to Section 4, where the role of housing as capital is discussed.<sup>10</sup> For a renter, when the borrowing constraint (4) is not binding, the relative expenditure across housing and non-housing can be expressed as:

$$\text{Renter} : \frac{q_t(\ell_t^i)h_t^i}{c_t^i} = \left( \frac{h^i}{h^i - \bar{h}} \right) \left( \frac{\omega}{1 - \omega} \right)^\varepsilon q_t(\ell_t^i)^{1-\varepsilon}. \quad (6)$$

Albouy et al. (2016) and Finlay and Williams (2022) provide a brief review of estimates of price and income elasticities of housing. Davis and Ortalo-Magne (2011) find that median housing expenditure shares are roughly constant across US metropolitan statistical areas (MSAs), which leads the authors and indeed a substantial share of macro housing studies to adopt Cobb-Douglas preferences where both price and income elasticity are equal to one (i.e.,  $\bar{h} = 0$  and  $\varepsilon = 1$ ). While these types of preferences may be convenient and useful for understanding macro patterns, they are of limited use for understanding housing and inequality. More specifically, they imply that the housing expenditure share is always equal to the preference parameter  $\omega$ . Thus, the cross-sectional and time-series patterns of the housing expenditure shares can only be explained by assuming that the preference parameter  $\omega$  is larger and rises faster for poorer households. In other words, the “regressive” patterns of housing expenditure shares simply reflect heterogeneity – in both levels and changes – in housing preferences, rather than indicating a concern for housing affordability.

Using city-level variations in income, prices, and rental expenditures for the US, Albouy et al. (2016) estimate that the price and income elasticity of housing are both less than one. These findings are corroborated by more recent findings by Finlay and Williams (2022), who use microdata on consumption and thus avoid assumptions regarding the aggregation of preferences in a city. The key reason for rejecting Cobb-Douglas preferences is that an aggregate approach that does not control for the local cost of housing  $q_t(l_t)$

---

<sup>9</sup>For a recent example of the use of *price-inelastic* housing demand in understanding how rising relative price of housing leads to rising wealth inequality, see Borri and Reichlin (2018); for the rising net capital share of aggregate income, see Rognlie (2015). The *income-inelastic* housing demand is used in understanding the effect of zoning deregulation on reducing welfare inequality Grossmann et al. (2021); it is also used in explaining how a rising aggregate skill premium can lead to an increase in spatial sorting by skill group (Finlay and Williams, 2022).

<sup>10</sup>There are different ways to calculate imputed rent for homeowners, such as market rent of similar properties or self-reported rental equivalent. This poses challenges to estimating elasticities of housing for homeowners (Finlay and Williams, 2022).

masks the offsetting price and income effects. More specifically, suppose that richer MSAs also have higher housing cost. Then higher housing prices imply *higher* housing expenditure when housing demand is price-inelastic, but higher income implies *lower* housing expenditure when housing demand is income-inelastic.

The finding of income-inelastic housing demand is due to the fact that poorer households spend more of their income on housing than richer households. One concern is that income after deducting housing costs is even lower for poorer households compared to richer households, leaving limited financial resources for non-housing consumption and investment. This led to a suggestion in the *IFS Deaton Review of Inequalities* (Cribb et al., 2023) for the UK to deduct housing costs from disposable incomes when measuring poverty and inequality in the bottom part of the income distribution. The report finds that disposable income measured after deducting housing costs is more closely correlated with non-income-based measures of living standards, such as food insecurity or the material deprivation rate calculated by the UK Department for Work and Pensions.

The finding of price-inelastic housing demand is due to the simultaneous increase in the relative price of housing and in the housing expenditure share. The recent survey by Duca et al. (2021) on housing prices and rents highlights an important role for locations, and specifically for the location-specific housing supply elasticity which pertains to the fixed supply of land and related issues. The locational aspects of housing, such as access to employment, local amenities and associational inequality, will be the focus of section 5.

In efforts to alleviate inequality in housing consumption and allow for access to shelter, a governmental presence in housing is ubiquitous. However, we defer to previous literature and eschew a general discussion of housing policy.<sup>11</sup> Instead, in the remainder of this section we restrict our attention to two issues: housing “instability” and exclusion from the housing market, and rent control. The former poses, *inter alia*, important legal issues of current concern in the US and relates to extreme market outcomes begging the notion of affordability.<sup>12</sup> The latter aims at arresting spiraling housing costs by directly interfering with the operation of the housing market.

---

<sup>11</sup>Saiz (2023) surveys 290 papers on policies around the world; Olsen and Zabel (2015) reference more than 200 papers on the US alone. Neither of those studies focuses on addressing housing and inequality.

<sup>12</sup>The Supreme Court of the United States, Case No. 23-175, ruled that fining and arresting homeless people does not violate constitutional protections against cruel and unusual punishment under the Eighth Amendment; <https://tinyurl.com/yc6te8hs>.

### 3.3 Exclusion from the Housing Market

The growing global concerns about housing affordability are centered around providing shelter to the extreme poor, who find themselves in complex circumstances leading to eviction, foreclosure or even homelessness. Evictions are removals of tenants from rental properties by their landlords, but they may also pertain to the removal of homeowners of foreclosed properties. These outcomes are conceptually related; they amount to *exclusion* from the housing market for at least for some time. This is the case for households that cannot afford to occupy spaces typically considered as dwellings and become homeless.

More than 2 million households incur eviction filings annually in the US.<sup>13</sup> Collinson et al. (2024) show that eviction filings are preceded by decreases in income and employment or health events. They establish that eviction orders increase homelessness and reduce earnings and access to credit. Diamond et al. (2020) detail the differential impact of foreclosures: landlords suffer a financial shock, tenants an eviction shock, and homeowners are far more profoundly affected by suffering both shocks. These shocks result in housing instability, reduced homeownership in the future (in part because of lingering effects of reduced credit scores), financial distress, relocation to inferior neighborhoods and family instability. Moreover, foreclosures have spillover effects as they propagate in their immediate neighborhoods, producing unintended outcomes (Towe and Lawley, 2013). Kermani and Wong (2021) attribute to foreclosures and “short sales” gaps in housing returns, realised by Black and Hispanic homeowners who are more likely to live in distressed neighborhoods, that are an order of magnitude larger than the disparities arising from housing costs alone. Desmond (2012) emphasizes the disruption that evictions cause to residents of poor urban Black neighborhoods in particular, and notes that they affect more households headed by women. Indeed, he likens the impact on those households to that inflicted by incarceration of young Black men, “a typical but severely consequential occurrence contributing to the reproduction of urban poverty.”

Homelessness is an extreme manifestation of housing inequality and while its incidence is inherently hard to define and measure, it is increasingly present worldwide. It has become particularly acute in high-cost metropolitan areas in the US.<sup>14</sup> To illustrate this,

---

<sup>13</sup>Not surprisingly, the actual numbers are hard to establish. Gromis et al. (2022) “mine” 99.9 million court cases and use novel techniques to estimate 2.7 million cases annually between 2000–2018. Data collection is hampered by hard-to-access court data. High eviction filing rates also occur outside high-cost urban areas.

<sup>14</sup>This is underscored by the many forms that homelessness takes, with tents, shelters, cars, motels

California which has 12% of the US population and is one of the richest US states host nearly 30% of the entire US homeless population; <https://tinyurl.com/42ufshrr>. The Annual Homelessness Assessment Report by the US Department of Housing and Urban Development reveals a substantial increase of 103,176 people experiencing homelessness from 2016 to 2023, a rise of 19%.<sup>15</sup> The incidence of homelessness varies dramatically across demographic groups, from around 6 per 10,000 people for Asians to 60 for African Americans and to 136 for Native Americans. About a quarter of the homeless people in shelters have jobs. In Los Angeles, 78% of the homeless are unsheltered, whereas in New York City a legal “right to shelter” means that only 8% are unsheltered. In the rest of the US, 51% of the homeless are unsheltered. More than 1.4 million people pass through emergency shelters every year. Over and above the poverty and hardship it is associated with, in the eyes of many, blights the affected urban areas. Its political impact has attracted the attention of decision makers.<sup>16</sup>

The UK Office of National Statistics (2023) reports that 13,955 people in England and Wales, or 2.3 per 10,000 people, were in hostels and temporary shelters for the homeless in the 2021 Census.<sup>17</sup> As in the US, the incidence of homelessness in the UK varies across demographic groups, with a greater incidence among of Blacks and younger individuals who are often in poor health and lack skills. Fetzer et al. (2023) establish a causal impact of unanticipated cuts in rent subsidies in the UK on statutory homelessness, but also evictions, financial distress and insecure temporary accommodation, which is most acute for families with children, single parents and those in poor health. Such cuts may be shortsighted, because as these authors argue the net social saving is ambiguous as local governments have to be compensated due to statutory homelessness obligations.

Evans et al. (2019) explore different policies aimed at reducing or preventing homelessness, highlighting the impact of the volatility of funding availability. Several other researchers seek to evaluate the effectiveness of specific interventions, such as providing cash assistance in a randomized evaluation setting. O’Flaherty (2019) argues that while a fair amount is known about policies that are effective in specific cases, little is

---

and couches hosting the homeless (see “A Life without a Home,” *New York Times*, February 25, 2024, <https://www.nytimes.com/interactive/2024/02/21/opinion/homelessness-crisis-america-stories.html>).

<sup>15</sup>Total Homeless Individuals, 653,104, US, 2023. Data originate in point-of-time counts by local volunteers who seek to enumerate homeless, sheltered and unsheltered on a single night in January.

<sup>16</sup>A new US government program plans to reduce homelessness by 25% by 2025 [<https://tinyurl.com/2p3um298>].

<sup>17</sup><https://www.gov.uk/government/collections/homelessness-statistics>. UK housing authorities have a statutory obligation to shelter the homeless.

known about why the incidence of homelessness varies so dramatically across demographic groups as well as geographical areas. Overall, homelessness deserves greater attention in the housing literature.

### 3.4 Rent Control

Local and national governments across the world have resorted to various rent control schemes, especially in response to housing scarcity after World War II. In many countries, some form of rent control remains in existence (see the OECD Housing Database).<sup>18</sup> According to OECD (2021), rent control stringency varies even across OECD countries, with Sweden being the most stringent and UK one of the least. Rent control is defended as insurance against rent increases, but while it may address the issue of housing affordability without a direct commitment of public resources such as providing housing benefits, ordering rents to remain fixed and granting rights to sitting tenants (who may not necessarily be low-income households) has a plethora of effects. In the short run, it does not guarantee housing to all and hinders residential mobility. It causes misalignment of demand with consumption as households' circumstances change, and may even reduce labor mobility. In the long run, it hampers housing investment and thus causes misallocation of capital. Hardman and Ioannides (1999) study rent control and allow for adjustments in the allocation of housing by means of restrictions on the frequency of moves within an aggregate two-sector model. They find that rent control favors physical capital investment at the expense of housing investment. For many reasons, deregulating housing markets is likely to improve affordability. The simulations reported in Figure 4.7 of OECD (2021) reveal improved allocative efficiency in line with the relaxation of rental market regulation.

Glaeser and Luttmer (2003) emphasize that in New York City, “rent stabilization” affecting some of the rental housing stock leads to misallocation that creates horizontal inequities across demographic subgroups. Enström-Öst and Johannson (2023) employ a unique randomized rental apartment lottery in the Stockholm metropolitan area, which has rent control, to analyse the behavior of individuals receiving rent-controlled housing contracts. They find that receiving such a contract leads to a reduction in recipients' annual labor income by between 13% to 20% and employment by between 8% to 13%.

---

<sup>18</sup><https://www.oecd.org/els/family/PH6-1-Rental-regulation.pdf>. In the US, as of 2022, over 200 local governments had a rent control policy in place, see <https://www.naahq.org/rent-control-policy>.

Rent control deregulation has complex effects. Donner et al. (2017) examine the likely distributional effects of deregulating the Stockholm rental housing market and predict that if rent control in metropolitan Stockholm were to be lifted, rents would increase in the city’s wealthy center by 30-70%, while suburban neighborhoods might experience smaller increases and some even rent decreases. All these studies demonstrate instances of profound misallocations that are associated with rent control.

Among many others, two studies in particular demonstrate the complexity of the distributional effects of rent deregulation. Autor et al. (2014), discussed in greater detail in section 5.2.2, show that in Cambridge, Massachusetts, rent deregulation led to increases in property values and associated improvements in amenities, that affected both existing and new owners of formerly controlled as well as never controlled units, but hurt tenants. Diamond et al. (2019) use a 1994 law change in San Francisco to show that the introduction of rent control reduced renters’ mobility by 20% and lowered renters’ displacement from San Francisco. However, the response by landlords reduced rental housing supply by 15% due to sales to occupants and building redevelopment.

## 4 Housing Capital

Housing capital makes up about half of the national capital stock in many countries and is the most important form of wealth for most homeowners. For these individuals, housing choice is a joint consumption and investment decision. When the collateral constraint is not binding, the relative consumption across housing and non-housing can be expressed as:

$$Owner : \frac{h_t^i}{c_t^i} = \left( \frac{h^i}{h^i - \bar{h}} \right) \left( \frac{\omega}{1 - \omega} \right)^\varepsilon \left[ p_t(\ell_t^i) - E \left( \frac{p_{t+1}(\ell_t^i)}{R_{t+1}} \right) \right]^{-\varepsilon}. \quad (7)$$

If the house price is equal to the discounted sum of future rents, the term in the square bracket above is equal to the rent  $q_t(\ell_t^i)$ . In that case, the relative housing expenditure for owners in (7) coincides with that for renters in (6). The effective price is affected by the tax treatment of the flow of housing services, mortgage interest charges, housing wealth via property taxes, capital gains, and climate-related investments. These factors are typically accounted for by the user cost theory of Poterba (1984) and are used extensively from the housing affordability literature to the macroprudential literature.

What truly differentiates the housing decision of homeowners from those of renters are the *housing wealth effect* through the budget constraint (2), the *collateral effect* through

the borrowing constraint (3), and the effective *dependence* of the price of owning on income (due to progressive taxation), and on wealth (due to borrowing constraints). We take up these in turn below.

## 4.1 Housing Wealth

Housing wealth has accounted for a significant fraction of national wealth for centuries. Evidence for France, Germany, the UK and the US since 1700, and for Australia, Canada, Japan and Italy since 1970, is documented in Piketty and Zucman (2014). The continued importance of housing wealth has been documented for many OECD countries for recent decades. The OECD (2021) *Brick by Brick* report summarizes findings by Causa et al. (2019) using microdata from the ECB Household Finance and Consumption Survey and the Luxembourg Wealth Survey during the 2010s. The authors find that, for the majority of countries, housing assets make up more than half of the total assets of households in the middle three quintiles of the income or wealth distribution.

Figure 5.4 in OECD (2021) reports a negative correlation coefficient of -0.61 between the average homeownership rate and the homeownership gap between the top and the bottom income quintiles for 27 OECD countries. The figure indicates that homeownership is more equally distributed across income groups in countries with high average homeownership. Furthermore, Figure 5.2 from the same report reveals a negative relationship between homeownership rate and the share of net wealth held by the top 10%, with a correlation coefficient of  $-0.54$ .<sup>19</sup> These negative correlations are indicative of the close relationship between housing and inequality, but they have not been highlighted in the literature. In addition to market forces and technological factors, cross-country differences in land use regulations, rental market regulations and the provision of social housing are fruitful avenues for future research.

Within OECD countries, the homeownership rate increases with income and wealth, see Figure 7 in Causa et al. (2019). On average across 20 countries during 2010s, the homeownership rate among the bottom income quintile was more than 25 percentage points lower than that among the top income quintile. The picture is even more pronounced along the wealth distribution: in almost all OECD countries, the homeownership

---

<sup>19</sup>Household net wealth is defined in the OECD Guidelines for Micro Statistics on Household Wealth as the value of financial and non-financial assets net of the value of liabilities held by private households resident in the country.



rate in the top wealth quintile was more than 50 percentage points higher than the rate in the bottom wealth quintile.<sup>20</sup> The homeownership rate captures the role of housing on wealth inequality through an extensive margin, distinguishing those who own from those who rent. Among homeowners, inequality in housing wealth is an important component of wealth inequality. According to OECD (2022), data from 28 OECD countries for 2019 (or the latest available year) show that the mean value of owner-occupied housing assets of those in the fifth quintile of the wealth (income) distribution is almost 16 (4) times higher than that of those in the first quintile.

Housing wealth can be a propagation mechanism for inequality as the distribution of housing wealth can persist into future generations through inheritance or other channels. Using the ECB Household Finance and Consumption Survey, Causa et al. (2019) document that, on average across 18 OECD countries, about 20% of households inherited their house outright or received it as a gift. Direct contributions to home purchase by parents is another channel through which individuals' access to homeownership depends on parental wealth. In some OECD countries, this channel has become increasingly important for young households in purchasing a home (OECD, 2020).<sup>21</sup> Using panel data from the UK, Blanden et al. (2023) look at the homeownership status of individuals aged 42 and that of their parents when they were 16 years old, identifying a strong and increasing intergenerational persistence of homeownership.<sup>22</sup> Using population-level administrative data from Denmark, Daysal et al. (2023) also find a strong correlation between parental housing wealth and children's wealth at ages 29 to 33. Furthermore, they estimate the effect of parental housing wealth changes at different stages of childhood: they find a significant effect during early and middle childhood, but close to no effect during teenage years. Changes in children's educational attainment and earnings account for only 20-30% of the transmission of parental housing wealth.<sup>23</sup> The authors attribute the remaining unexplained portion to changes in unobserved household environments and parental behaviors that influence children's savings and investment behavior.

---

<sup>20</sup>The only exception is the Netherlands where the difference was about 30 percentage points.

<sup>21</sup>According to the *English Housing Survey* (a national survey for England), the proportion of first-time buyers that had help from friends and family for their downpayment increased from 22% in 1995 to 29% in 2016 and to 36% in 2023.

<sup>22</sup>More specifically, they find that for the earliest cohort of 42 year-olds observed in 2000, the homeownership rate is about 14 percentage points higher for those whose parents owned their home in 1974. For the cohort observed in 2015, that increases to 27 percentage points.

<sup>23</sup>The positive relationship between parents' housing wealth and children's education have been documented for other countries, including Germany, Sweden, the US and the UK (Lovenheim, 2011; Pfeffer and Hallsten, 2012; Karagiannaki, 2017).

## 4.2 Housing Returns and Wealth Inequality

Housing capital acts as a propagation mechanism for inequality by exacerbating the impact of changes in housing returns due to unequal distribution of housing wealth. A debate surrounding the influential work of Piketty and Zucman (2014) revolves around the attention the authors paid to a rising aggregate wealth-to-income ratio, which is interpreted as a shift of aggregate income from workers to those who own capital. Rognlie (2015) shows that the increase is entirely driven by housing capital and especially by the rise in the return to housing capital. He disputes the *accumulation view* of Piketty (2014), according to which the rise in the capital share is due to capital accumulation. Instead, Rognlie supports a *scarcity view*, according to which the scarcity of land pushes up the return to housing capital, which in turn increases the housing capital share when housing demand is sufficiently price-inelastic (see Section 3.2).<sup>24</sup> His findings suggest that the shift of aggregate income has been from renters to homeowners.<sup>25</sup> Therefore, policymakers concerned about inequality should monitor housing costs, and particularly those that may be linked to restrictions on land use and residential construction, as these factors contribute to housing scarcity.

Among homeowners, variations in housing returns by location can drive heterogeneity of returns across the wealth distribution. Using city-level data, Amaral et al. (2022) document substantial spatial variation in housing returns across 15 OECD countries (see also Aladangady et al. (2017) who use US city data).<sup>26</sup> Using two countrywide data sets for Norway that follow individual homeowners, Eggum and Larsen (2024) measure capital gains based on changes in house prices, and consider explicitly three types of capital gains: realized, semi-realized, and potential depending on the timing of buying and selling. They find a substantial increase in capital gains inequality over the period 2007 to 2019, as measured by differences between the ninetieth and the tenth percentiles across and within both geographical strata and birth cohorts. They adopt this measure because it is in relative terms. Thus it is easy to interpret as difference in purchasing

---

<sup>24</sup>The rising relative price of housing could also be driven by slower productivity growth in the construction sector compared to other sectors, which, as shown by Borri and Reichlin (2018), can contribute to rising wealth inequality when housing demand is price-inelastic.

<sup>25</sup>Greaney (2023) highlights the uneven distribution of gains from local productivity shocks across homeowners and renters. A positive local shock raises wages and housing costs, which generates larger welfare gains to homeowners because they are insulated from higher housing costs, but the rise in rent mitigates the positive effect for renters.

<sup>26</sup>The contribution of the location to the structure of returns to housing has been overlooked, but Ortalo-Magné and Prat (2016) offer a theoretical first step in this direction; see also 4.4.1.

power.

The distinction between realized and potential gains is also crucial to the finding of Piketty and Zucman (2014) of a rise in the wealth-to-income ratio. Bonnet et al. (2014) argue that the returns to housing capital should be evaluated using rents, which represent the actual income derived from housing capital for landlords and the opportunity cost for owner-occupiers. They find that in Canada, Germany, France, the US, and the UK house prices have risen significantly faster than rents since the late 1990s.<sup>27</sup> When the authors recalculate the value of housing capital using rents, they find only a modest increase in the wealth-to-income ratio relative to the findings of Piketty and Zucman (2014). While the debate on the causes of the rising wealth-to-income ratio remains unsettled, these authors agree on the real consequences of housing price increases for access to housing and its impact on inequality.

Fagereng et al. (2022) make a different yet closely related argument regarding the distributional consequences of rising asset prices. In a world without borrowing and collateral constraints, the *welfare* of households that never buy or sell assets is unaffected by changes in asset prices. Similarly, changes in house prices only have an impact on welfare of net buyers and sellers. This has implications across cohorts since the young are more likely to be net buyers of housing than the old. Thus, rising house prices can favor older generations at the expense of younger ones. However, the collateral constraint (3) implies that changes in house prices can influence the welfare of homeowners even if they choose not to buy or sell.<sup>28</sup>

### 4.3 Housing as Collateral

Housing capital is the primary, and often the only, source of pledgeable capital for most households. Unlike with other purchases using debt, homeowners can use home equity to borrow for other purposes.<sup>29</sup> According to the OECD Wealth Distribution Database, across 27 OECD countries about one-quarter of households (one-third of homeowners) have mortgages. The share of households with mortgage debt increases with household

---

<sup>27</sup>Fagereng et al. (2022) document the same pattern in Norway from 1994 to 2015, but recent studies utilizing micro data from the UK and Germany (Belfield et al., 2015; Dustmann et al., 2022) reveal that rents have increased at a faster rate than prices.

<sup>28</sup>In the presence of collateral constraints, changes in house prices can cause even greater redistribution between net buyers and net sellers of houses (Kiyotaki et al., 2011).

<sup>29</sup>De Soto (2000) has drawn attention to the fundamental role of ownership of titled property, over and above arguably disputable ownership of housing as shelter, for the functioning of capital markets that may allow economic development.

income, from less than 10%, in the bottom quintile, to over 40%, in the top quintile (Causa et al., 2019). Mortgage debt is the largest component of household debt, accounting for more than half of total household debt in 26 OECD countries, and over 75% in 11 OECD countries. Among households with mortgages, it represents more than 80% of household debt.

The ECB Household Finance and Consumption Survey provides information on the use of the primary home as collateral, asking respondents in 22 OECD countries about the purpose of the mortgage on their primary home (Causa et al., 2019). The results reveal that the main purpose of mortgages is to buy or renovate the primary home; in most OECD countries, fewer than 10% of homeowners use a mortgage on the primary home for another purposes (the only exception is Canada, where this figure reaches 30%). The fraction is higher for homeowners in the top income and wealth quintiles. The most common other uses are purchasing other real estate assets, followed by financing business or professional activities, covering living expenses or other purchases, consolidating other debts, and education purposes.

As house prices increase, households can and do borrow more based on their home equity. The literature documents various spending outcomes resulting from increased borrowing, including increased investment in human capital<sup>30</sup> and reduced labor supply.<sup>31</sup> Most studies concentrate on the impact on consumption, driven by the strong correlation between house prices and aggregate consumption. Specifically, these studies investigate the collateral effect of house prices on consumption and assess its significance relative to the wealth effect. The two effects imply that house price fluctuations will have heterogeneous effects across the young and old, and across households with different degrees of financial constraints. The typical life-cycle model predicts a positive age profile of housing wealth effects, as older homeowners have a shorter time horizon and therefore a stronger incentive to utilize housing wealth for consumption. This prediction, however, stands in contrast with the negative age profile found by many empirical studies. Cloyne et al. (2019) demonstrate that the key to reconciling these two bodies of literature lies in the fact that younger households face greater financial constraints, and more financially

---

<sup>30</sup>Lovenheim (2011) uses short-run changes in individual housing wealth during a period of high housing wealth liquidity in the early 2000s in the US as exogenous variation in the wealth of homeowners. He finds that \$10,000 in home equity raises the rate of college enrollment by 0.7 of a percentage points on average; the effect is much higher for low-income families by 5.7 percentage points.

<sup>31</sup>Favilukis and Li (2023) use variations in house price growth across US MSAs to show the rise in housing wealth post Covid-19 has contributed to the fall in the labor supply among the older workers.

constrained households exhibit a more pronounced response to increases in house prices due to the collateral effect.

A major challenge in the literature is to identify the extent to which a rise in house prices is independent of common factors that also influence other relevant outcomes. For example, anticipation of income growth can result in simultaneous rises in house prices, borrowing, and consumption. Studies of house price growth across geographical areas must therefore address confounding regional shocks such as fluctuations in local income expectations, which can be the common driver behind both house prices and consumption (Attanasio et al., 2011). Significant progress has been made in addressing this issue and identifying the collateral effect of house price increases. For example, Leth-Petersen (2010) uses the natural experiment provided by a Danish mortgage reform that allowed homeowners to use mortgage loans for any purpose. The author finds that the effect is strongest for younger households who are more financially constrained.<sup>32</sup> Recent work by Cloyne et al. (2019) and Andersen and Leth-Petersen (2021) confirms the significant collateral effect for younger households. These studies utilize administrative data on individual mortgages to demonstrate that rising house prices prompt mortgage extraction through refinancing. In particular, Cloyne et al. (2019) exploit the prevalence of short-term fixed-rate mortgages in the UK, where most homeowners refinance at regular and quasi-exogenous intervals. Andersen and Leth-Petersen (2021) use longitudinal survey data on expectations to identify unanticipated changes in home values in Denmark.

The collateral constraint (3) clearly benefits homeowners when housing prices increase. However, it is important to acknowledge that this is a simplified approach to modeling the role of housing as collateral in many macro models. In reality, the majority of households have mortgages, and the availability of mortgage options depends on credit scores and income levels. The two principal types of mortgages are adjustable-rate and fixed-rate. In the US, the majority of mortgages are 30-year fixed-rate mortgages, which differ from mortgage markets in many other countries, both in terms of their share and extended maturity. According to the OECD (2022), in around half of the 26 OECD countries surveyed, over 50% of mortgages in 2019–2020 were fixed-rate. However, the duration of the fixed-rate maturity is typically shorter in these countries than in the US. In the UK,

---

<sup>32</sup>Recent work uses the Danish reform to investigate effects on labor market behavior. By relaxing household liquidity constraints, the reform contributed to more entry into entrepreneurship (Jensen et al., 2022) and better job matching (He and le Maire, Forthcoming).

for instance, fixed-rate mortgages with a duration over 10 years are uncommon; most are fixed for 2-5 years before adjusting to a new rate. This setup can incentivize homeowners to refinance when rates fall, but if house prices decrease, owners are likely to face higher interest rates with their existing mortgage providers unless they can generate additional equity to compensate for the price decline.

There are two additional factors that need to be considered in relation to the benefits of housing as collateral. First, due to substantial transaction costs associated with buying and selling houses, as reflected in the budget constraint (2) by the parameter  $\kappa^o$ , housing is often regarded as an illiquid asset. Among households with the same level of wealth, those with more housing wealth are typically more financially constrained than those with more liquid assets. Indeed, households whose wealth primarily consists of housing wealth are sometimes referred to as “wealthy hand-to-mouth” households (Kaplan and Violante, 2014). Second, the leverage provided by housing investment implies a much larger gain (or loss) relative to non-housing assets when experiencing the same increase (or decline) in prices. This concern is particularly important in the presence of house price uncertainty. We now turn to the decision between owning and renting, as well as the broader wealth portfolio decision.

#### 4.4 Renting, Owning, and the Wealth Portfolio

Pure preference for the mode of housing tenure, that is, renting versus owning, is expressed by parameter  $\xi_i$  in utility function (1). It drives a wedge between housing demand by owners and renters, *ceteris paribus*: Renters face effective borrowing constraints, while owners can borrow using the housing asset as collateral. This means that housing has a dual role as both a consumption and investment good. Henderson and Ioannides (1983) motivated a considerable literature that distinguishes owner-occupants from renters, with the former modeled as individuals whose investment demand for housing exceeds their consumption demand.<sup>33</sup>

Properly comparing renting to owning requires comparing the lifetime indirect utilities associated with renting versus owning, defined in section 2 as a function of the state variables at time  $t$ . The difficulty of working with value functions is well known,<sup>34</sup> so

---

<sup>33</sup>See also the literature on understanding the determinants of homeownership rates surveyed by Goodman and Mayer (2018), and macro life-cycle models such as Chambers et al. (2009).

<sup>34</sup>Notable progress has been made with econometric methods bypassing tedious computation of the value function; see Davis et al. (2021) for a housing application.

much of the empirical literature models tenure choice in terms of discrete choice based on annualized cost comparisons. For renters, those costs are based on market data on rents and expectations about the future (although this is rarely done). For homeowners, this requires imputations that take into account all attributes of owning.

Such imputations are facilitated by the user cost of housing (Poterba, 1984), that is, the one-period cost of housing services per unit of owner-occupied stock. This is defined as the sum of (i) after-tax depreciation, repair and improvement costs, property taxes, and after-tax interest costs that apply to the portion corresponding to the share that is financed by borrowing (levered); and (ii) the opportunity costs of funds within the asset portfolio, net of the expected capital gain. Expected capital gains reduce the opportunity cost of housing, an effect which theoretically could be strong enough to make the demand for owner-occupied housing upward-sloping (Dusansky and Koç, 2007). Many homeowners benefit from levered housing returns; these returns typically exceed unlevered ones (Jorda et al., 2019).<sup>35</sup> This could explain households' seemingly irrational behavior during housing-price bubbles. The leverage choice is influenced by expectations of future housing prices (which may be conditioned on owners' demographic characteristics), agency issues and neighborhood effects that, for example, affect house maintenance behavior and many other things.<sup>36</sup>

Studying housing tenure choice in the context of inequality requires recognizing an economy's institutional setting. At one extreme, there may be barriers to free choice in the form of taste-based market discrimination; this is taken up in Section 6. At another extreme, access to public (social) housing differs dramatically across countries. Eligibility often reflects non-price rationing, which depends on individuals' demographics in complex ways (for UK council housing, see King (1980), and for Singapore public housing estates, see Wong (2013)).

Since homeownership involves highly endogenous determinants and institutional differences, its relationship with income and wealth inequality is tricky to assess. The average renter is much poorer than the average owner. Kaas et al. (2019) use the ECB Household Finance and Consumption Survey (2013–2016) to show that this explains

---

<sup>35</sup>The levered return is equal to the unlevered return minus the long-term mortgage rate multiplied by the leverage ratio, divided by the equity ratio.

<sup>36</sup>Bailey et al. (2018a) show, using plausibly exogenous variation in house price beliefs, that more pessimistic homebuyers make smaller down payments and choose higher leverage, in particular in states where default costs are relatively low, as well as during periods when house prices are expected to fall on average.

the negative correlation between homeownership and wealth inequality across European countries, as measured by the Gini coefficients. Some differences are stark: Germany, a much wealthier country than Greece, has a homeownership rate of 44% compared to 72% for Greece, while the respective Gini coefficients for wealth are 0.76 and 0.56. It is thus difficult to draw lessons from international comparisons even across two European countries.

Given their opportunity sets, households that choose to own their residences are clearly better off. But by how much? How do they compare with those who choose to rent? In view of the myriad factors entering the decisions, and the numerous endogeneities, the findings of Sodini et al. (2023) are particularly interesting. In Stockholm, municipally owned rental housing was unexpectedly privatized, confronting tenants with a tenure choice between owning and renting. The authors find that homeownership caused substantial wealth accumulation, as house price growth exceeded the borrowing rate. Homeowners increased consumption relative to the preceding four years. They also availed themselves of additional borrowing capacity, because they were able to purchase their homes at a discount relative to the market. Homeowners were able to “climb the housing ladder,” and older homeowners were able to allocate more of their financial wealth to risky assets. The average “treated” household moved up from the fifty-fourth to the seventy-first percentile of the Stockholm wealth distribution.

It is interesting to briefly review the returns to housing as an asset from a macroeconomic perspective. Jorda et al. (2019) (Supplemental Data, Table A.5) report that the average annual (unweighted) real returns to housing are quite heterogeneous across countries, but they exceed the returns to equity for the authors’ entire sample period of 1870–2015 (including war years): 7.3% versus 6.7%. The authors find that real returns to housing exceed the return to equity in individual countries such as Belgium, Denmark, France, Germany, Japan, Netherlands, Norway, Portugal and Sweden. However, the opposite is true for the US (6.1% versus 8.5%) and the UK (5.4% versus 6.8%). Real returns to equity fluctuate much more than returns to housing and their correlation was high and positive until World War II, but it has been much lower since then. Figures VII and VIII in Jorda et al. (2019) plot decadal moving averages for 16 countries. The authors argue that the evidence of overall low covariance of real returns to equity and housing over the long run reveals potential attractive gains from portfolio diversification which economists



have not fully explored.

#### 4.4.1 Housing in Households' Wealth Portfolios and Inequality

The housing tenure choice literature considers individual housing outcomes and how they are affected by inequality. However, the quantity of housing – the largest component in most households' wealth portfolios – depends on all the factors (including numerous options for saving and borrowing) that determine the household's entire portfolio. Households must consume housing services regardless of whether they rent or own the property they live in, so they face the problem of hedging risks. Both renters and owners are exposed to aggregate and individual-specific shocks, but the risks they face are different. Owners with mortgages commit to a down payment and interest payments that depend on the nature of their mortgage loans. These loans may have fixed or adjustable interest rates. The latter expose borrowers to aggregate shocks, while inflation benefits fixed-rate borrowers.

Variations in income and wealth map differently into variations in consumption and investment demands.<sup>37</sup> Ioannides and Rosenthal (1994) test the predictions of Henderson and Ioannides (1983) and find that investment demand is more sensitive to wealth and income than consumption demand, and that consumption demand is more sensitive to demographic and geographic variables. Moreover, the value of the principal residence of most owner-occupiers is determined by their consumption demand for housing, not their investment demand. Brueckner (2017) uses Survey of Consumer Finances data and confirms the prediction that the mix of non-housing assets differs between constrained and unconstrained cases, net of actual and imputed rental income. Arrondel and Lefebvre (2001), using French data, show that the difference between consumption and investment demands cannot in itself explain housing purchases by French households. Crossley et al. (2022) use UK household-level data on borrowing, consumption and investment to show a borrow-to-invest motive whereby leveraged households increase borrowing to make additional residential investments so as to get closer to their optimal asset portfolio. These studies could be used, along with the distribution of demographic characteristics of households within the population, to assess the endowments-related housing inequality that originates in wealth portfolios.

---

<sup>37</sup>This is measured as total real estate holdings. The value of primary residence is examined separately.

Transactions costs typically include fixed components of all types. They cause portfolio readjustments to take place at discrete times, usually coinciding with housing consumption changes. Demographic shocks or job relocation (planned or unplanned) can lead to moving, remodeling or changes of tenure. Flavin and Nakagawa (2008) and Flavin and Yamashita (2011) allow for adjustable non-housing consumption and general asset portfolios. Since overall risk preference depends on wealth, distributional consequences follow. The highly levered position of young homeowners leaves little room for extensive risk diversification. Notably within the housing and asset portfolio literature, both of the above-mentioned papers endogenize the timing of adjustments of the housing quantity in reaction to exogenous events. Thus, housing is quasi-fixed during residence spells whose length is endogenous, but timing depends on the share of housing in total wealth. These considerations link endowments-related housing inequality with associational inequality. The strength of the neighborhood effects, documented by Chetty and Hendren (2018a,b) (see section 5.2), depends on the length of residential spells (see section 5.1). Relatively high transaction costs prevent households from adjusting their housing consumption in line with their preferences and lead to prolonged residence spells. This is an advantage in good neighborhoods but a disadvantage in bad ones, impacting associational inequality. This link between residence spells and inequality calls for further exploration.

Martinez-Toledano (2022) emphasizes market timing. Using Spanish data, she finds that top wealth holders time the market better, investing a larger share in housing during booms and reshuffling their portfolios away from housing and in favor of financial assets at the beginning of busts. Such portfolio reshuffling is an important driver of short- to medium-term fluctuations in wealth inequality. Sakong (2022) estimates the trading patterns of households across wealth levels in the US housing market for 1988–2013. This study complements the findings of Martinez-Toledano (2022) by showing that poorer households are more likely to buy risky assets in booms — when expected returns are high — and to sell after a bust — when expected returns are low. The interquartile-range-difference is 60 basis points annually. Consequently, geographical areas in the US with historically high housing market volatility will be associated with greater wealth inequality than income inequality.

All in all, theoretical and empirical progress has been made in our understanding of the role of housing in households' wealth portfolios. However, the macroeconomic estimates

obtained by Jorda et al. (2019), discussed at the end of the preceding section, have not yet been fully integrated by the literature in order to provide a fuller understanding of the impact of cyclical fluctuations. As such fluctuations are macroeconomic in origin, they mask important details about the risks faced by individual households and how they may be hedged.

## 4.5 Taxation and Housing Inequality

Mortgage debt is an important part of household debt, accounting for more than half of all household debt across the OECD countries. It has also grown in importance, especially in the US. Mortgage interest deductibility lowers the cost of homeownership, but although it is present in many countries, its incidence is uneven. The length of mortgage loans is also important because interest charges are front-loaded, allowing greater tax deductions early on, and vary across countries.

The elimination of mortgage interest deductibility has been debated in both the US and in Europe.<sup>38</sup> Arguments in favor are that it generates a large loss in tax revenue and is effectively a regressive feature as it interacts with the progressivity of taxation: the value of the deduction increases with household incomes and the associated marginal tax rates. An argument against eliminating is that it will reduce the homeownership rate. Sommer and Sullivan (2018) challenges this view. They consider the general equilibrium effect through endogenous house prices and rents and show that eliminating deductibility could reduce house prices by increasing the relative cost of homeownership. Consequently, lower house prices imply that low-wealth, credit-constrained households would be more likely to become homeowners. The authors argue that the elimination of the mortgage interest deductibility could actually increase homeownership. More importantly, such a reform would improve the housing consumption of lower-income relative to higher-income households.

Rather than reviewing the huge specialized literature on the tax treatment of housing we focus on a few key issues. The tax treatment of housing favors higher-income households. A progressive tax system reduces the burden of the property taxes, which are levied on property values. In the US, the actual tax liability may be deductible from federal income tax under certain conditions, and various improvement categories may

---

<sup>38</sup>This deductibility is limited in the US nowadays, but it still favors taxpayers with higher marginal tax rates (see IRS Publication 936).

also be tax-advantaged. Figure 4.4 in OECD (2021) shows that across OECD countries, the marginal effective tax rate for owner-occupied, debt-financed investment ranges from a subsidy of 70% in the Netherlands to a tax of 22% in the UK.

A related and under-explored issue is the fact that implicit income in the form of housing services from owner-occupied homes (a form of asset income in kind) is rarely taxed. That is, from (3), the value of housing consumption on the l.h.s.  $p(\ell_t^i)h_t^i$  is associated with asset income on the r.h.s.  $p(\ell_t^i)h_{t-1}^i$ , which is implicit if the home is not sold. This also favors owner-occupancy over renting. From (4), renters incur housing expenditure  $q_t(\ell_t^i)h_t^i$  which is not associated with any asset income. This amounts to unequal treatment of renters relative to owners, that is, horizontal inequity. Property taxes, an important feature of the tax treatment of housing, with implications for inequality are discussed in section 5.3.1.

Poterba and Sinai (2008) show that the often-forgotten exclusion of the imputed income of owner-occupants from the tax liability is an important benefit favoring higher-income taxpayers. They assess that the revenue loss in the US from the exclusion of this imputed income from total income amounts to four times the revenue loss from the property tax deduction. They also show that the “last dollar” user-cost of housing that follows by taxing the imputed income (and treating it like landlord rental income) decreases with household income. However, as List (2023) shows, using data for several European countries, the impact of taxing imputed income on income inequality is ambiguous. This is because the share of housing in total wealth typically decreases with total wealth. Thus, the user cost decreases with total income, and wealthier households hold little mortgage debt. List quantifies inequality within and across renters and owners by means of Theil’s generalized entropy measure. Figari et al. (2017) investigate the distributional implications of abolishing mortgage interest tax exemption (and other special tax treatments of expenses related to the main residence) and include the imputed rents as taxable income of homeowners. They look at six European countries with varying tax treatment of homeowners and argue that removing the “homeownership bias” would generate revenues that could allow taxation of labor to be lightened. As highlighted by Kiyotaki et al. (Forthcoming), a clear distributional impact of removing homeownership subsidies is a welfare loss, measured as consumption-equivalent, for older generations, who are more likely to be homeowners, a reason why it is politically difficult to implement.

Finally, transaction taxes on property transfers have garnered significant attention from policymakers, as seen in the *Henry Review* (in Australia) and the *Mirrlees Review* (in the UK). Research using data from Australia, Europe and the US, as reviewed by Määttä and Terviö (2022), demonstrates that transaction taxes reduce homeowners' mobility, transaction volumes, and house prices in the ownership market, resulting in substantial welfare loss. The discussion has led to proposals to replace transaction taxes with property taxes; see Chapter 6 of OECD (2021) for a discussion of transaction taxes and residential mobility in OECD countries. A recent literature explores the distributional effects of transaction taxes and their impact on tenure decisions. For instance, Han et al. (2022) find that a higher transaction tax decreases buy-to-own transactions while increasing buy-to-rent transactions, leading to a lower homeownership rate. Their analysis, employing a housing search model encompassing rental and ownership markets, reveals a significant aggregate welfare loss and distributional effects among new homebuyers, renters, investors, and existing homeowners.

## 5 Housing, Location, and Associational Inequality

Unlike with other major durables, the location of housing links economic and social spaces through their neighborhoods. Neighborhoods are the stuff of social space, regardless of the institutional environment of housing. They host social life, promote social interaction, and accommodate informational channels – all functions that persist with and/or are complemented by increasing reliance on informational technologies. Precisely because of their multiple roles, neighborhoods are hard to define, but are still crucial for housing's role in inequality; c.f. Durlauf (2001).<sup>39</sup> Definitions favored by economists often follow the geographic detail associated with data availability.<sup>40</sup>

Topa and Zenou (2015) link neighborhood effects, which are typically construed in geographical space, with social network effects, which are typically construed in social space. They recognize that much more additional attention should be paid to the interface between the two. The present section elaborates on attributes of locations such as access

---

<sup>39</sup>Durlauf (2004) offers a thorough a review of related theory and empirics. Graham (2018) adopts the term associational inequality in a review of identification and estimation issues pertaining to all types of neighborhood effects.

<sup>40</sup>A series of articles by a team of New York Times journalists, led by Buchanan et al. (2023), has pioneered interactive maps of New York City neighborhoods as defined by the perceptions of residents. As a general concept, this is consistent with any measure of inequality.

to jobs, schools and social networking opportunities. However, the Covid-era experience with working from home (WFH) has ushered in important changes, discussed in section 5.5.

The location decision has investment-like features.<sup>41</sup> It involves social costs as well as moving costs, and pays off over time. As Kennan and Walker (2011) emphasize and Jia et al. (2023) recently reaffirm, many aspects of a new location might not be ascertained without moving and experiencing life in that location. With the location decision being conceptually similar for renters and owners, here we focus on the formulation for renters. Owners, however, have more at stake as they typically incur greater moving costs.

## 5.1 Location Choice as Investment

Moving is an investment decision that involves a trade-off between incurring immediate costs against expected future returns. Residential moves are often prompted by changes in demographic characteristics, such as household composition and fertility decisions, or jobs prospects, which motivate the location and housing quantity chosen. Households with school-age children evaluate locations for local school quality, whereas retired persons will value different local amenities.

The location choice  $\ell_t^i$  proxies for the *associational* information that enters the determination of wage  $w(\ell_t)$  and skill accumulation  $S(z_t; s_{t-1}, \ell_t)$ . It generates future payoffs in terms of better jobs and schooling opportunities through the same wage and skill accumulation functions. Choosing location equates the marginal cost of location, in terms of higher rent, to its marginal benefit. The latter consists of two components. The first component of benefits may be interpreted broadly as proxying for the full range of benefits accorded by a location, to be referred to *associational* benefits. These include more lucrative employment opportunities in a more expensive location, or better social networking options, given one's skill and social status. The second component reflects the role of location in the improvement of skill. Since such improvements pay off in the future, they are anticipated in setting direct spending on skill accumulation, thereby bringing in a relationship between current and future location. The fact that both components express social effects may justify their being referred to by the literature collectively as *neighborhood effects*.

Moving is modeled in Ngai and Sheedy (2020) as an investment in match quality

---

<sup>41</sup>Bilal and Rossi-Hansberg (2021) proposed the concept of location *asset* to underscore this feature.

between the household and location and neighborhood amenities. Macroeconomic conditions and search and other frictions can impede moves, as households tolerate quality mismatch. The frequency of moving defines residence spells, the lengths of which are linked to intensity of exposure to neighborhood effects (Chetty and Hendren, 2018a,b) and adjustment to households' asset portfolios, as discussed in section 4.4.1. Impediments to households' ability to invest in locational aspects of housing contribute to housing-related inequality. Restrictions in housing supply can make access to attractive locations expensive and will have consequences for inequality both immediately and in the future via the propagation mechanisms (see also section 5.3.2). Since future skill depends on current skill, the duration of households' stay in a neighborhood reflects a trade-off between beneficial neighborhood effects and quality mismatch.

Researchers have documented a long-standing decline in the mobility of renters in the US, which reflects mostly rent-to-rent moves (Ioannides and Zabel, 2019). This pronounced decline in residential mobility in the US involves young adults, in particular, the group most in need of investing in location.<sup>42</sup> An important next step in this area is to establish causal motives of residential moves. These have only rarely been addressed by the literature, with the notable exceptions of Kennan and Walker (2011) and Jia et al. (2023).

## 5.2 Location Choice and Neighborhood Effects

The literature examining the importance of neighborhood in housing decisions has looked at a myriad of socioeconomic outcomes. A key objective of this literature is to describe the implications of neighborhood choice along with choice of housing for an in-depth analysis of the relationship between housing and inequality. Access to better neighborhoods is determined by ability to pay for better-quality housing, which is jointly packaged with better neighborhood effects. The non-random sorting of households across neighborhoods makes it difficult to establish causal relationships between neighborhood characteristics and individual outcomes. Some of the literature examining neighborhood choice sets out to account for selection effects, using covariate controls or counterfactual models. Other work aims at characterizing the sorting of households into communities as equilibrium

---

<sup>42</sup>From 1976 to 2016, the percentage of those who had moved in the preceding year declined monotonically with age, the mobility of those of aged 20–24 declining from 40% to 25% during 1976–2016 in monthly terms.

outcomes, using estimation models of the choice process. All researchers recognize that the joint distributions of housing consumption and income within different urban areas are not random samples from the unconditional national distribution.

Neighborhoods function inherently in a multidimensional fashion, and this fact confronts all empirical studies of neighborhood choice. Location in space is inherently heterogeneous. Housing density typically varies, as an outcome of supply and demand for shelter, and underlies associational benefits. Bailey et al. (2018b) establish that spatial and social proximity are strongly correlated, despite the aspatial nature of modern communication technologies (on which much social interaction now relies). As Sampson and Levy (2022) document for Chicago, residents of both advantaged and disadvantaged neighborhoods “travel far and wide,” but a *relative* residential isolation by race and class persists. Residents of disadvantaged neighborhoods are also impacted by a *mobility-based disadvantage*: residents of other disadvantaged neighborhoods traveling to their own neighborhoods and they themselves travel to other disadvantaged neighborhoods. These *external* effects are even more pronounced than those emanating from their own disadvantaged neighborhoods. Albeit correlational and not causal, as the authors recognize, the effects persist when controlling for many theoretically justified covariates. This “enduring neighborhood effect” provides additional support in favor of location as an important angle on housing and inequality.

Taking the multidimensional nature of neighborhoods seriously implies that they may be evaluated in an ordinal fashion in the sense that sets of attributes of neighborhoods are considered jointly. Neighborhoods are identified as discrete objects, and neighborhood choice is addressed by means of discrete choice tools resting on utility comparisons. Such tools allow us to address the link between housing and inequality via the persistence of neighborhoods with characteristics pertaining to inequality. Utility comparisons on which estimations rest can accommodate a great range of possibilities, including peer effects and social norms, typically instances of homophily, being important as explanatory variables. The results of such comparisons are rich. In view of Theorem 1 in Brock and Durlauf (2002), there exist plausible parameter values for which the utility trade-offs between individuals’ private utility from living in a neighborhood and their valuation of the social effects associated with that neighborhood can produce up to three equilibria – one of which is unstable and two are stable. Such conceptualizations may structure



outcomes whereby individuals may segregate themselves by type in the presence of strong social effects. This induces within-group homogeneity and cross-group heterogeneity. The interplay of individual characteristics and social effects leading to segregation underlies models of tipping and the dynamics of segregation. Such Schelling-type models have been examined empirically by Card et al. (2008) and Card et al. (2011); see section 6, and in particular section 6.2.1.

In the remainder of this section, we first explore the role of neighborhoods as hosts of spatial and social proximity. Then we examine the literature on housing and neighborhood effects, focusing on two extreme geographies. One considers neighborhoods defined as *points in space* that are associated with social context and in particular the acquisition of education. A second adopts *census tracts* as neighborhoods, which are discrete spatial population groups that delineate urban areas. Both these approaches serve as a background for studying assortative matching, the formation of neighborhoods and their dynamic evolution in relation to changing tastes.

### 5.2.1 Neighborhood Effects and Jobs

Since the review by Ioannides and Datcher Loury (2004), the literature has sought to establish links between social connections and employment prospects. Calvo-Armengol and Jackson (2004) model labor markets within which workers find out about jobs through their social networks. They show that both wages and employment are positively associated across time and agents. Gee et al. (2017), using anonymized confidential data from Facebook for 55 countries, establish that more people obtain jobs where their weak ties (i.e., casual acquaintances) work than where their strong ties (i.e., friends) work because weak ties are more numerous. In all the countries in the authors' data, going to work where a specific friend works is more likely the higher is the tie strength (although it is not always statistically significantly greater than zero for all three of their tie strength measures). Interestingly, the authors show that the value of strong ties for jobs is positively correlated with greater income inequality, as measured by the Gini coefficient. Several authors have established that the incidence of unemployment clusters spatially. Bilal (2023) confirms this for France and tests a theory that this is due to firms' co-location decisions and behavior, not of workers'. He shows that firms' behavior increases spatial unemployment differentials five-fold.

Hellerstein et al. (2014) use matched employee-employer data for a large number of workers in the US and link workers' residence and employment.<sup>43</sup> They obtain robust evidence that workers who are more connected to their neighbors have lower job turnover and greater earnings. The former effect also holds for those who are more connected to neighbors of the same ethnic or race group, though not the latter. This points to neighborhood-based job-related interactions. The authors' dataset is massive and their claims particularly persuasive as they rely on much weaker assumptions than other similar research.

Altonji and Mansfield (2018) seek to establish lower bounds for the neighborhood (treatment) effects associated with, for example, attending the same schools or living in the same neighborhoods when individuals sort based on observed and unobserved characteristics. Using multiple datasets, they confirm strong effects affecting several outcomes. In particular, they find that attending a ninetieth versus a tenth percentile school or living in a ninetieth versus a tenth percentile neighborhood increases the probability of high school graduation by 4% and college enrollment by 11% percent, and permanent wages by 13.7%.

Neighborhood effects for job opportunities can be broadly explained in terms of sorting between workers and firms in the presence of complementarities. Eeckhout et al. (2014) show that the nature of the complementarities determines the equilibrium skill distribution across cities. If skill complementarity is extreme, then the skill distribution has thicker tails in large cities. The authors use wage and housing price data to show that large cities disproportionately attract both high- and low-skilled workers; those with average skills are more evenly present across city sizes. DeLaRoca and Puga (2017) use data from Spain to show that not only are mean earnings greater in bigger cities but also the dispersion of earnings. They attribute the latter to the fact that "big city experience" not only improves skills but also benefits most those with higher innate ability, leading to greater dispersion of earnings within occupational groups. Lhuillier (2024) also postulates that workers learn from one another and confirms, using French matched employer-employee administrative data, that workers employed in relatively skill-dense cities experience faster wage growth, and disproportionately so if they are skilled. Spatial

---

<sup>43</sup>These researchers merge the data from the Longitudinal Employer-Household Dynamics (LEHD) program and the Decennial Employer-Employee Database (DEED). The latter are assembled by matching the 2000 Long-Form Census respondents from the "Sample Edited Detail File" (SEDF) to their establishment of employment.

sorting of skilled workers and more productive jobs in larger cities, defined as commuting zones, favors skill accumulation but accentuates spatial wage inequality, defined in terms of between-city wage variance.

### 5.2.2 Sorting with Neighborhoods Modeled as Points in Space

This section considers a simplification of the basic framework, from Ioannides (2013), section 3.3, in order to focus on housing and associational inequality when neighborhoods are defined as points on the positive real line,  $\ell \in \mathcal{N} = R_+$ . The model determines an equilibrium rent  $q(\ell)$  that drives individuals' self-selection into neighborhoods and underpins the resulting neighborhood income distributions. Locations are indexed by parents' average neighborhood schooling,  $S(\ell)$ . The equilibrium rent is increasing in this endogenous quantity. At each location  $\ell$  parents care about non-housing consumption, defined as income minus housing rent, and the expectation of their children's schooling. The latter is produced with parental schooling, parents' average neighborhood schooling, the child's ability and a random shock as inputs. Individuals are characterized by a vector of attributes: parental schooling, parental income, an idiosyncratic characteristic of the child, and a random shock that enters the educational production function (the counterpart of (5) here) together with parental income and schooling. Parents' trade off location and their children's expected schooling. The model delivers an equilibrium rent function  $q(S)$ , a *hedonic rent function*, which is increasing in  $S$  (and sigmoid under reasonable assumptions), and supports assortative matching. Average neighborhood parental schooling is given as an implicit function of all parameters and increasing in parental income. The neighborhood income distribution, that is, the distribution of income of parents who choose neighborhood  $S$ , is well defined and lognormal and so is that of parental education. These distributions define the associational inequality that is mediated by the housing market. Their means, conditional on parents' neighborhood schooling, are increasing in that quantity; their variances are decreasing functions of the correlation between parental income and willingness to pay for neighborhood quality, which is evidence of sorting. Parental education and income are positively correlated within neighborhoods.

### 5.2.3 Sorting with Neighborhoods Modeled as US Census Tracts

The previous section stripped the location choice to a bare minimum in order to isolate the role of housing prices in neighborhood sorting. Neighborhoods have multiple attributes over which individuals have preferences. These include various amenities, and also descriptions of the neighborhood population with particular demographic characteristics, neighborhood school quality, geographical attributes etc. Defining neighborhoods as spatially well-defined areas for which data on the plethora of relevant characteristics exist allows modeling neighborhood choice over discrete sets of options.

Davis et al. (2021) is a good example of a dynamic model of optimal location choice and its estimation based on data for all census tracts of Los Angeles. The authors seek to recover preferences of renters, while relying on very special but commonly made assumptions, who are likely recipients of housing vouchers, over neighborhood. The observations form a long panel, obtained from a 5% subsample of the relevant population, who are followed over all moves. Their specification is a special case of (1),  $\sigma = 1, \varepsilon = 1, \bar{h} = 0$ , with the addition of location-specific amenities including demographic characteristics of the census tract, which they express in terms of simple functions of model parameters and choice probabilities.<sup>44</sup> They then examine what would happen if Los Angeles were to convert its existing housing assistance program to one where all housing assistance is in the form of housing vouchers that can only be used in the top  $X\%$  of Opportunity Atlas neighborhoods.<sup>45</sup> They find that  $X = 20$  maximizes the aggregate earnings of children of renting households offered location-restricted vouchers. Their results show that such a substitution benefits the children of households that accept vouchers, but not of those who were not offered vouchers. They thus demonstrate that properly designed housing vouchers may improve intergenerational mobility. While the within-period stochastic structure is simple (though it could be generalized), it is nonetheless put to very ambitious use in estimating a dynamic structural model, a method that has many other potential applications.

An alternative approach by Ioannides and Zabel (2008) models neighborhood choice jointly with demand for housing services in a two-stage setting. In principle, demand

---

<sup>44</sup>While their assumptions are very special, their estimation of deep parameters is innovative. It is based on a little known approach that allows evaluation of the likelihood of observed choice probabilities in terms of model parameters without having to solve for the underlying value functions. This powerful procedure could have potentially many applications. The robustness of their results is impressive.

<sup>45</sup><https://www.opportunityatlas.org/>

for neighborhood quality and for housing services may be substitutes or complements. Notably the study uses neighborhood characteristics in a nested hierarchical setting. A random sample of observations on households from the American Housing Survey is geolocated and linked to its neighborhood cluster, defined as the set of their immediate neighbors, which is in turn linked to their census tract and then to their respective metropolitan area. The authors' approach allows them to estimate endogenous and contextual neighborhood effects. Controlling for non-random sorting into neighborhoods allows for unbiased estimates and provides a means for identifying endogenous neighborhood effects. Their neighborhood choice accounts for numerous characteristics of neighborhoods and their residents, and the results confirm the importance of homophily. The authors' estimates of the housing structure demand equation confirm that neighborhood effects are important and that housing demands by neighbors are interdependent.

This particular feature is a key element of Autor et al. (2014), who show empirically that such residential neighborhood effects are critical in assessing the redistributive effects of removing rent control in the city of Cambridge, Massachusetts. Specifically, price appreciation in decontrolled units and nearby never-controlled units accounted for almost one-quarter of the total property appreciation between 1988 and 2005, most of which accrued to never-controlled properties through spillovers (due to improved maintenance, amenities and more efficient sorting of individuals to housing), and much less to investment. The new tenants were significantly richer than those before rent control was removed.

Although neither Davis et al. (2021) nor Ioannides and Zabel (2008) explicitly address inequality, their methodological approaches are important to understanding how housing contributes to associational inequality. One may use the estimates to make inferences about individuals' neighborhood context at much finer geographical detail as in Reardon et al. (2015), which is discussed in section [6.2.2](#) below.

While Ioannides and Zabel (2008) correct for sample selection, their approach to inference is not based on observing agents at decision points. Data for individuals who are *plausibly forced* to make decisions are thus particularly useful. An interesting example of such research is Chyn (2018), who compares outcomes in young adulthood for children displaced by demolition of public housing to outcomes for originally similar but non-displaced peers in nearby public housing in Chicago. The displaced households were

offered tenant-based housing vouchers. Chyn finds that the displaced children were more likely to be employed and earned more in young adulthood, experienced fewer arrests for violent crime and had lower high school dropout rates than those not displaced. Several related studies use field experimental data from the “Moving to Opportunity” (MTO) program, a major randomized housing mobility experiment (Bergman et al., 2024). This and related studies are discussed further in section 6.1.2 below.

Patacchini and Zenou (2011) identify neighborhood effects in the inputs by parents to their children’s education and therefore to human capital investment. Using panel data from an entire cohort of the UK National Child Development Study (NCDS), they compare outcomes for households that chose private dwellings in residential neighborhoods with those that were assigned council housing units (public or social housing in the UK). Their results suggest that parental involvement and neighborhood quality are complements.<sup>46</sup> In “good” neighborhoods, better-educated parents provide time input into their children’s education, and their children are more likely to reach high educational levels. This is not the case for those living in “bad” neighborhoods.<sup>47</sup>

Gilraine et al. (2023) associate school quality with the intergenerational transmission of wealth from rising housing prices in a model linking neighborhood choice and endogenous local school quality in the US, with school zones as the unit of observation. Rising prices improve school quality via the increased tax base, and hence also increase human capital and future incomes. Wealth consists of intergenerational transfers and their children’s human capital, which depends on local school quality. A novelty of the authors’ approach is that school quality improves via the sorting of high-performing teachers across schools (while pay is unchanged), to schools with higher socioeconomic status students in the same large school district. Using data from 2002 to 2017 from Zillow’s Transactions and Assessment Database (ZTRAX) for house prices, and community data from the American Community Survey, they find that the school quality channel accounts for over half of the total wealth effect of a housing market shock. The authors confirm that the estimates indicate that most of the change in school quality is not due to changing peer effects (i.e., to changes in student demographics) but is instead due to changes in

---

<sup>46</sup>To counter possible criticism that these results are due to unobserved heterogeneity, such as heritability, the authors obtain results for adopted children and find that the “results remain (qualitatively) unchanged.”

<sup>47</sup>We follow Chetty and Hendren (2018a,b) and adopt the term “good neighborhoods”, using it informally to refer to neighborhoods with low poverty, unemployment and crime rates, with good student test scores or large fractions of college graduates.

teacher quality.

### 5.3 Assortative Matching and Changing Amenities

Since individuals sort themselves into residential neighborhoods in a non-random fashion, it is not surprising that the joint distributions of their neighbors' characteristics do not form random samples of a nation's or a city's population.

A large literature seeks to document that individuals are attracted to cities that host other individuals of similar skill levels. A rich literature finds that the earnings of skilled individuals are higher in larger cities. Households' moves provide evidence on the relationship between individuals' characteristics and the wages and other characteristics of their destinations. Card et al. (Forthcoming) use longitudinal data from the LEHD program of the US Census Bureau and find, consistent with recent research from France, Spain and Germany, that two-thirds of the variation in observed wage premiums from working in different commuting zones (CZs) is attributable to skill-based sorting, and that the effect is much stronger for college-educated workers. Thus they find a positive correlation between measured returns to skill and CZ average wages (and CZ size), that is "almost entirely due to sorting on unobserved skills within the college workforce." Moreover, they find that matching across CZs is much higher for college-educated workers. Assortative matching fuels nominal inequalities across cities. Moreover, differences in local housing costs more than offset the corresponding earnings premiums, suggesting that workers who move to larger CZs have lower net-of-housing consumption, which produces real income inequalities. Clearly, since moves are voluntary, such real income losses must be offset by higher consumption amenities.

Individuals' pursuit of better lifetime prospects is associated with greater earnings inequality. Since households make deliberate choices about job opportunities and quality of life in evaluating prospective destinations over time, neighborhoods, communities and indeed entire cities are reshaped to reflect preferences as the demographic characteristics of urban populations change. Larger cities also host more heterogeneous populations (DeLaRoca and Puga, 2017). The heterogeneity of the housing stock affords flexibility in accommodating different tastes and demands and can provide more housing through additions and conversions. Thus, shocks to housing demand due to the arrival of wealthier consumers increase housing prices for all. The attraction of so-called superstar cities, in

particular, has been an important force in the reshaping of US urban areas (Gyourko et al., 2013; Baum-Snow, 2023).

Diamond (2016) demonstrates how sorting has reshaped higher-skilled US cities. From 1980 to 2000, the rise in the wage gap between high school and college graduates coincided with increased geographic sorting as college graduates concentrated in high-wage, high-rent cities. The supply of amenities changed to match changing tastes. These amenities, together with changes in the wages and rents in cities, increased welfare inequality between high school and college graduates by more than is implied by the increase in the wage gap alone. The authors measure the impact on inequality in terms of welfare decompositions based on log-wage equivalents.<sup>48</sup>

Changes in cities that follow changing demographics are not always welcomed by existing residents. A case in point is Paris, where efforts to keep the city center affordable for diverse demographic and occupational groups have been prompted by concern over preserving its characteristic urban fabric. Specifically, the city government has pioneered a policy giving it right of first refusal when dwelling units come up for sale. The properties the government does purchase are converted to government-owned housing, which has resulted in one-fourth of Paris residents' living in such housing.<sup>49</sup>

### 5.3.1 Local Provision of Education and Sorting

In countries like the US, where 91% of enrollments in primary and secondary education are accommodated by local governments and financed through property taxes in their jurisdictions, a potentially important force of housing inequality is linked to location.<sup>50</sup>

The presence of this force is much greater in the US than in any other OECD country with the exception of Canada, and the impact of property taxes on inequality via housing depends on its incidence. The majority of the relevant literature considers that property taxes levied on private homes are capitalized on house prices, thus reducing their attractiveness. The literature also considers that the benefits of the locally provided public

---

<sup>48</sup>See Almagro and Dominguez-Iino (2022) for a similar urban reshaping in Amsterdam induced by tourism that led to new housing regulations, all of which have had notable distributional effects.

<sup>49</sup>“How Does Paris Stay Paris?” *New York Times*, March 19, 2024.

<sup>50</sup>Property taxes amount to one-third of combined state and local taxes in the US, and are the principal source of financing of local public services, such as public safety, in addition to schools. In 2018-2019, local taxes amounted to 36% of K-12 public education revenue in the US, where the representative homeowner pays 1% of their property value in local taxes. In addition, US states contributed 47% of US K-12 public education spending in 2018–2019. The picture is similar in Canada, where most of the 40% of school finance originates in the property taxes, but this is not the case worldwide.



services that a property tax finances are also capitalized on house prices enhancing their attractiveness. Finally, the literature also considers that the property tax levied on rental properties is shifted to renters. If viewed as a tax on housing consumption, it is regressive because lower-income households spend a greater share of their income on housing (see section 3). If viewed as a tax on capital, however, it is more progressive because higher-income taxpayers own larger shares of capital. In either case, it may be regressive for the lowest income groups, while more progressive for the other groups (Reschovsky, 2023). The power of local governments over zoning (section 5.3.2 below), together with their control over the property taxes can reinforce sorting and contribute to inequality via regressive educational outcomes. Higher home values, which generate a larger tax base, are often associated with high levels of residential segregation by socioeconomic status (see section 6). Therefore, wealthy communities and school districts may spend more per student, and housing may thus contribute to widening rather than narrowing existing educational inequalities, in turn contributing to associational inequality.

There are other reasons why reliance on the local community property tax base for financing schools is a source of inequality in the US. Property tax assessments vary in accuracy and equity along the community wealth distribution. Moreover, state governments employ different policies in aiding poorer school districts, and local governments employ a variety of redistributive tax abatement schemes. Evidence of racial inequalities in tax assessment has been explored by Avenancio-Léon and Howard (2022). Using administrative data on transactions and tax assessments, and a property-level data set spanning most properties in the US, the authors find that Black and Hispanic owners face a tax burden that is between 10% and 13% higher for the same level of public services. This is because these owners are effectively assessed at higher rates (based on house structure), while other characteristics that are factored into the market value are ignored. Given the well-documented existence of racial segregation in the US, this leads to over-taxation of communities with a high share of minority residents (see Section 6.2). For all these reasons, the literature has not settled on the net redistributive impact of the local financing of education. The incidence of such taxes depends on demand and supply elasticities as well as on numerous other issues, including whether it is considered on a lifetime or annual basis, and on the income concepts employed (especially if the imputed income from the owner-occupied home is included). Incidence on an annual basis is more

appropriate for renters and on lifetime basis for owners, which is an important feature that complicates the analysis.

In addition, the systems allowing children to apply to schools outside their neighborhood that are increasingly being contemplated and introduced in the US aim at delinking residential location from school attendance. As Avery and Pathak (2021) show, whether or not such systems truly increase access to high-quality schools is complicated by families' self-selection of housing choices.

### 5.3.2 Land-Use Regulation, Zoning, and Codes

Not only are parcels of land differentiated due to location, but their suitability for housing is subject to numerous land use regulations, zoning and building codes. They are employed to varying degrees across the world and affect the supply of housing and therefore rents and prices. Regulations are also subject to overlapping governmental jurisdictions to varying degrees. Across OECD countries, overlaps tend to be greater in the wealthier countries, as demonstrated by Figure 4.4 in OECD (2021). Decentralization of land-use regulations is associated with more restrictive land use settings, as it allows local jurisdictions to adopt policies that favor politically powerful groups of residents. It also permits different levels of government to hinder projects that are likely to expand housing supply. At the same time, metropolitan-level policies can be more effective in restricting urban sprawl. Because land use and building density regulations are often very locale-specific and hard to quantify, it is not easy to relate land use governance patterns to levels of development. Figure 4.7 in OECD (2021) simulates a relaxation of land-use policies across OECD countries and show that countries with the highest house price-to-income ratios are likely to benefit most. While there is a positive correlation between the two rankings, Great Britain stands out as being almost as likely to benefit from improved affordability as New Zealand, which has the highest house price-to-income ratio.

Housing types and prices depend on land use regulations with zoning affecting density, in particular. In the US, land use regulation is under local government control, though it is subject to state-level legislation, which in turn influences public and social housing policies. Zoning is typically criticized for promoting low-density residential developments in US cities. Such developments are far more prevalent in the US than in other countries, and they limit housing opportunities for those who cannot afford large homes or lots.<sup>51</sup>

---

<sup>51</sup>A proposed introduction of zoning in the UK has been criticized as likely increasing housing inequal-

Lens (2022) argues that zoning policies in the US have racist and classist origins, make housing more expensive, and reinforce segregation patterns. The role of exclusionary zoning laws in placing restrictions on the types of homes that can be built in particular neighborhoods has been emphasized by policy makers.<sup>52</sup> In examining the effects of exclusionary zoning on the lowest-income residents, Trounstine (2023) takes a political economy approach that links the racial composition of communities to voting patterns over the stringency of land use regulations that are implemented by US local governments. The author shows that cities that were “Whiter” than their metropolitan area in 1970 were more likely to have restrictive land use patterns in 2006. Trounstine provides *prima facie* evidence of discriminatory practices. Assembling data for communities that have been sued for Federal Fair Housing Act violations, she finds that cities with no lawsuits exhibited a greater presence of White residents. Specifically, cities without lawsuits were about 73% White on average, compared with 68% for cities with lawsuits. Trounstine also shows, using precinct-level initiative elections from several Californias cities, that “Whiter” neighborhoods are more supportive of restricting development. Although land use policies are in principle race-neutral, adopting restrictive policies contributed to racial as well as homeownership segregation.<sup>53</sup>

Diamond and Gaubert (2022) show that, by 2017, residential sorting in US cities has been driven by preferences for consumption amenities, rather than moves for production amenities as in earlier times. The authors assess how well-being inequality has changed by examining the impact of the different drivers of sorting: changes in nominal wages alone, then rents, and finally amenities. They find that nominal wage inequality increased by 16.7 percentage points (of utility) between 1980 and 2000, and by 10.7 percentage point between 2000 and 2017. Including the effects of changes in rents reduces the increase in wage inequality by 10 percentage points, because high-skill workers tend to live in more expensive locations. However, adding the effects of changes in endogenous amenities leads to a greater change in well-being inequality (measured in utility) of 17 and 12.1 percentage points between 1980 and 2000 and between 2000 and 2017, respectively.

---

ity; see <https://tinyurl.com/mr23u8bm>.

<sup>52</sup>See Rouse et al. (2021) for a policy inspired view and Ellickson (2022) for a long-standing legal critique.

<sup>53</sup>Kulkarni and Malmendier (2022) find that the upward mobility of children from low-income families is not predicted by homeownership rates, but by homeownership segregation. Higher residential segregation between homeowners and renters predicts lower upward mobility of children from low-income families, while not affecting high-income families.

The findings of Diamond and Gaubert (2022) are consistent with those of Hsieh and Moretti (2019) and also Herkenhoff et al. (2018). The latter work with a representative-individual, general equilibrium multi-region model with endogenous housing supply and specification of state-level land-use regulations that affect housing and non-housing production to an extent that can hamper relocation of skilled individuals in pursuing job opportunities in fast-growing sectors. They simulate their model with panel data at the level of US states for 1950–2014 and examine how a slowdown in productivity and output growth feeds into high house prices in high-income states, such as California and New York State. They predict that deregulation in California and New York State alone, taking them back to their 1980 levels of land use regulation, would raise aggregate productivity and consumption by at least as much as 7% and 5%, respectively.

Like zoning, housing and building code restrictions are either state-controlled or locally-controlled policies in the US (and often elsewhere) and affect both the cost of new housing and the use of existing stock through remodeling. While such restrictions confer some rigidity on the housing market’s ability to cater to households of different incomes and taste, filtering in some way mitigates this. Filtering refers to the process through which dwelling units command lower rents and prices as they age and depreciate in quality (not unlike other capital goods) and become affordable for occupancy and purchase by lower-income households. It has served as a robust source of lower-cost housing in the US. Remodeling and filtering influence housing stock maintenance and re-use, both of which are sources of housing options for lower- and middle-income households. They also influence the demographic composition of city centers. Gentrification, defined as re-occupation of the city center by higher-income households when the central city becomes more attractive, is particularly pronounced in large North American cities and depends critically on the age composition of the housing stock.

Using American Housing Survey data, Rosenthal (2014) estimates that owner-occupied housing units filter at a rate of 0.5% per year, while rental dwellings filter at higher rates, typically 1.8–2.5% per year. Both processes are slowed by real house price inflation and are less likely where the price elasticity of demand is high. Dwelling units are more likely to transition into the rental sector as they age. To visualize the impact of the filtering process, Rosenthal estimates that the real income of an occupant moving to a 50-year-old home would be 60% less than the income of an occupant of a newly built home (most of

which are owner-occupied). Rosenthal’s results confirm that “filtering is a viable long-run market-based source of lower-income housing,” which is relevant to the design of housing assistance. The process of gentrification, however, is a source of the spatial pattern of upward filtering as higher-income households are drawn to old but centrally located, and subsequently heavily renovated dwelling units (Brueckner and Rosenthal, 2009). Urban redevelopment is often seen as a key policy in arresting the decline of city centers throughout the world. It raises land values and invites gentrification which together with filtering are important factors affecting the supply of low-income housing in central cities throughout the world. But it also intensifies calls for affordable housing policies.<sup>54</sup>

## 5.4 Intergenerational Aspects of Neighborhood Effects

Neighborhoods matter for intergenerational mobility. This has been established by a series of studies, starting with Chetty and Hendren (2018a,b). These studies use information on moves by seven million families across US commuting zones and counties to estimate neighborhood effects on intergenerational mobility. By observing the careers of households as they move from one neighborhood to another and implementing clever identification strategies that exploit variations across birth cohorts, genders, and quantiles, they estimate that neighborhood effects on the income of people who moved to a neighborhood as a child converge to those of permanent residents at a rate of 4% per year of exposure. When they use US counties to represent neighborhoods, they find that for children in low-income families, each year of childhood exposure to one standard deviation “better” county (defined as a county with less concentrated poverty, less income inequality, better schools, a larger share of two-parent families, and lower crime rates) increases household income at age 26 by 0.5%.<sup>55</sup>

In the US, housing can become “unaffordable” (to use a popular term) to the poor for many reasons. These include high urban land values in city centers, where low-skill jobs were often located historically, and exclusionary zoning and land use restrictions, due to local control of land use. The latter make living near better jobs and schools expensive. Thus, the local income distribution and expensive housing reinforce income segregation patterns, with the poor living disproportionately near low-paying jobs. The local political

---

<sup>54</sup>Some of the complexities of the ensuing conflicts are reviewed in a special case by Ioannides (2017).

<sup>55</sup>See Chyn and Daruich (2021) and Fogli et al. (2022) for uses of micro estimates in macro quantitative models and the importance of the associated general equilibrium effects.

process itself can, through the local control of schools, zoning and land use regulation (sections 5.3.1 and 5.3.2), produce feedbacks reinforcing income and racial segregation, which in turn can lead to sustained underinvestment in human capital by minority groups (Durlauf, 1996).

As the present section underscores, the impact of housing location on inequality via its associational aspect means that location is as much a necessity as housing consumption, if not more so. Tackling inequality requires not just affordable housing but affordable housing in opportunity-rich neighborhoods, as Raj Chetty argued in his testimony to the US Congress in 2021.<sup>56</sup>

## 5.5 Working from Home

After the onset of the Covid-19 pandemic in 2020, policy responses around the world forced a reliance on telecommuting technologies or Working-from-Home (WFH). Not all jobs are amenable to WFH, but substantial numbers of workers continued their work remotely. The latest US data after the end of the pandemic show that while 80% of those between the ages of 18 and 64 who are working do so in-person, among those who work partly or entirely remotely most have a bachelor's degree, followed by a graduate degree, some college and finally high school or less. They are predominantly White (both men and women) with no children.<sup>57</sup>

These facts call for an assessment of the impact of WFH on the housing market and indeed the urban structure. Across cities, workers who can work remotely can retain high-productivity jobs but economize by moving to lower-cost locations. Within cities, remote job access flattens the intracity house price gradient (OECD (2023), Figure 4.6) and elevates the importance of multi-center urban areas.

Among a flurry of research Brueckner et al. (2023) stands out. The authors use data on house prices and rents from ZTRAX, data on local amenities and productivity from Albouy (2016), and data on county population outflows from the United States Postal Service address change data. They confirm, in broad strokes, much discussed predictions of WFH, including urban population outflows. WFH may have a different impact on the urban geometry to long-run improvements in urban transportation. For many OECD countries, WFH increased by between 25% and 35% from 2020 to 2022

---

<sup>56</sup><https://tinyurl.com/mpw3sh6k>

<sup>57</sup>“Who still Works from Home,” *The New York Times*, March 16, 2024.

(OECD (2023), Figure 4.5). By bringing about an enormous reduction in commuting costs for workers, it represents an urban decentralization force with major implications for housing and inequality. In high-productivity cities real-estate owners lose and renters gain, and vice versa in low-productivity cities. Davis et al. (2024) emphasize the effect of WFH as a complementary technology to working from the office that has the effect of increasing demand for residential space and house values. They do not predict a mass exodus to remote locations, but their approach does support the notion that at least some telecommuting would continue after the pandemic ended.

Since many jobs do not lend themselves to telecommuting, WFH introduces another source of inequality, firmly linked to housing and with long-run consequences for the industrial composition of cities. WFH favors primarily highly skilled workers and occupations and is likely to have major distributional consequences, softening urban housing markets while strengthening suburban and rural ones and in ways that are as yet hard to assess. There is reasonable speculation that some commercial real estate in city centers will be converted to housing.<sup>58</sup>

It is also too early to assess the net impact of WFH on individual productivity and total factor productivity. WFH saves commuting time and may induce workers to work longer hours, but it is hard to assess the effects on individual productivity of the lost serendipity of office interactions and the consequences for corporate culture (Van Nieuwerburgh, 2023). WFH, coming after widespread adoption of informational technologies that reduce the need to travel to shop or consult a doctor (or other professionals), is bound to have major impacts on housing and land use. It is an open question whether the Covid-19 pandemic may have reversed the phenomenon in superstar cities of extraordinarily high housing costs that were producing a flight to less expensive locations.

## 6 Racial Discrimination and Segregation

Race discrimination is present in many markets including housing (Lang and Kahn-Lang Spitzer, 2020). To the extent that discrimination drives unequal treatment of otherwise identical people based on their race, ethnicity, gender or socioeconomic status, it is a potential driver of housing inequality. Its role could persist even after controlling for

---

<sup>58</sup>OECD (2023) (Chapter 4) details how the new geography of housing demand evolves. For example, whereas population densities decline with distance from the centers of functional urban areas, house price differences increase with distance from the centers for small and medium functional urban areas along with increased reliance on telecommuting technologies.

household-level state variables such as initial level of skill, assets or location. Therefore, its consequences for housing inequality are important in their own right as an endowment force of inequality and via location: residential segregation by race could in principle be a feature of associational inequality. Discrimination may occur in the form of covert rather than overt exclusion from markets. Persistent effects of past exclusion from housing markets may combine with its current impact. Detecting the totality of effects and assessing their measurable implications for welfare requires considering both endowments and associational housing inequality.

Housing is traded in personalized markets where interpersonal transactions are conducive to racial and other discriminatory practices even when such practices are ostensibly outlawed. As Arrow (1998) puts it, in the housing market “the transactors bring to it a whole set of social attitudes which would be irrelevant in the market model.” As housing transactions almost always require search, discrimination operates through both person-to-person and intermediated transactions, with the latter increasingly taking place via the internet.

Individuals subject to discrimination face opportunity sets which are either adversely unrepresentative of market opportunities or accompanied by incomplete information on the full set of attributes of housing. As a result, they face suboptimal options or outcomes, given their preferences and endowments. Furthermore, with the prevalence of online housing search, novel possibilities for misinformation and disinformation arise for at least two reasons. One is the *informational divide*: lower-income home seekers may not be as web-savvy in searching for opportunities as higher-income ones. A second reason is the fact that although searching via online markets allows agents to avail themselves of masses of information at trivial search costs, such markets are not as effectively “monitored” for compliance with antidiscrimination laws as physical markets. Agents may be susceptible to manipulated information, making them vulnerable to outcomes that are even more unequal than on physical markets (sections 6.1.2 and 6.1.3). We refer to these outcomes as instances of *endowments* inequality.

Gaps in homeownership and wealth holding between Whites and Blacks in the US are important features of the housing market that have received particular attention. As shown by Derenoncourt et al. (2024), the Black homeownership rate has increased since 1860, but still stood at two-thirds of the White homeownership rate of 67% in 2020. The



authors argue, however, that the increase in Black homeownership has not contributed substantially to an improvement in the racial wealth gap. On the contrary, they show that there has been a widening of the racial wealth gap since 1980 because Black households have held nearly two-thirds of their wealth in housing and very little in equity and other risky assets during a period when returns to housing were lower than returns to equity. However, as we discuss in section 3.3, these effects could be due in part to distressed sales that are more likely to affect disadvantaged neighborhoods. In any case, the findings suggest that housing as a source of associational inequality through neighborhood effects is likely to be a more important factor than endowment inequality via housing wealth in explaining the racial wealth gap. As discussed in Section 5, access to schools and jobs could constrain earnings, resulting in less disposable income to invest in equity. We delve into racial segregation further below in section 6.2.

## 6.1 Detecting Discrimination through Market Outcomes

Oh and Yinger (2015) review four US national studies based on in-person audits together with studies based on correspondence audits in the US and in several European countries.<sup>59</sup> Despite variation in methods, sample sizes and locations, the studies consistently find evidence of statistically significant discrimination against home seekers who belong to historically disadvantaged racial or ethnic groups. For example, a 2012 US national audit study found that there were 9% more audits in which a White homebuyer was shown more available houses than an equally qualified Black homebuyer than the share in which a Black homebuyer was shown more houses than their White counterpart. However, the authors note that housing discrimination against Black and Hispanic home seekers appears to have declined recently in the US, with more advertised units being shown to such customers.

Bayer et al. (2017) seek to detect discrimination in the form of racial and ethnic price differentials in the housing market, using a rich data set covering 2 million repeat-sale housing transactions drawn from four major US metropolitan areas and accounting for house and neighborhood-by-time fixed effects. They find that Black and Hispanic homebuyers pay premia of around 2% on average in the four cities. They also show that

---

<sup>59</sup>An in-person audit involves monitoring the behavior of realtors when dealing in-person with individuals posing as potential buyers who have identical profiles but belong to different ethnic groups. Correspondence audits are similar but take place over the internet.

Black and Hispanic buyers pay more for housing “regardless of the race or ethnicity of the seller, and that (if anything) these premia are greater when blacks buy from blacks and Hispanics from Hispanics.”

In addition to direct discrimination in housing markets, housing outcomes can also reflect discrimination in mortgage credit markets. Tootell (1996) finds evidence of racial discrimination in lending to minority applicants, regardless of where the applicants intended to purchase. He finds that discrimination goes beyond redlining of neighborhoods (at least in Boston). More recently, Bhutta et al. (2022) examine racial discrimination in mortgage approvals using data on mortgage applications from the US Home Mortgage Disclosure Act (HMDA) database. They find that after accounting for significantly lower credit scores and higher downpayment requirements, which make minority applicants less likely than White applicants to receive *algorithmic* approval from race-blind automated underwriting systems (AUS), observable (and unobservable) applicant risk factors explain most of the racial disparities in loan denial gaps. They conclude that gaps attributed to racial factors have played a limited role in generating disparities in credit denials in recent years.

Racial discrimination in labor markets means that minority households have fewer resources, other things being equal, and that they are more likely to hold jobs with characteristics that are perceived as “risk factors” in the mortgage application process. In addition, racial housing discrimination and residential segregation can reduce access to good jobs for minority workers, according to the spatial mismatch hypothesis first proposed by John F. Kain in 1968. A vibrant literature that has followed has attributed to this hypothesis a substantial fraction of racial differences in employment. Most recently, however, rigorous empirical research by Card et al. (2024) has raised serious doubts about the role of geographic proximity to good jobs as a major source of the Black-White racial earnings gaps in major US cities today. These findings do not contradict the notion that spatial mismatch has historically played a role, especially when the fractions of Black residents of central US cities were greater and housing discrimination more widespread than today. However, the endogeneity of both employment and residential decisions makes this a complex matter that is indeed centrally important for the associational component of housing inequality.

### 6.1.1 Discrimination via Intermediaries

Just as banks may reject mortgage applications by minority applicants, real estate agents can screen which homes to show to families of minorities. In both instances, agents act on inferences about whether particular applicants “fit” in certain neighborhoods. In the former case, banks perceive that minority applicants are not reliable borrowers; in the latter case, agents fear that their clients would object to members of certain minorities as neighbors. Such behaviors are known as statistical discrimination.

That housing market intermediation as a social transaction has been racially fraught in the past is unambiguous. Discriminatory behavior has been defended on grounds of professional ethics and a reluctance to go against the racial preferences of other residents.<sup>60</sup> The economics literature has sought to determine if that era is indeed over.

The US government has adopted a number of devices, in particular Department of Housing and Urban Development (HUD) audits, to enforce compliance with the US Fair Housing Act passed in 1968. That and subsequent legislation prohibit discrimination on grounds of race or color, religion, sex, national origin, familial status or disability by all involved in the direct provision of housing, such as landlords, real estate companies, municipalities, banks, and homeowners’ insurance companies.<sup>61</sup>

Historically, discrimination took the form of steering Black and Hispanic home seekers to minority neighborhoods and denying them loans (“redlining”). Christensen and Timmins (2023) seek to explain how discrimination can impact households’ choice of neighborhood. They estimate the welfare effects for renters confronted with choice set constraints determined by the landlords’ response probabilities for specific demographic groups, using real-time data from landlords’ responses collected through an online realtor platform. Landlords were sent stylized inquiries (via a bot) from fictitious applicants posing as White, African American and Latinx in order to estimate choice constraints in five different US metropolitan areas. The authors estimate preference parameters from a residential sorting model, using data on actual location decisions of households from InfoUSA.<sup>62</sup> They find that neighborhoods with amenities such as good schools, less crime,

---

<sup>60</sup>From 1924-1949, the US National Association of Realtors *Code of Ethics*, Article 34, featured the following guidance: “A Realtor should never be instrumental in introducing into a neighborhood...members of any race or nationality...whose presence will clearly be detrimental to property values in that neighborhood.”

<sup>61</sup><https://www.justice.gov/crt/fair-housing-act-1>

<sup>62</sup>InfoUSA, <https://dupri.duke.edu/infousa-data> is a massive consumer database.

many cafes, and high environmental quality are associated with higher levels of discrimination. They estimate the welfare costs of discrimination at 4.7% of annual income for renters of color, with the costs increasing for African Americans as their incomes rise.

In an earlier paper (Christensen and Timmins, 2022), the authors provide powerful evidence that the role of intermediaries is conducive to housing discrimination in neighborhood choice. Using data from the 2012 HUD audits (and from previous audits for 1977, 1989, and 2000), they find that discrimination has declined over time for renters and prospective owners. In an experiment, White and minority testers are shown similar numbers of units, but the units shown to minority testers (relative to their White counterparts) were closer to inferior schools and in neighborhoods with higher poverty rates, with fewer residents who are skilled workers and fewer college-educated families, and with more single-parent households.<sup>63</sup> The authors find that holding preferences and income constant, *discriminatory steering* alone can explain the disproportionate number of minority households in high-poverty neighborhoods in the US and the higher exposure of African American mothers to toxic pollutants where they live. Christensen et al. (2022) offer detailed evidence that renters with African American or Hispanic/Latinx names are 41% less likely than renters with “White” names to be offered properties in locations with a low level of pollution exposure. No discriminatory constraints appear to be present in locations with high levels of pollution.

### **6.1.2 Discrimination, Information and Disinformation**

Bergman et al. (2020) and Bergman et al. (2024) seek to explain, using field experiments, why low-income families in the US are more likely to live in neighborhoods that offer limited opportunities for upward income mobility (as established by Chetty and Hendren (2018a,b)). A common explanation for this pattern is that low-income families *prefer* such neighborhoods either because of affordability or proximity to family and to jobs they perceive as accessible to them. Bergman et al. (2024) argue, however, that informational barriers prevent families from moving to high-opportunity areas. As part of a randomized controlled trial, recipients of housing vouchers in Seattle and King County, Washington were provided services in the form of customized search assistance, landlord engagement, and short-term financial assistance. The intervention increased the fraction of families

---

<sup>63</sup>These facts may help explain why African American households experience inferior upward mobility than White households (Chetty and Hendren, 2018a,b).

moving to high-upward-mobility areas from 14% in the control group to 54% in the treatment group. Based on these findings and additional evidence from interviews with families, the authors suggest that redesigning affordable housing policies in order to provide customized assistance in housing search could reduce residential segregation and increase upward mobility substantially.<sup>64</sup> These findings on informational barriers and the results of Chetty and Hendren (2018a,b) on the role of the length of exposure to neighborhood effects are powerful evidence in favor of associational housing inequality.

### 6.1.3 A Role for Information Technology Tools

Much home search now takes place online. We also know that individuals interact with their online social contacts about housing decisions (Bailey et al., 2018b). Online platforms that host listings, such as Zillow.com, Craigslist.org and many others, should be treated as digital maps of physical markets. They are particularly important as conduits of information and may even have taken on part of the role played by person-to-person informal search. The literature has not yet fully addressed this role, at least not to the same extent as the case of job search.

Besbris et al. (2021) examine cross-sectional data on rental housing advertised online via millions of geocoded Craigslist.org posts across the 50 largest US MSA, merged with census tract-level data from the American Community Survey. They find that ads for units in neighborhoods with more Black, Latino residents, or with poorer residents are relatively less precise about unit amenities, and relatively more precise about tenant (dis)qualifications, compared with ads from “more White” or lower-poverty neighborhoods. Searches for units in White and Asian neighborhoods are more likely to display positive descriptions of neighborhood characteristics and to include higher-rent listings in low-income White and Asian neighborhoods undergoing, or poised to undergo gentrification. The consequences of biased information are difficult to detect, but they are potentially important for inequality because housing market intermediation is increasingly web-based. In contrast to the manipulation of prospective tenants’ opportunity sets, a complementary study by Rouse et al. (2021) throws light on the different screening techniques large-and small-portfolio landlords employ with predominately low-income

---

<sup>64</sup>Bergman et al. (2020) show that helping households move to better neighborhoods by providing better information complements more expensive policies, such as Moving to Opportunity (MTO) and Creating Moves to Opportunity (CMTO), though it is arguably less effective.

Black prospective tenants. Both aim at revenue maximization by excluding “risky” tenants but large-portfolio landlords are more likely to employ algorithmic methods, which in effect embody statistical discrimination, while small-portfolio landlords typically use informal methods that aim at excluding “risky” tenants with similar outcomes.

## 6.2 Segregation: Homophily vs. Discrimination

Discriminatory practices can discourage or hinder access to “good” neighborhoods, effectively facilitating residential segregation in housing outcomes and exacerbating *associational* inequality. Residential segregation by race and by income are enduring features of urban America. Graham (2018) argues that “understanding the effects of residential segregation on educational attainment, labor market outcomes, criminal activity, and other outcomes has been a leading project of the social sciences for over half a century.”

Whereas the evidence of racial segregation is indisputable, its causes and indeed (as we discuss below) the trade-offs between its benefits and costs are harder to establish. Segregation could reflect homophily — i.e. that people like being near others like themselves — given the residential options available to them, which might differ across demographic groups (Ioannides and Zabel, 2008).<sup>65</sup> Aliprantis et al. (Forthcoming) use evidence that high-income, high-wealth Black households live in neighborhoods similar to neighborhoods of low income White households to argue neighborhood sorting cannot be explained by financial constraints alone. Instead, they argue that neighborhood sorting is due to homophily. Given the options open to them — high-socioeconomic status Black neighborhoods in US metropolitan areas are rare — Black households sort into Black neighborhoods. This is enough, the authors argue, to explain the racial gap in neighborhood quality at all income levels.

Although housing outcomes due to segregation and discrimination are difficult to disentangle, it is generally agreed that racial discrimination is offensive on grounds of fairness and morality. But what are its associated welfare costs, and are there any benefits? A body of literature finds that racial segregation, especially when it results from individuals’ deliberate decisions, could generate benefits. For example, sufficiently large populations of prosperous Blacks can sustain Black neighborhoods where people may live near others like themselves while accessing good schools. Indeed, Bayer et al. (2014) specify demo-

---

<sup>65</sup>In view of section 2, homophily may be nested within a general specification of the “amenity” function through  $\mathcal{L}(\ell^i)$ , that allows for a preference to be near neighbors of your own race/ethnic background.

graphic conditions under which this is possible. They find that improved educational attainment of Blacks relative to Whites between 1990 and 2000 led to a significant rise in segregation in the form of an increased number of middle-class Black communities. This goes against the grain of objections to segregation that link reduced educational inequalities to increased racial segregation. Cutler et al. (2008) arrive at broadly similar conclusions on segregation of immigrants into ethnic neighborhoods but only after they correct for endogenous selection into such neighborhoods.

Higgins (2023) seeks to estimate, using a dynamic assignment model, the welfare cost of “segmentation” by race. He finds that Black households are not only less likely to own their home but also pay higher quality-adjusted rents and prices. He estimates that since 1960, and in particular since the 1968 Fair Housing Act, rent and price gaps have declined by about one-half, but a large gap in homeownership rates between Whites and Blacks persists: Black households are on average 20 percentage points less likely to own a house than White households with the same income. Black households also typically live in lower-quality homes than similar White households. Relative to a market without discrimination, in 1960 Black households were, on average, 5% worse off in terms of lifetime consumption-equivalent welfare and remained 1% worse off in 2019, with the highest quintile being 2% worse off. While this approach is powerful, it treats segments in isolation so that one may not study them in the contexts of neighborhoods and communities. It also does not specifically engage with outcomes of discrimination in markets other than housing (with the exception of the mortgage market) and their associated welfare impacts.

### **6.2.1 Homophily, Segregation, and Inequality: The Schelling Model**

Current research on residential segregation has benefited from modernization of Schelling’s models of neighborhood location decisions and neighborhood tipping which imply segregation as a stable outcome even when homophily is weak (Schelling, 1971). In Schelling’s words, “[this] kind of analysis explores the relationship between the behavior characteristics of the *individuals* who comprise some social aggregate, and the characteristics of the *aggregate*” (p. 13). A key element of Schelling’s ideas in conjunction with the mechanics of self-organization is that aggregate social outcomes that reflect magnification

of individual propensities may well be *unintended*.<sup>66</sup>

Card et al. (2008, 2011) are notable examples of renewed empirical interest in the Schelling model. The authors test the Schelling model of neighborhood tipping using regression discontinuity methods with US Census tract data from 1970 through 2000 in order to detect the presence of discontinuities in the dynamics of neighborhood racial composition. They show that White population flows exhibit tipping-like behavior in most US cities, with a distribution of tipping points ranging from a 5% to 20% minority share. They find large, significant discontinuities in the growth rate of White population at the tipping points. Still, they find that housing prices show relatively modest effects of tipping. Estimated tipping points persist and imply attitudes of White residents across US cities which are consistent with common knowledge about prevailing racial tolerance. Card et al. (2008, 2011) provide the first direct empirical evidence of the nonlinear dynamic behavior predicted by social interaction models of the Schelling type: segregation is driven at least in part by preferences of White families over the (endogenous) racial and ethnic composition of neighborhoods.<sup>67</sup> Xu et al. (2024) simulate a Schelling-type model and show that when homophily is defined in terms of neighbors' decisions instead of their demographic characteristics – in other words, in terms of endogenous instead of exogenous social effects – integration may emerge but segregation prevails provided that housing is allocated through the market and segregation is increasing with income inequality (measured by the ratio of the top to the bottom income quantile). While the authors do provide an empirical example, it is their theoretical results on the enduring tendency for segregation due to homophily that are notable.

Regardless of its causes, segregation constitutes a potent but not necessarily immutable force of associational inequality when it operates in combination with neighbor-

---

<sup>66</sup>A “bare bones” model (in the spirit of Schelling (1971)) would be a discrete choice version of the model in section 2 that can explain how homophily contributes to the emergence of segregation. Consider a population made up of two different types of individuals who value more the presence in their neighborhood of individuals of their own type. Self-organization of individuals into two neighborhoods follows, and the equilibrium outcomes may exhibit multiplicity, provided that homophily is sufficiently strong; see Brock and Durlauf (2002). Analytical and estimation properties of a more general sorting model are provided by Bayer and Timmins (2005, 2007) for the static cases, and by Davis et al. (2021) and Zhang (2004) for the dynamic cases. In fact, Zhang (2004) modernizes the Schelling model using the theory of stochastic stability and proves that segregation emerges and persists even if every person in a society prefers to live in an integrated neighborhood. See Ioannides (2013) (Chapter 2 and 3) for a discussion of literature inspired by Schelling (1971) in greater detail.

<sup>67</sup>Card et al. (2011) delve deeper into the racial dynamics and find that tipping behavior is one-sided, and that neighborhoods with minority shares below the tipping point attract both White and minority residents.



hood effects (see also section 5). In institutional settings where it is possible, individuals self-organize into neighborhoods that offer access to employment opportunities and prospects for human capital accumulation that mutually reinforce the forces of inequality.

### 6.2.2 Neighborhood Income Distributions and Overall Inequality

Considering the numerous forces that are present in the housing decisions of households and determine their geographic location, what can we say about the *neighborhood* income distributions that result from their self-organization into neighborhoods? As reviewed by Reardon et al. (2015), the literature that measures US segregation and its neighborhood context finds Black and Hispanic households residing in neighborhoods with substantially lower median income than neighborhood in which White households live, even after controlling for household income. The authors criticize this literature for relying on relatively broad categories of income (poor, middle-class and affluent) that are not comparable over time, and often lacking a single universally accepted summary statistic to describe segregation. They propose and implement a new non-parametric measure of segregation as a way to address these two concerns. Using data from the US Census and the American Community Survey, they measure households' incomes in terms of percentile rank relative to the national income distribution and then plot the median income of their neighborhoods (defined as US census tracts) as functions of the percentile rank of households' incomes.<sup>68</sup> The steepness of the resulting curves serves as a non-parametric measure of segregation, with a flat line indicating no segregation – i.e., everyone has the same neighborhood income — and a 45-degree line indicating maximum segregation.

They construct such curves for four racial/ethnic groups (White, Black, Hispanic and Asian). All four curves are upward-sloping and all become steeper for higher income percentiles, indicating substantial income segregation within each racial group, and especially among higher-income households (see *ibid.*, Figure 3). Importantly, the curves for Asian and White households are much higher than those for Black and Hispanic households; that is, even after controlling for household income, Black and Hispanic households live dis-proportionally in neighborhoods with substantially lower median incomes. The

---

<sup>68</sup>A precursor of this approach is Hardman and Ioannides (2004), who employ data for micro neighborhoods from the US American Housing Survey and introduce the related concept of *Schelling statistics*. Relatedly, Schmidheiny (2006) works with Swiss data and Wheeler and La Jeunesse (2008) with data from a sample of 359 US metropolitan areas also underscore that sorting into neighborhoods is very imperfect. For example, Wheeler and La Jeunesse (2008) show that overall income inequality within a metro area tends to be driven by variation within neighborhoods, not between them.

difference in the neighborhood median income between Black and White households is about 10 percentage points across the entire distribution of household income.<sup>69</sup> In other words, Blacks and Hispanics must have household incomes that are substantially higher than Whites and Asians in order to live in neighborhoods with the same median income. In 2009, Black households at the 50th income percentile are living in neighborhoods with a median income almost identical to that of neighborhoods where White households at the 10th income percentile were living. These patterns of racial differences in income segregation are persistent, as indicated by the minimal change in the vertical distance between these curves between 1990 and 2009 (see *ibid.*, Table 1).

## 7 Conclusion

The housing literature has exploded over the last two decades. First, the Great Recession of 2007-2009 motivated a search for a deeper understanding of the critical role of housing after subprime mortgages were blamed for the financial crisis that led to the recession. Second, there has been a surge in interest, partly as a result of new tools and new data, in urban and regional economics, where the economics of housing has always played an important role. Third, an interest in quantitative housing policy design has been motivated by the increasing welfare inequality (including homelessness) that has taken hold in many countries and has drawn attention to housing inequality. It has challenged traditional approaches to many economic issues.

This review has two objectives. The first is to demonstrate ways that income and wealth inequality have exacerbated unequal housing outcomes. The second is to explore how two increasingly salient features of housing – its neighborhood dimension and the prominent role of housing in household asset portfolios – contribute to overall inequality of income, wealth and welfare. As the reader will have realized, a review of this literature must cope with the lack of uniformity in the particular measures of inequality employed by different contributors. Increasing reliance on welfare measures makes this even harder, as contributors do not employ the same utility functions.

Areas that deserve attention in future research include a full understanding of the

---

<sup>69</sup>More precisely, for 2009, they find that for households at the 10th percentile income, the neighborhood median income for Black and White households are at the 31th and 43th percentile respectively, which implies a difference of 12 percentage points. For households at the 50th and 90th percentiles, the difference in the neighborhood median income for Black and White households is equal to 8 and 7 percentage points respectively.

forces that promote residential segregation, which is critical for the feasibility of urban policies aiming at creating stable economically and racially mixed neighborhoods. The role of policy tools like zoning and mandates for mixed-income housing while market forces work in favor of segregation deserve attention, especially in the context of place-based policies. Housing vouchers, operating on the demand-side, and supply-side regulations, both of which are employed in various combinations across the world should be explored in general equilibrium contexts. Many of the policies have general equilibrium effects, but such analyses have only just begun. The consequences of reduced mobility for aggregate growth, while mitigated in part by the working from home phenomenon, also appear to be important. How the demographic structure of many economies, along with surging home and stock prices, will usher in increased inequality via intergenerational transfers and thus further exacerbate economic and social inequality is little appreciated.

We argue that housing and inequality are better understood via three distinct features: consumption, capital and location. One overarching theme cries out for attention, namely, linking life cycle events with households' residential and financial decisions. Doing so also requires accounting for possibly catastrophic events leading to exclusion from the housing market. Articulating the role of the attributes of the neighborhoods, the importance of search frictions and the increased reliance of intermediation on web-based technologies deserve attention as these all impact human and financial capital accumulation and the distribution of income and wealth.

## References

- Accardo, Jerome, Sylvain Billot, and Buron Mael-Luc**, "Household Income, Consumption and Saving per Broad Category between 2011 and 2015, French Economy," Report, INSEE 2017.
- Aladangady, Aditya, David Albouy, and Mike Zabek**, "Housing Inequality," Working Paper, University of Illinois 2017.
- Albouy, David**, "What Are Cities Worth? Land Rents, Local Productivity, and the Total Value of Amenities," *The Review of Economics and Statistics*, 2016, 98, 477–487.
- , **Gabriel Ehrlich, and Yingyi Liu**, "Housing Demand, Cost-of-living Inequality, and the Affordability Crisis," Working Paper 22816, NBER 2016.
- Aliprantis, Dionissi, Daniel R. Carroll, and Eric R. Youno**, "What Explains Neighborhood Sorting by Income and Race?," *Journal of Urban Economics*, Forthcoming.

- Almagro, Milena and Tomas Dominguez-Iino**, “Location Sorting and Endogenous Amenities: Evidence from Amsterdam,” WP 162, Becker Friedman Institute 2022.
- Altonji, Joseph G. and Richard K. Mansfield**, “Estimating Group Effects Using Averages of Observables to Control for Sorting on Unobservables: School and Neighborhood Effects,” *American Economic Review*, October 2018, *108* (10), 2902–46.
- Amaral, Francisco, Martin Dohmen, Sebastian Kohl, and Moritz Schularick**, “Interest Rates and the Spatial Polarization of Housing Markets,” Discussion Paper 17780, CEPR 2022.
- Andersen, Henrik Yde and Soren Leth-Petersen**, “Housing Wealth or Collateral: How Home Value Shocks Drive Home Equity Extraction and Spending,” *Journal of the European Economic Association*, 2021, *19*, 403–440.
- Arrondel, Luc and Bruno Lefebvre**, “Consumption and Investment Motives in Housing Wealth Accumulation: A French Study,” *Journal of Urban Economics*, 2001, *50*, 112–137.
- Arrow, Kenneth J**, “What Has Economics to Say about Racial Discrimination?,” *Journal of Economic Perspective*, 1998, *12*, 91–100.
- Attanasio, Orazio, Matthew Wakefield, and Andrew Leicester**, “Do house prices drive consumption growth? The coincident cycles of house prices and consumption in the UK,” *Journal of European Economic Association*, 2011, *9*, 399–435.
- Autor, David, Christopher Palmer, and Parag Pathak**, “Housing Market Spillovers: Evidence from the End of Rent Control,” *Journal of Political Economy*, 2014, *122*, 661–717.
- Avenancio-Léon, Carlos F and Troup Howard**, “The Assessment Gap: Racial Inequalities in Property Taxation,” *The Quarterly Journal of Economics*, 02 2022, *137* (3), 1383–1434.
- Avery, Christopher and Parag A. Pathak**, “The Distributional Consequences of Public School Choice,” *American Economic Review*, January 2021, *111* (1), 129–52.
- Bailey, Michael, Eduardo Davila, Theresa Kuchler, and Johannes Stroebel**, “House Price Beliefs And Mortgage Leverage Choice,” *The Review of Economic Studies*, 11 2018, *86* (6), 2403–2452.
- , **Rachel Cao, Theresa Kuchler, Johannes Stroebel, and Arlene Wong**, “Social Connectedness: Measurement, Determinants, and Effects,” *The Journal of Economic Perspectives*, 2018, *32*, 259–280.
- Baum-Snow, Nathaniel**, “Constraints on City and Neighborhood Growth: The Central Role of Housing Supply,” *Journal of Economic Perspectives*, 2023, *37*, 1–22.
- Bayer, Patrick and Christopher Timmins**, “On the Equilibrium Properties of Locational Sorting Models,” *Journal of Urban Economics*, 2005, *117* (518), 462–477.
- and – , “Estimating Equilibrium Models of Sorting Across Locations,” *Economic Journal*, 2007, *117*, 353–374.

- , **Hanming Fang**, and **Robert McMillan**, “Separate when equal? Racial inequality and residential segregation,” *Journal of Urban Economics*, 2014, *82*, 32–48.
- , **Marcus Casey**, **Fernando Ferreira**, and **Robert McMillan**, “Racial and ethnic price differentials in the housing market,” *Journal of Urban Economics*, 2017, *102*, 91–105.
- Belfield, Chris**, **Daniel Chandler**, and **Robert Joyce**, “Housing: Trends in Prices, Costs and Tenure,” Briefing Note BN161, IFS 2015.
- Bergman, Peter**, **Eric Chan**, and **Adam Kapor**, “Housing search frictions: evidence from detailed search data and a field experiment,” WP 27209, NBER 2020.
- , **Raj Chetty**, **Nathaniel Hendren**, **Stefanie DeLuca**, **Lawrence Katz**, and **Christopher Palmer**, “Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice,” *American Economic Review*, May 2024, pp. 1281–1337.
- Besbris, Max**, **Ariela Schachter**, and **John Kuk**, “The unequal availability of rental housing information across neighborhoods,” *Demography*, 2021, pp. 1197–1221.
- Bhutta, Neil**, **Aurel Hizmo**, and **Daniel Ringo**, “How Much Does Racial Bias Affect Mortgage Lending? Evidence from Human and Algorithmic Credit Decisions,” Technical Report 2022.
- Bilal, Adrien**, “The Geography of Unemployment,” *The Quarterly Journal of Economics*, 03 2023, *138* (3), 1507–1576.
- and **Esteban Rossi-Hansberg**, “Location as an Asset,” *Econometrica*, 2021, *89*, 2459–2495.
- Blanden, Jo**, **Andrew Eyles**, and **Stephen Machin**, “Intergenerational Home Ownership,” *The Journal of Economic Inequality*, 2023, pp. 251–275.
- Bonnet, Odran**, **Bono Pierre-Henri**, **Chapelle Guillaume**, and **Etienne Wasmer**, “Does housing capital contribute to inequality? A comment on Thomas Piketty’s Capital in the 21st Century,” Discussion Paper 2014-07, Sciences Po 2014.
- Borri, Nicola** and **Pietro Reichlin**, “The Housing Cost Disease,” *Journal of Economic Dynamics and Control*, 2018, *87*, 106–123.
- Brock, William A.** and **Steven N. Durlauf**, “A Multinomial Choice Model of Neighborhood Effects,” *American Economic Review*, 2002, *92* (2), 298–303.
- Brueckner, Jan**, “Consumption and Investment Motives and the Portfolio Choices of Homeowners,” *Journal of Real Estate Finance and Economics*, 2017, *5* (2), 159–180.
- and **Stuart Rosenthal**, “Gentrification and Neighborhood Housing Cycles: Will America’s Future Downtowns Be Rich?,” *Review of Economics and Statistics*, 2009, *91* (4), 725–743.
- Brueckner, Jan K.**, **Matthew E. Kahn**, and **Gary C Lin**, “A New Spatial Hedonic Equilibrium in the Emerging Work-from-Home Economy?,” *American Economic Journal: Applied Economics*, 2023, *15* (2), 285–319.

- Buchanan, Larry, Josh Katz, Rumsey Taylor, and Eve Washington**, “An Extremely Detailed Map of New York City Neighborhoods,” *New York Times*, 2023.
- Calvo-Armengol, Antoni and Matthew O. Jackson**, “The Effects of Social Networks on Employment and Inequality,” *American Economic Review*, June 2004, *94* (3), 426–454.
- Card, David, Alexandre Mas, and Jesse Rothstein**, “Tipping and the Dynamics of Segregation,” *Quarterly Journal of Economics*, 2008, *123* (1), 177–218.
- , – , and – , “Are Mixed Neighborhoods Always Unstable? Two-Sided and One-Sided Tipping,” in Susan Wachter, Eugenie Birch, and Harriet Newburger, eds., *Handbook of Regional And Urban Economics*, University of Pennsylvania Press, 2011.
- , **Jesse Rothstein, and Moises Yi**, “Re-assessing the Spatial Mismatch Hypothesis,” Technical Report, NBER working paper No. 32252 March 2024.
- , – , and – , “Location, location, location,” *American Economic Journal: Applied Economics*, Forthcoming.
- Causa, Orsetta, Nicolas Woloszko, and David Leite**, “Housing, Wealth Accumulation and Wealth Distribution: Evidence and Stylized Facts,” Working Paper 1588, OECD Economics Department 2019.
- Chambers, Matthew, Carlos Garriga, and Don E Schlagenhauf**, “Accounting For Changes in the Homeownership Rate,” *International Economic Review*, 2009, *50* (3), 677–726.
- Chetty, Raj and Nathaniel Hendren**, “The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects,” *Quarterly Journal of Economics*, 2018, *133* (3), 1107–1162.
- and – , “The Impacts of Neighborhoods on Intergenerational Mobility II: County-Level Estimates,” *Quarterly Journal of Economics*, 2018, *133* (3), 1163–1228.
- Christensen, Peter and Christopher Timmins**, “Sorting or Steering: The Effects of Housing Discrimination on Neighborhood Choice,” *The Journal of Political Economy*, 2022, *130*, 2110 – 63.
- and – , “The Damages and Distortions from Discrimination in the Rental Housing Market,” *The Quarterly Journal of Economics*, 06 2023, *138* (4), 2505–2557.
- , **Ignacio Sarmiento-Barbieri, and Christopher Timmins**, “Housing Discrimination and the Toxics Exposure Gap in the United States: Evidence from the Rental Market,” *The Review of Economics and Statistics*, 07 2022, *104* (4), 807–818.
- Chyn, Eric**, “Moved to Opportunity: The Long-Run Effects of Public Housing Demolition on Children,” *American Economic Review*, 2018, *108*, 3028–56.
- and **Diego Daruich**, “An Equilibrium Analysis of the Effects of Neighborhood-based Interventions on Children,” Working Paper 29927, NBER 2021.

- Cloyne, James, Kilian Huber, Ethan Ilzetzki, and Henrik Kleven**, “The Effect of House Prices on Household Borrowing: A New Approach,” *American Economic Review*, 2019, *109*, 2104 – 2136.
- Collinson, Robert, John Eric Humphries, Nicholas Mader, Davin Reed, Daniel Tannenbaum, and Winnie van Dijk**, “Eviction and Poverty in American Cities\*,” *The Quarterly Journal of Economics*, February 2024, *139* (1), 57–120.
- Cribb, J., T Wernham, and X. Xu**, “Housing Costs and Income Inequality in the UK,” Technical Report, Institute for Fiscal Studies 2023.
- Crossley, Thomas, Peter Levell, and Hamish Low**, “House Price rises and borrowing to invest,” Working Paper 15, Institute for Financial Studies 2022.
- Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor**, “When are ghettos bad? Lessons from immigrant segregation in the United States,” *Journal of Urban Economics*, 2008, *63* (3), 759–774.
- Davis, Morris A., Andra C. Ghent, and Jesse M. Gregory**, “The work-from-home technology boon and its consequences,” *Review of Economic Studies*, 2024, *91* (6), 3362–3401.
- Davis, Morris and Francois Ortalo-Magne**, “Household expenditures, wages and rents,” *Review of Economic Dynamics*, 2011, *14*, 248–261.
- **and Stijn Van Nieuwerburgh**, “Housing, Finance, and the Macroeconomy,” in Gilles Duranton, J Vernon Henderson, and William Strange, eds., *Handbook of Regional and Urban Economics*, Vol. 5, North Holland, 2015, chapter 12, pp. 753–811.
- **, Jesse Gregory, Daniel Hartley, and Kegon Tan**, “Neighborhood Choices, Neighborhood Effects and Housing Vouchers,” *Quantitative Economics*, 2021, *12*, 1307–1346.
- Daysal, N. Meltem, Michael F. Lovenheim, and David N. Waasser**, “The Inter-generational Transmission of Housing Wealth,” Working Paper 31669, NBER 2023.
- DeLaRoca, Jorge and Diego Puga**, “Learning by Working in Big Cities,” *The Review of Economic Studies*, 2017, *84*, 106–142.
- Derenoncourt, Ellora, Chi Hyun Kim, Moritz Kuhn, and Moritz Schularick**, “Wealth of Two Nations: The U.S. Racial Wealth Gap, 1860-2020,” *The Quarterly Journal of Economics*, 09 2024, pp. 1–58.
- Desmond, Matthew**, “Eviction and the reproduction of urban poverty,” *American journal of sociology*, 2012, *118* (1), 88–133.
- Diamond, Rebecca**, “The Determinants and Welfare Implications of US Workers,” *American Economic Review*, 2016, *106* (3), 479–524.
- **, Adam Guren, and Rose Tan**, “The Effect of Foreclosures on Homeowners, Tenants, and Landlords,” Working Paper 28357, NBER 2020.
- **and Cecile Gaubert**, “Spatial Sorting and Inequality,” *Annual Review of Economics*, 2022, *14*, 795–819.

- , **Tim McQuade**, and **Franklin Qian**, “The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco,” *American Economic Review*, 2019, 109 (9), 3365–94.
- Donner, Herman, Peter Englund, and Mats Persson**, “Distributional Effects of Deregulating the Stockholm Rental Housing Market,” Report 2017/1, The Swedish Fiscal Policy Council 2017.
- Duca, John V., John Muellbauer, and Anthony Murphy**, “What Drives House Price Cycles? International Experience and Policies,” *Journal of Economic Literature*, 2021, 59 (3), 773–864.
- Durlauf, Steven N.**, “A Theory of Persistent Income Inequality,” *Journal of Economic Growth*, 1996, 1 (1), 75–93.
- , “The Memberships Theory of Poverty: The Role of Group Affiliations in Determining Socioeconomic Outcomes,” in Sheldon Danziger and Robert H. Haveman, eds., *Understanding Poverty*, Harvard University Press, 2001, pp. 392–416.
- , “Neighborhood Effects,” in J. Vernon Henderson and Jacques-François Thisse, eds., *Cities and Geography*, Vol. 4 of *Handbook of Regional and Urban Economics*, Elsevier, 2004, chapter 50, pp. 2173–2242.
- Dusansky, Richard and Cagatay Koç**, “The capital gains effect in the demand for housing,” *Journal of Urban Economics*, 2007, 61, 287–298.
- Dustmann, Christian, Bernd Fitzenberger, and Markus Zimmermann**, “Housing Expenditure and Income Inequality,” *The Economic Journal*, 2022, 132, 1709–1736.
- Eeckhout, Jan, Roberto Pinheiro, and Kurt Schmidheiny**, “Spatial Sorting,” *Journal of Political Economy*, 2014, 122 (3), 554–620.
- Eggum, Terje and Erling Larsen**, “Is the Housing Market an Inequality Generator?,” *The Review of Income and Wealth*, 2024, 70 (3).
- Ellickson, Robert M.**, *America’s Frozen Neighborhoods*, Yale University Press, 2022.
- Enström-Öst, Cecilia and Per Johannson**, “The consequences of the Swedish rent control system on labor income: Evidence from a randomized apartment lottery,” *Journal of Public Economics*, May 2023, 221.
- Evans, William, David Phillips, and Krista Ruffini**, “Reducing and Preventing Homelessness: Lessons from Randomized Evaluations,” Technical Report, Abdul Latif Jameel Poverty Action Lab 2019.
- Fagereng, Andreas, Matthieu Gomez, Emilien Gouin-Bonenfant, Martin Holm, Benjamin Moll, and Gisle Natvik**, “Asset-Price Distribution,” Working Paper, LSE 2022.
- Favilukis, Jack and Gen Li**, “The Great Resignation was caused by the Covid-19 housing boom,” Working Paper, University of British Columbia 2023.



- Fetzer, Thiemo, Srinjoy Sen, and Pedro C. L. Souza**, “Housing Insecurity and Homelessness: Evidence from the United Kingdom,” *Journal of the European Economic Association*, 2023, pp. 526–559.
- Figari, Francesco, Alari Paulus, Holly Sutherland, Panos Tsakloglou, and Gerlinde Verbist**, “Removing Homeownership Bias in Taxation: The Distributional Effects of Including Net Imputed Rent in Taxable Income,” *Fiscal Studies*, 2017, 38 (4), 525–557.
- Finlay, John and Trevor C. Williams**, “Housing Demand, Inequality and Spatial Sorting,” Working Paper, Imperial College 2022.
- Flavin, M. and Shinobu Nakagawa**, “A Model of Housing in the Presence of Adjustment Costs,” *American Economic Review*, 2008, 98 (1), 474–495.
- **and T. Yamashita**, “Owner-Occupied Housing: Life-Cycle Implications for the Household Portfolio,” *American Economic Review: Papers and Proceedings*, 2011, 101 (3), 609–614.
- Fogli, Alessandra, Veronica Guerrieri, and Mark Ponder**, “The End of the American Dream? Inequality and Segregation in US cities,” WP, Chicago Booth 2022.
- Gee, Laura K., Jason J. Jones, Christopher J. Fariss, Moira Burke, and James H. Fowler**, “The Paradox of Weak Ties in 55 Countries,” *Journal of Economic Behavior Organization*, 2017, 133, 362–372.
- Ghent, Andra and David Leather**, “Is America’s Housing Affordability Problem a Housing Problem?,” Working Paper, University of Utah 2021.
- Gilraine, Michael, James Graham, and Angela Zheng**, “Public Education and Intergenerational Housing Wealth Effects,” WP 31345, NBER 2023.
- Glaeser, Edward L. and Erzo L. P. Luttmer**, “The Misallocation of Housing Under Rent Control,” *American Economic Review*, 2003, 93, 1027–1046.
- Goodman, Laurie S and Christopher Mayer**, “Homeownership and the American Dream,” *Journal of Economic Perspective*, Winter 2018, 32 (1), 31–58.
- Graham, Bryan S.**, “Identifying and Estimating Neighborhood Effects,” *Journal of Economic Literature*, 2018, 56, 450–500.
- Greaney, Brian**, “Homeownership and the Distribution Effects of Uneven Regional Growth,” Working Paper, University of Washington 2023.
- Gromis, Ashley, Fellows Ian, James R. Hendrickson, Lavar Edmonds, Lillian Leunga, Adam Porton, and Matthew Desmond**, “Estimating eviction prevalence across the United States,” *PNAS*, 2022, 119(21), pages = e2116169119.
- Grossmann, Volker, Benjamin Larin, Hans Torben Lofflad, and Thomas Steger**, “Distributional Consequences of Surging Housing Rents,” *Journal of Economic Theory*, September 2021, 196.
- , – , **Lofflad, and Thomas Steger**, “Das House Kapital: A Long-run Theory of House Prices and Housing Wealth,” *Journal of European Economic Association*, 2024.

- Gyourko, Joseph, Christopher Mayer, and Sinai Todd**, “Superstar Cities,” *American Economic Journal: Economic Policy*, 2013, 5, 167–199.
- Han, Lu and William Strange**, “The Microstructure of Housing Markets: Search, Bargaining, and Brokerage,” in Gilles Duranton, Vernon Henderson, and William Strange, eds., *Handbook of Regional And Urban Economics*, Vol. 5, North Holland, 2015, chapter 13, pp. 813–886.
- , **L. Rachel Ngai, and Kevin D. Sheedy**, “To Own or to Rent? The Effects of Transaction Taxes on Housing Markets,” Working Paper 17520, CEPR 2022.
- Hardman, Anna M. and Yannis M. Ioannides**, “Residential Mobility and the Housing Market in a Two-Sector Neoclassical Growth Model,” *Scandinavian Journal of Economics*, 1999, 101, 315–335.
- and – , “Neighbors’ income distribution: economic segregation and mixing in US urban neighborhoods,” *Journal of Housing Economics*, 2004, 13, 368–382.
- He, Alex and Daniel le Maire**, “Household liquidity constraints and labor market outcomes: Evidence from a Danish Mortgage Reform,” *Journal of Financial Economics*, Forthcoming, 145.
- Hellerstein, Judith K., Mark J. Kutzbach, and David Neumark**, “Do Labor Markets Have an Important Spatial Dimension?,” *Journal of Urban Economics*, 2014, 79, 39–58.
- Henderson, J.Vernon and Yannis M. Ioannides**, “A Model of Housing Tenure Choice,” *The American Economic Review*, 1983, 73, 98–113.
- Herkenhoff, Kyle F., Lee E. Ohanian, and Edward C. Prescott**, “Tarnishing the golden and empire states: Land-use restrictions and the U.S. economic slowdown,” *Journal of Monetary Economics*, 2018, 93, 89–109.
- Higgins, Brian**, “Racial Segmentation in the US Housing Market,” Working Paper, Stanford University 2023.
- Hsieh, Chang-Tai and Enrico Moretti**, “Housing Constraints and Spatial Misallocation,” *American Economic Journal: Macroeconomics*, 2019, 11, 1–39.
- Ioannides, Yannis**, “Review of Climbing Mount Laurel: The Struggle for Affordable Housing and Social Mobility in an American Suburb by Douglas S. Massey et al.,” *Journal of Economic Literature*, 2017, 55, 609–620.
- and **Stuart S. Rosenthal**, “Estimating the Consumption and Investment Demands for Housing and Their Effect on Housing Tenure Status,” *The Review of Economics and Statistics*, 1994, 76, 127–141.
- Ioannides, Yannis M.**, *From Neighborhoods to Nations: The Economics of Social Interactions*, Princeton University Press, 2013.
- and **Jeffrey E. Zabel**, “Interactions, Neighborhood Selection and Housing Demand,” *Journal of Urban Economics*, 2008, 63, 229–252.

- and –, “Housing and Labor Market Vacancies and Beveridge Curves: Theoretical Framework and Illustrative Statistics,” in Yannis M. Ioannides, ed., *Recent Developments in the Economics of Housing*, Vol. II, Edward Elgar, 2019.
- and **Linda Datcher Loury**, “Job Information Networks, Neighborhood Effects, and Inequality,” *Journal of Economic Literature*, 2004, 42 (4), 1056–1093.
- Jensen, Thais, Soren Leth-Petersen, and Ramana Nanda**, “Financing constraints, home equity and selection into entrepreneurship,” *Journal of Financial Economics*, 2022, 145, 318–337.
- Jia, Ning, Raven Molloy, Christopher Smith, and Abigail Wozniak**, “The Economics of Internal Migration: Advances and Policy Questions,” *Journal of Economic Literature*, March 2023, 61 (1), 144–80.
- Jorda, Oscar, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick, and Alan M Taylor**, “The Rate of Return on Everything, 1870–2015,” *The Quarterly Journal of Economics*, 04 2019, 134 (3), 1225–1298.
- Kaas, Leo, Georgi Kocharkov, and Edgar Preugschat**, “Wealth Inequality and Homeownership in Europe,” *Annals of Economics and Statistics*, 12 2019, pp. 27–54.
- Kaplan, Greg and Giovanni L. Violante**, “A Model of the Consumption Response to Fiscal Stimulus Payments,” *Econometrica*, July 2014, 82 (4), 1199–1239.
- Karagiannaki, Eleni**, “The Effect of Parental Wealth on Children’s Outcomes in Early Adulthood,” *The Journal of Economic Inequality*, 2017, 15, 217–243.
- Kennan, John and James R. Walker**, “The Effect of Expected Income in Individuals’ Migration Decisions,” *Econometrica*, 2011, 79 (1), 211–251.
- Kermani, Amir and Francis Wong**, “Racial Disparities in Housing Wealth,” Working Paper 29306, NBER 2021.
- King, Mervyn A.**, “An econometric model of tenure choice and demand for housing as a joint decision,” *Journal of Public Economics*, 1980, 14 (2), 137–159.
- Kiyotaki, N., A. Michaelides, and K Nikolov**, “Winners and Losers in Housing Market,” *Journal of Money, Credit and Banking*, 2011, 43 (2/3), 255–296.
- , –, and –, “Housing, Distribution and Welfare,” *Journal of Money, Credit and Banking*, Forthcoming.
- Knoll, Katherine, Moritz Schularick, and Thomas Steger**, “No Price like Home: Global House Prices, 1870–2012.,” *American Economic Reviews*, 2017, 107, 331–353.
- Kulkarni, Nirupama and Ulrike Malmendier**, “Homeownership Segregation,” *Journal of Monetary Economics*, 2022, 129, 123–149.
- Lang, Kevin and Ariella Kahn-Lang Spitzer**, “Race Discrimination: An Economic Perspective,” *Journal of Economic Perspectives*, May 2020, 34 (2), 68–89.
- Lens, Michael**, “Zoning, Land Use, and the Reproduction of Urban Inequality,” *Annual Review of Sociology*, 2022, 48, 421–439.

- Leth-Petersen, Soren**, “Intertemporal consumption and credit constraints: does total expenditure respond to an exogenous shock to credit?,” *American Economic Review*, 2010, *100*, 1080–1103.
- Lhuillier, Hugo**, “Should I Stay or Should I grow?,” Technical Report, Department of Economics, Princeton University January 2024.
- List, Emanuel**, “Housing and Income Inequality in Europe: Distributional Effects of Non-Cash Income from Imputed Rents,” *Review of Income and Wealth*, 2023, *69*, 504–532.
- Lovenheim, Michael**, “The effect of Liquid Housing Wealth on College Enrollment,” *Journal of Labor Economics*, 2011, *29* (4), 741–771.
- Määttänen, Niku and Marko Terviö**, “Welfare effects of housing transaction taxes: a quantitative analysis with an assignment model,” *Economic Journal*, May 2022, *644*, 1566–99.
- Martinez-Toledano, Clara**, “House Price Cycles, Wealth Inequality and Portfolio Reshuffling,” Working Paper, Imperial College 2022.
- Miles, David and James Sefton**, “House Prices and Growth with Fixed Land Supply,” *The Economic Journal*, 07 2020, *131* (636), 1815–1848.
- Ngai, L. Rachel and Kevin D. Sheedy**, “The decision to move house and aggregate-market dynamics,” *Journal of European Economic Association*, 2020, *18*, 2487–2531.
- Nieuwerburgh, Stijn Van**, “The remote work revolution: Impact on real estate values and the urban environment,” *Real Estate Economics*, 2023, pp. 1–42.
- OECD**, *Housing and Inclusive Growth*, Paris: OECD Publishing, 2020.
- , *Brick by Brick: Building Better Housing Policies*, Paris: OECD Publishing, 2021.
- , *Housing Taxation in OECD Countries*, Paris: OECD Publishing, 2022.
- , *Brick by Brick (Volume 2): Better Housing Policies in the Post-COVID-19 Era*, Paris: OECD Publishing, 2023.
- O’Flaherty, Brendan**, “Homelessness research: A guide for economists (and friends),” *Journal of Housing Economics*, 2019, *44*.
- Oh, Sun Jung and John Yinger**, “What Have We Learned From Paired Testing in Housing Markets?,” *Cityscape*, 2015, *17* (3), 15–60.
- Olsen, Edgar and Jeffrey Zabel**, “US Housing Policy,” in Vernon Henderson and William Strange, eds., *Handbook of Regional and Urban Economics*, Elsevier, 2015.
- Ortalo-Magné, François and Andrea Prat**, “Spatial Asset Pricing: A First Step,” *Economica*, 2016, *83*, 130–171.
- Patacchini, Eleonora and Yves Zenou**, “Neighborhood effects and parental involvement in the intergenerational transmission of education,” *Journal of Regional Science*, December 2011, *51* (5), 987–1013.

- Pfeffer, Fabian and Martin Hallsten**, “Mobility Regimes and Parental Wealth: The United States, Germany, and Sweden in Comparison,” Technical Report, DIW 2012.
- Piazzesi, Monika and Martin Schneider**, “Housing and Macroeconomics,” in John B. Taylor and Harald Uhlig, eds., *Handbook of Macroeconomics*, Vol. 2B, North Holland, 2016, chapter 19, pp. 1547–1640.
- Piketty, Thomas**, *Capital in the Twenty-First Century*, Harvard University Press, 2014.
- **and Gabriel Zucman**, “Capital is Back: Wealth – Income Ratios in Rich Countries 1700 – 2010,” *Quarterly Journal of Economics*, 2014, pp. 1255 – 1310.
- Poterba, James and Todd Sinai**, “Tax Expenditures for Owner-Occupied Housing: Deductions for Property Taxes and Mortgage Interest and the Exclusion of Imputed Rental Income,” *American Economic Review*, 2008, 98 (2), 84–89.
- Poterba, James M.**, “Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach,” *Quarterly Journal of Economics*, November 1984, pp. 729–752.
- Quigley, John M. and Steven Raphael**, “Is Housing Unaffordable? Why Isn’t It More Affordable?,” *Journal of Economic Perspective*, 2004, 18, 191–214.
- Reardon, Sean F., Lindsay Fox, and Joseph Townsend**, “Neighborhood Income Composition by Household Race and Income, 1990–2009,” *Annals of the American Society of Political and Social Science*, 2015, 660, 78–97.
- Reschovsky, Andrew**, “Do Property Taxes in the United States contribute to Housing Inequities?,” in Sean Dougherty and Hyun-A Kim, eds., *Bricks, Taxes and Spending: Solutions for Housing Equity across Levels of Government*, Paris: OECD Publishing, 2023.
- Rognlie, Matthew**, “Deciphering the fall and rise in the new capital share: accumulation, or scarcity?,” *Brookings Papers on Economic Activity*, 2015, 46, 1–69.
- Rosenthal, Stuart S.**, “Are Private Markets and Filtering a Viable Source of Low-Income Housing? Estimates from a ‘Repeat Income’ Model,” *American Economic Review*, 2014, 104, 687–706.
- Rouse, Cecilia, Jared Bernstein, Helen Knudsen, and Jeffery Zhang**, “Exclusionary Zoning: Its Effect on Racial Discrimination in the Housing Market,” Technical Report, Council of Economic Advisers, the White House 2021.
- Saiz, Albert**, “The Global Housing Affordability Crisis: Policy Options and Strategies,” Working Paper 23-01, MIT Center for Real Estate Research 2023.
- Sakong, Jung**, “Cyclical Transactions and Wealth Inequality,” Working Paper 2022-05, Federal Reserve Bank of Chicago 2022.
- Sampson, Robert J. and Brian L. Levy**, “The Enduring Neighborhood Effect, Everyday Urban Mobility, and Violence in Chicago,” *The University of Chicago Law Review*, 2022, 89, 323–347.
- Schelling, Thomas C.**, “Dynamic Models of Segregation,” *Journal of Mathematical Sociology*, 1971, 1, 143–186.

- Schmidheiny, Kurt**, “Income segregation from local income taxation when households differ in both preferences and incomes,” *Regional Science and Urban Economics*, 2006, *36*, 270–299.
- Sodini, Paolo, Stijn Van Nieuwerburgh, Roine Vestman, and Ulf von Lilienfeld-Toal**, “Identifying the Benefits from Homeownership: A Swedish Experiment,” *American Economic Review*, 2023, *113* (12), 3173–3212.
- Sommer, Kamil and Paul Sullivan**, “Implications of US Tax Policy for House Prices, Rents and Homeownership,” *American Economic Review*, 2018, *108*, 241–274.
- Soto, Hernando De**, *The Mystery of Capital*, Basic Books, 2000.
- Tootell, Geoffrey M. B.**, “Redlining in Boston: Do Mortgage Lenders Discriminate Against Neighborhoods?,” *The Quarterly Journal of Economics*, 1996, *111* (4), 1049–1079.
- Topa, Giorgio and Yves Zenou**, “Chapter 9 - Neighborhood and Network Effects,” in Gilles Duranton, J. Vernon Henderson, and William C. Strange, eds., *Handbook of Regional and Urban Economics*, Vol. 5 of *Handbook of Regional and Urban Economics*, Elsevier, 2015, pp. 561–624.
- Towe, Charles and Chad Lawley**, “The Contagion Effect of Neighboring Foreclosures,” *American Economic Journal: Economic Policy*, 2013, *5*, 313–335.
- Trounstine, Jessica**, “The Geography of Inequality: How Land Use Regulation Produces Segregation,” *American Political Science Review*, 2023, *114*, 443–455.
- Wheeler, Christopher H. and Elisabeth A. La Jeunesse**, “Trends in Neighborhood Income Inequality in the U.S.,” *Journal of Regional Science*, 2008, *48*, 879–891.
- Wong, Maisy**, “Estimating Ethnic Preferences Using Ethnic Housing Quotas in Singapore,” *The Review of Economic Studies*, 02 2013, *80* (3), 1178–1214.
- Xu, Bing, William A.V. Clark, and Maxwell Pak**, “Homophily, Selection, and Choice in Segregation Models,” *PNAS*, 2024, *121* (e2313752121).
- Zhang, Junfu**, “Residential segregation in an all-integrationist world,” *Journal of Economic Behavior and Organization*, 2004, *54*, 533–550.