Housing and Inequality

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Housing in Macroeconomics

- Growing literature on housing in macroeconomics during the last two decades.
  - Motivated by the critical role of housing in the Great Recession of 2007–2009.
  - Impacts of macro policies via housing decisions.
  - Quantitative frameworks investigating macro implications of housing policies.
- The global housing "affordability" crisis: inequality in housing consumption.
- This paper: all links between **housing and inequality**.

Housing can both reflect and reinforce inequalities across socio-economic groups across generations, and across space.

OECD (2020) Housing and Inclusive Growth Report

Housing and Inequality

- Individuals choose quantity of housing and neighborhood.
- Three features of housing:
  - Consumption: housing services.
  - Housing capital: as wealth and as collateral.
  - Location as investment: access to schools, jobs and job information networks, amenities.
- Housing $\rightleftarrows$ inequality
  - Housing as symptoms of inequality.
  - Housing as sources of inequality.
  - Housing as propagation mechanisms of inequality.

Overview of Paper

- Housing is a bundle: consumption, location and capital.
  $\rightarrow$ providing shelters, access to jobs, wealth and collateral.
- Housing reflects and acts as sources and propagation mechanisms for inequality.
- GE effects: mobility decisions, tenure choices, house prices and rents, important for understanding functioning of the housing market and policy impacts.
- Search frictions important for mobility and tenure decisions.
  $\rightarrow$ access better matched locations and housing wealth.
- Working-from-home: smaller importance of job access but not an option for all workers.

Organize as two aspects of inequality

- Endowments-related inequality; a conventional concept.
  Inequality in own endowments maps through housing and labor markets into inequality in housing outcomes. Similarly via intergenerational transfers from parental endowments.
- Associational (Memberships) inequality; a more novel concept [Durlauf (2001); Graham (2018)]:
  - Individuals self-select into associations, broadly construed, operates in social space, part of allocation of housing, inherently linked to neighborhood choice.
  - Neighborhood choice gives rise to neighborhood income distributions and to residential segregation.

A Conceptual Framework – Household's Decision Problem

- Aggregate state variables: gross return to financial assets R_t, location-specific house price $p_t(\ell)$, rent $q_t(\ell)$ and wage $w_t(\ell)$.
- Household state variables – *sources of inequality*:
  - skill s^i_{t-1}, non-housing financial assets a^i_{t-1}
  - location ℓ^i_{t-1}
  - tenure status: renter or homeowner
  - housing stock h^i_{t-1} for homeowner
  - Possible shocks:
    - location income shock $w^i_t(\ell) = w_t(\ell) + \eta^i_t$, η^i_t i.i.d.
    - location preference shock $\mathcal{L}^i_t(\ell) = \mathcal{L}_t(\ell) + \psi^i_t$, ψ^i_t i.i.d.

Household Lifetime Utility

Choose $\ell_t^i :\in \mathcal{N}$, a set of locations; housing consumption h_t^i; non-housing consumption c_t^i; investment in human capital z_t^i, and financial assets a_t^i.

$$\sum_{t=0}^{\infty} \beta^t E_0 \left[u^i \left(c^i, h^i, \ell^i \right) \right]$$

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

- $\bar{h}$ affects critically income elasticity of housing consumption;
- ϵ: elasticity of substitution across housing and non-housing consumption;
- $\mathcal{L}^i \left(\ell^i \right)$: preference for location; ι^i : tenure status, $\iota = o, r$. $\xi_{o^i} > \xi_{r^i}$

Household's Constraints

Accumulation of human capital: $s_t^i = S\left(z_t^i; s_{t-1}^i, \ell_t^i\right)$

Budget constraint for a renter:

$$\begin{aligned} c_t^i + z_t^i + q_t\left(\ell_t^i\right) h_t^i + M_t^i \kappa_t^r + a_t^i &= w_t\left(\ell_t^i\right) s_{t-1}^i + R_t a_{t-1}^i, \\ a_t^i &\geq 0. \end{aligned}$$

Budget constraint for a homeowner:

$$\begin{aligned} c_t^i + z_t^i + p_t\left(\ell_t^i\right) h_t^i + M_t^i \kappa_t^o + a_t^i &= w_t\left(\ell_t^i\right) s_{t-1}^i + R_t a_{t-1}^i + p_t\left(\ell_t^i\right) h_{t-1}^i, \\ a_t^i &\geq -\left(1-\phi\right) p_t\left(\ell_t^i\right) h_t^i,\ 0 < \phi < 1. \end{aligned}$$

Moving decision: indicator $M_t^i = 1$ if $\ell_t^i \neq \ell_{t-1}^i$ and/or $h_t^i \neq h_{t-1}^i$.

Housing and Inequality

- Focus on household's decision problem:
  - Sources: income and wealth inequality through wages and housing wealth.
  - Symptoms: housing consumption, neigbourhood and wealth.
  - Propagation: housing location and housing collateral affect investment.
- Equilibrium $p_t(\ell), q_t(\ell)$ equate housing demand and supply in each location. Equilibrium $R_t, w_t(\ell)$ depend on firms' production decisions.

  Surveys, Davis and Van Nieuwerburgh (2015), Piazzesi and Schneider (2016) and Duca, Muellbauer and Murphy (2021).
- Moving cost captures the illiquid nature of housing, abstract from search frictions (survey, Han and Strange 2015).

Housing Consumption

- Inequality concern: three facts on housing expenditure shares
  1. Biggest expenditure item, average 22% in OECD. Figures
  2. Cross-section: poorer households spend larger share on housing.
  3. Time-series: rising housing expenditure share, especially for the poor.
- Some historical evidence on the cross-section and time-series patterns.
- For recent decades, OECD(2020) reports by income quintile: Figure
  - bottom quintile spends 37%, 31% for middle and 25% for top.
  - increased by 9 percentage point for the bottom quintile, 3 for the top.
- Similar patterns documented for individual countries:
  France (Accardo et al. 2017), Germany (Dustmann et al. 2022), U.K. (Belfield et al. 2015), U.S. (Albouy et al. 2016).

Housing Affordability Crisis

- Policy concern: rising housing expenditure share for the low-income households – *housing affordability crisis*
  - Both increase in cost of housing and lack of growth in income for low-income households are responsible.
  - Broader implications than housing as shelter – what is left for non-housing consumption and investment
- Low-income households – renters – *rental affordability crisis*.
  - Homeownership rate for the top income quintile is much higher – 25 percentage points for 20 OECD countries and 50+ for 9. (Causa et. al. 2019) Figure
  - Housing overburden rate (exp. $\geq 40\%$): extremely high at 35% for private renters in the bottom quintile (OECD 2020).
- Extreme housing outcomes, *Displacements*: evictions, foreclosures, homelessness.

When Would Housing not Affect Inequality?

- If $w(\ell)$ and $S(.)$ are independent of location ℓ, and no moving or transactions costs, $(\kappa_t^r = \kappa_t^o = 0)$: no locational advantages and house price and rent equalized across locations.
- If no borrowing constraint, housing no role as collateral.

When these two sets of assumptions hold, housing like any consumption goods. Endowment inequality will affect housing, but housing would not affect inequality.

Price and Income Elasticity

Renter's relative expenditures across housing and non-housing:

$$\rho_t^i(\ell_t^i) \equiv \frac{c_t^i}{q_t(\ell_t^i)h_t^i} = \left(1 - \frac{\bar{h}}{h^i}\right)\left(\frac{1-\omega}{\omega}\right)^{\varepsilon} q_t(\ell_t^i)^{\varepsilon-1}$$

- Cobb-Douglas utility ($\bar{h} = 0, \varepsilon = 1$): income and price elasticity equal to one.

  $\rightarrow$ Housing expenditure share is the same across households, locations and time.

  $\rightarrow$ limited use for understanding *housing and inequality*.

Assume borrowing constraint is not binding.

Price/Income Elasticity: Housing Expenditure Share

- Cobb-Douglas preference in macro motivated by exp. shares across US MSA.
  - Masking offsetting price and income effects due to local costs of housing.
- Using micro data, Albouy et al (2016) and Finlay and Williams (2022) estimate both price and income elasticity are less than one. Intuition:
  - Unitary income elasticity: same across households within same location.
    - Cross-section and time-series patterns together require poorer households sort into higher rent locations.
  - Unitary price elasticity: expenditure share independent of rent.
    - Not possible to obtain cross-section and time-series patterns simultaneously.

Price/Income Elasticity: Implications

- Borri and Reichlin (2018), price elas. < 1: housing cost disease when productivity growth slower in construction $\rightarrow$ rising wealth inequality.
- Grossman et al. (2021), income elas. < 1: zoning deregulation slows down rent and price growth $\rightarrow$ welfare gain to poorer households.
- Finlay and Williams (2022), income elas. < 1: increase in aggregate skill premium $\rightarrow$ increase in spatial sorting by skill group.

Housing Quality

- Rising housing expenditure may reflect quality improvement (plumbing/kitchen facilities/minimum size), but not as relevant for recent decades.
  - Overcrowding: Ghent and Leather 2021, Belfield et al. 2015, OECD 2020.
- No improvement in self-assessed neighborhoods (Quigely and Raphael 2004).
  - Rising inequality of housing prices/rent not explained by dwelling characteristics but by locations (Aladangady et al. 2017).
  - Housing is the most important item for spatial variations across commuting zones in the cost-of-living indexes (Diamond and Moretti 2022).

Housing Capital

Owner's *housing consumption* is linked to *housing investment*:

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

- Expected housing capital gain/loss changes relative cost of housing.
- If house price is equal to the discounted sum of future rent:

$$p_t(l_t^i) - E\left(\frac{p_{t+1}(\ell_t^i)}{R_{t+1}}\right) = q_t(\ell_t^i)$$

- Housing expenditure share is the same as renters when actual rent is used as *imputed rent* for homeonwer.

Assume borrowing constraint is not binding.

Housing Capital: cont'd

- Effective price $p_t(\ell_t^i$: sum of (i) after-tax depreciation, repair and improvement costs, property taxes, and after-tax interest costs associated with borrowing (levered); and (ii) the opportunity costs of funds within the asset portfolio, net of the expected capital gain [Poterba (1984), user cost].
- Expected capital gains reduce the opportunity cost of housing, if effect strong enough theoretically make demand for owner-occupied housing upward sloping. Observable during housing price bubbles? [Dusansky and Koç (2007)].
- Housing decisions by owners and renters: differentiated due to:
  - *housing wealth effect* through the budget constraint;
  - *collateral effect* through the borrowing constraint;
  - effective *dependence* of the price of owning on income (due to nonlinear taxation), and on wealth (due to borrowing constraints).

Housing Wealth

- Piketty and Zucman (2014): large housing wealth in France, Germany, U.K. and U.S. since 1700 and for Australia, Canada, Japan and Italy since 1970.
- Recent decades, most important form of wealth:
  - Causa et al (2019): more than half of total assets of middle class (middle income/wealth quintile). Smaller for household in bottom quintile but still at 20% for bottom wealth quntile and 50% for bottom income qunitile.
  - Kuhn et al (2020): Middle-class portfolios are dominated by housing while rich households predominantly own business equity (US micro data since 1950). Differential change in equity and house prices shaped wealth dynamics.

Housing Wealth and Intergenerational Transmission

- Homeownership rate of the top wealth quintile was more than 50 percentage points higher than the bottom, 26 OECD countries (Causa et al 2019). Figure
- Intergenerational transmission
  - Bequest: 20 % inherited their houses, 18 OECD countries (Causa et at 2019)
  - 'Bank of Mum and Dad': a rise from 27 % to 60% for first-time buyers since 1990s (Wood and Clarke 2018, UK).
  - Housing wealth and children's education: evidence from Germany, Sweden, U.S. and U.K. (Karagiannaki 2017, Pfeffer and Hallsten 2012, Lovenheim 2011).
  - Homeownership rate of 42 years old in 2000 (2015) is 14% (27%) higher for those whose parents owned their home at birth (Blanden et al. 2021, UK).
  - "Inheritocracy:" Aging cohorts are passing on to offspring vast amount of wealth [*NY Times* (2023); *Economist* (2025)].

Housing Returns and Wealth Inequality

Housing capital as a propagation mechanism through changes in house prices.

- Unequal distribution of housing: distribution of homeownership rates and distribution of housing wealth among homeowners.
- Spatial variations in housing returns: 15 OECD (Amaral et. al. 2022), US (Aladangady et al 2017), Norway (Eggum and Larsen 2021).
- Distinguish realized gains from potential gains:
  - Price v.s. rent: Bonnet et al. (2014) comments on Piketty (2014)
  - Affect net buyers/sellers (Fagereng et al. 2022), absence of collateral constraint.
- Asset portfolio readjustment: wealthier and richer households time better the market (Martinez-Toledano 2022, Sakong 2022).

Housing Collateral

Housing asset is the main and only source of pledgeable capital for most households.

- 1/4 households (1/3 of homeowners) have mortgages debt, 27 OECD countries. The share increases with household income. figures
- Mortgage debt is the largest part of household debt.
  - Account for 50+% in 26 OECD and 75+% in 11. figures
  - Account for 80+% among households with mortgage.
- Surveys report primary house as collateral for non-primary house purpose: real estate, finance business, education, durables. figures

Housing Collateral – Amplification Mechanism

When house prices increase, households increase home equity-based borrowing:

- Consumption: large literature, collateral effect is important to reconcile the negative age profile in data and positive age profile in theory.
- Labor market outcome: entry into entrepreneurship (Jensen et al. 2022). retirement (Favilukis and Li 2023).
- Human capital investment: raise college enrollment rate especially for low-income families (Lovenheim 2011).
- Residential investment (Crossley 2022).

Key challenge: identify rise in house prices that is independent of common factors that affect other outcomes.

- UK administrative mortgage data where homeowners refinance at regular and quasi-exogenous intervals (Cloyne el al. 2019).
- 1992 Danish mortgage reform allows homeowners to use loans for any purpose (Leth-Petersen 2010).

Renting, Owning, and the Wealth Portfolio: Facts on Returns to Housing

Jorda et al. (2019), (Supplemental Data, Table A.5) report:

- average annual (unweighted) real returns to housing quite heterogeneous across countries
- exceed the returns to equity over 1870–2015 (including war years): 7.3% versus 6.7%.
- Authors report real returns to housing exceed the return to equity in" Belgium, Denmark, France, Germany, Japan, Netherlands, Norway, Portugal and Sweden. Not in US, 6.1% versus 8.5%, and UK, 5.4% versus 6.8%.
- Real returns to equity fluctuate much more than returns to housing; their correlation high positive until World War II, much lower since. Figures VII and VIII in **?** plot the decadal moving averages for 16 countries.
- Jorda et al. (2019): overall low covariance of real returns to equity and housing over long run potential attractive gains from portfolio diversification?

Renting, Owning, and the Wealth Portfolio: Linking with Residential Mobility

Demographic shocks or job relocation (planned or unplanned) can lead to moving, remodeling, or changes in tenure, portfolio adjustments.

- Flavin and Nakagawa (2008), Flavin and Yamashita (2011): endogenize the timing of adjustments of the housing quantity in reaction to exogenous events. Housing quasi-fixed during residence spells with endogenous lengths, timing depends on the share of housing in total wealth.
- Strength of neighborhood effects (Chetty and Hendren 2018a,b) depends on lengths of residential spells, strengthing associational inequality at the cost of misallocation.

These considerations link endowment-related housing inequality with associational inequality.

Renting, Owning, and the Wealth Portfolio: Further Details

- In budget constraint, add vector of risky asset holdings, $(a_t, \mathbf{X}_t)$, total wealth

$$W_t = p_t h_t + a_t + \mathbf{X}_t)\mathbf{1},$$

  $\mathbf{X}_t$ is an $1 \times n$ vector of amounts of risky assets, $\mathbf{1}$ an $n \times 1$ vector of 1's. If excess returns of risky assets follow $n-$dimensional Brownian motion process, $\mu = (\mu_1, \mu_2, \ldots, \mu_n)$, $\mathbf{\Sigma}$, with the full covariance matrix, $\sigma_p^2, \sigma_{p'}^2, \sigma_h)$, block-diagonal with zero covariance between the risky assets and the house prices, $(p_h, p_{h'})$.
- Moves as stopping times.
- During residence spells while housing is constant the portfolios of risky assets are chosen so as to

$$\max_{\mathbf{x}_t} \left\{ \mathbf{x}_t \mu - \frac{1}{2} \text{RRA}_t \mathbf{x}_t \mathbf{\Sigma} \mathbf{x}_t^T \right\},$$

  subject to the following constraints. *RRA* defined in terms of the value function.
- Constraints can accommodate the Henderson-Ioannides definitions.

Renting, Owning, and the Wealth Portfolio: More Details

- Flavin and Yamashita (2011) employ CES utility function in an empirical demonstration with SCF data: subtle effects associate with the dependence of the share of housing on total wealth.
- Zanetti (2014) derives a closed-form solution for the long-run coefficient of relative risk aversion (RRA) in terms of elasticities of the marginal utility of non-housing and housing consumptions with respect to their arguments, and the ratio of housing to non-housing consumption.
  Very promising simple result in a promising area: allows structuring the discussion of portfolios and the forces of inequality that emanate from the differential impact of constraints.

Housing. Location and Associational (Memberships) Inequality

- Initial housing location ℓ_{t-1} as a source of inequality,
  location choice ℓ_t as symptom and propagation mechanisms of inequality.
- Moving, location choice an investment, incurring costs and *expectation of returns*:
  - access to schools $s_t = S(z_t; s_{t-1}, \ell_t)$
  - access to jobs $w_t(\ell_t)$
  - access to amenities $\mathcal{L}_t^i(\ell_t)$

Bilal and Rossi-Hansberg (2021) location asset in frictionless world.

Ngai and Sheedy (2020) investment on match quality with search frictions.

Kennan and Walker (2011), Jia *et al.* (2023) need to move, experience life in new location

Associational benefits, i.e. neighborhood effects. Slower mobility of the young in US, most in need of location investment [Ioannides and Zabel (2019)].

Moving as Investment in Housing Location

State vector: $\mathbf{x_t^r} = (s_{t-1}, a_{t-1}, \ell_{t-1}, \eta_t, \psi_t, \mathbf{q_t}, \mathbf{w_t}, R_t)$, dropping i, focus on renter.

Two stages within period t: choose location ℓ_t then choose (c_t, h_t, z_t).

Second-stage decision rules are $\mathcal{C}(\mathbf{x_t^r}, \ell_t)$, $\mathcal{H}(\mathbf{x_t^r}, \ell_t)$, $\mathcal{Z}(\mathbf{x_t^r}, \ell_t)$, the location decision:

$$V(\mathbf{x_t^r}) = \max_{\ell_t \in N} \left\{ u(\mathcal{C}(\mathbf{x_t^r}, \ell_t), \mathcal{H}(\mathbf{x_t^r}, \ell_t), \ell_t) + E_t V\left(\mathbf{x_{t+1}^r}\right) \right\}.$$

subject to constraints and evolution of state vector $\mathbf{x_t^r}$.

The trade off for moving:

- Cost and benefits in usual static model: $\kappa^r, q_t(\ell_t), w_t(\ell_t), \mathcal{L}(\ell_t)$.
- Future $\mathbf{x_{t+1}^r}$: $\ell_t, s_t = S\left(\mathcal{Z}(\mathbf{x_t^r}, \ell_t); s_{t-1}, \ell_t\right), a_t = \tilde{a}(\mathcal{C}(\mathbf{x_t^r}, \ell_t), \mathcal{H}(\mathbf{x_t^r}, \ell_t), \mathcal{Z}(\mathbf{x_t^r}, \ell_t))$.

Moving as Investment in Housing Location: some thoughts

- An analytical approach is too messy.
- A computational approach may be facilitated by Bilal's Master Equation methodology,
  "Solving Heterogeneous Agent Models with the Master Equation", JPE R&R
  but no examples so far.
- More promising is an econometric "short-cut" by Davis et al. (2021) that gets around the computation of the value function.
- But important!

Affordable Housing Location

Raj Chetty, US Congress Testimony:

"Providing affordable housing in opportunity-rich neighborhoods can be a powerful lever for increasing upward economic mobility and breaking the cycle of intergenerational poverty. The data are unequivocal: neighborhoods matter. From one's future earnings, to their likelihood of attending college or becoming incarcerated to their health outcomes, neighborhoods play a key role in shaping children's life trajectories. Unequal access to neighborhoods that provide opportunities for success amplify the stark racial and income disparities that are prevalent in America today."

Location Asset – Bilal and Rossi-Hansberg (2021)

- Location asset is not subject to borrowing constraints:
  - Savers in the location asset transfer resources into the future by going to expensive locations with higher future returns.
  - Borrowers transfer resources to the present by going to cheap locations, e.g. those received bad income shocks.
- Location asset has heterogenous returns depends the holder:
  - labor supply, fertility decision and other choices determine the current cost and future benefits of living in a location.
- Place-based policies reducing supply of cheap locations can hurt currently poor.

Assumed away migration cost and idiosyncratic $\mathcal{L}^i(l)$

Bilal and Rossi-Hansberg 2021 – Empirics

French individual panel data from tax returns.

- Bottom wealth quintile, those more constrained, move more frequently figure
  - Falsify **static model** focusing only on current cost and benefits.
- Moving to better locations pays off gradually over time.
  - Wages 10% higher upon moving, 20% after 10 years. figure
- After a negative income shock (25+%), bottom wealth quintile downgrade location by about 2 percentile points relative to movers at the top quintile.
  - Low-wealth individuals downgrade location but do not adjust holding of financial assets (close to credit constraint).
  - High-wealth individuals do not downgrade location but reduce holding of financial assets.

Use average income to rank locations based on the theory. The estimated dynamic location effect abstract from schools and peer neighborhood effects.

Investment in Match Quality – Ngai and Sheedy (2020)

- Moving is an investment in match quality.
- Moving to better match when
  - lower interest rate,
  - higher income,
  - better search technology.
- Moving increases housing supply and demand, esp. given flows of first-time buyers/renters and new home are small relative to existing stock.

  $\rightarrow$ important margin for understanding housing market dynamics.

Neighborhoods: Definitions and Measurement

Neighborhood: distinctive characteristics of "communities," inhabitants, environs where dwelling units lie, but also metaphorically.
Sub-jurisdictional units, characterized by "some degree of social cohesion." In economic applications with focus on externalities, often spatial.

- neighborhoods as applied to distinct neighborhood effects of interest, must measurable, suitable data:
  - Chetty *et al.* (2018a; 2018b), conceptualized as additive shocks, over nested geographical contexts:

$$\text{NE}_{\text{Commuting Zone}} + \text{NE}_{\text{County}} + \text{NE}_{\text{Zip Code}} + \text{NE}_{\text{Block}}.$$

  - Ioannides and Zabel (2008), conceptualized as additive separable shocks similarly defined:

$$\text{NE}_{\text{Metropolitan Statistical Area}} + \text{NE}_{\text{Census Block}} + \text{NE}_{\text{Neighborhood Cluster}},$$

- Bewildering variety of institutional settings, regarding provision of services.

Provocative Definition: in the **perception** of residents

Larry Buchanan et al. NY Times, Upshot (2023): How is a neighborhood born? In a small pocket of the Bronx, the answer involves rising rents, a civil war and an air traffic controller at Kennedy Airport. To see for yourself, zoom in with Google Maps near the Bronx Zoo, past Van Nest, Bronxdale and Morris Park. Get closer, and another label appears: ***L I T T L E Y E M E N***

An Extremely Detailed Guide to an Extremely Detailed Map of New York City Neighborhoods

Provocative: what does it do to those shocks?

Neighborhoods as **perceived** by residents

Larry Buchanan says:
"imply the **name** of the neighborhood (Crown Heights vs. Prospect Heights; Upper East Side vs East Harlem) can have a huge impact on housing value, neighborhood character and public perception. And because New York does **not** have any true definitions of neighborhoods — and, in fact, explicitly resists those definitions! — these things are always changing in the city."

Neighborhood Effects and Jobs

- Review Ioannides and Loury (2004); Calvo-Armengol and Jackson (2004) link social connections and employment prospects; Gee *et al.* (2017) most get jobs with weak links, because they are more numerous, value of strong ties correlated with higher income ienequality.
- Bilal (2023): France, unemploymnt clusters spatially, due to firms' decisions, increasing unemployment differentials 5-fold.
- DeLaRoca and Puga (2017): Spain, mean earnings and dispersion greater in bigger cities; Lhuillier (2024): French matched employer-employee data show workers employed in relatively skill-dense cities experience faster wage growth, disproportionately so if skilled.
- Altonji and Mansfield (2018) 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%, college enrollment by 11% percent, permanent wages by 13.7%.

Neighborhood Sorting: Models and Empirics

Modeling two extremes

- Sorting with Neighborhoods Modeled as Points in Space: Ioannides (2013), ch. 3: sorting via housing market equilibrium yields neighborhood income distributions.
- Sorting with Neighborhoods Modeled as US Census Tracts: Davis et al. (2021) estimate preferences over neighborhoods (Census tracts) of Los Angeles, with characteristics $\mathcal{L}^i(\ell^i)$, with dynamic model that allows for moves,

$$u^i(\ell|j,\epsilon) = \frac{1}{\sigma_{\epsilon_\ell}} \ln \mathcal{L}^i(\ell^i) + \frac{1-\omega}{\sigma_{\epsilon_\ell}} \ln c^{i,\ell^i} + \frac{\omega}{\sigma_{\epsilon_\ell}} \ln h^{i,\ell^i} - \kappa_{\ell^i,j^i} + \epsilon^i_\ell.$$

They show that properly designed housing vouchers may improve intergenerational mobility, an important associational inequality. The simple within-period stochastic structure allows an econometric work-around that avoids the tedious methodology of John Rust.

Location Assets and Wages

Hsieh and Moretti (2019): misallocation across cities.

- High productivity city has stringent restrictions to housing supply. $\rightarrow$ productivity growth translate to higher house prices and higher nominal wages.
- US county level data aggregated to 220 MSA :
  - increase spatial dispersion in nominal wage 1964-2009 Figure: stdev. of residual wage $\uparrow$ 0.083 log points (control education, race, gender, age and union status).
  - Local employment, house prices, wages in response to local TFP, amenities and elasticity of housing supply.
  - Spatial dispersion in nominal wage is due to spatial dispersion in housing prices caused by zoning law.
  - Misallocation of labor across locations lower aggregate growth by 36 percent.

Neighborhood Sorting: Models and Empirics, cont'd

- Extensive literature, Ioannides (2013 book), Graham (2018), emphasizes estimation.
- Ioannides and Zabel (2008) estimate neighborhood effects though not at decision points.
- Chyn and Katz (2021 JEP): neighborhoods matter for adult health and well-being, but little causal impact on contemporaneous adult labor market outcomes. Stronger causal impact on children.
- "Moving to Opportunity" randomized experiment: strong evidence that the outcomes for children that moved when young are positive (Chetty et al 2016)
- Other housing mobility programs in the US.
- Chyn (2018) outcomes in young adulthood for children forced to move compared with outcomes for originally similar but non-displaced peers in public housing; Displaced children more likely to be employed, earned more in young adulthood, fewer arrests, lower high school dropout rates.

Location and Life Cycle Outcomes

Chetty and Hendren (2018a, 2018b) use information on moves for 7 million families across US commuting zones (a) and counties (b).

- Exploit variations in age of children when families move. Comparing outcomes of siblings within families, studying moves triggered by displacement shocks, exploiting variations across birth cohorts, genders, and quantiles.
- Childhood exposure effects: children's income converge to permanent resident at a rate of 4% per year.
- County-level estimates: low-income families children, **each year** of childhood exposure to one standard deviation better county, increases household income at age 26 by 0.5%.

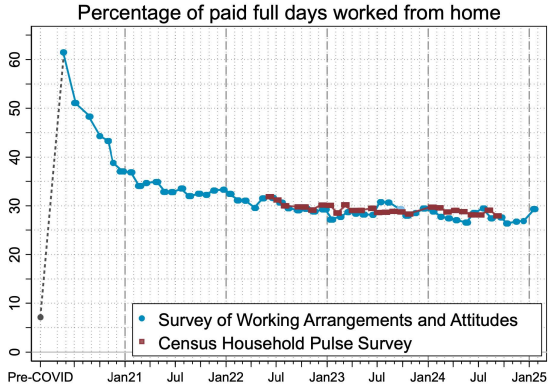
Children born between 1980-88, moved once across commuting zones between 1997-2010. Better county: less concentrated poverty, less income inequality, better schools, larger share of two-parent families, lower crime rates.

Location and Life Cycle Outcomes: Exogenous Moves

- Chyn (2018) compares young adult outcomes of children displaced due to demolitions of public housing to peers in nearby public housing in Chicago.
  - Displaced children more likely to be employed and earn more in young adulthood, fewer violent crime arrests, lower high school dropout rates.
- Nakamura et al. (2022): volcanic explosion (1973 Westman Islands, Iceland)
  - Uneven benefits/costs of moving: parents were slightly worse off but children increased in lifetime earnings and education.

Working from Home

Many jobs do not lend themselves to telecommuting, WFH introduces another source of inequality: affecting housing and the industrial composition of cities. Covid 19 changes profoundly where people work: 29% of Paid Days, US, January 2025; 62% January 2020 Were Work-From-Home Days



Research NYT March 10 2025.jpg

Working from Home: cont'd

- WFH favors primarily highly skilled workers and occupations, 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.
- WFH saves commuting time, induces workers to work longer hours; hard to assess the effects on
- Across cities, workers who can work remotely can retain high-productivity, economize by moving to lower-cost locations.
- Within cities, remote job access flattens the intracity house price gradient (OECD (2023), Figure 4.6), elevates the importance of multi-center urban areas.
- Notable papers: Brueckner *et al.* (2023), Van Nieuwerburgh (2023)
  - individual productivity of the lost serendipity of office interactions Consequences for corporate culture (Van Nieuwerburgh, 2023).
- Reasonable speculation some commercial real estate in city centers to convert to housing.

Racial Segregation and Discrimination

- Racial segregation in housing, mostly evidence from US (Graham JEL 2018, Ray et al. Brookings 2021). figures
- Its consequences may be long lasting and difficult to offset (Schelling 1971, Boerma and Karabarbounis 2022)
- Discrimination/information frictions/costs
  - Lack of information (Bergman et al. 2020, Bergman et al. 2024).
  - Role of intermediaries (Christensen and Timmins 2022 & 2023, Higgins 2022).
  - Access to mortgage and loan-to-value ratio: Black households tend to have higher leverage (Gupta et al. 2022).

Racial Discrimination and Homophily

- An alternative view for racial segregation is homophily – be near people like yourself, captured by $\mathcal{L}^i(\ell)$ (Ioannides and Zabel 2008)
- Aliprantis et al (2023): high-income/wealth Black households live in neighborhoods similar to low-income White households:
  - racial composition of neighborhoods – psychic cost to live in white neighborhood,
  - but absent high-quality black neighborhoods could be racial discrimination.
- Low-income families stay in low-opportunity areas because of information barriers during search process, not because of preference.
  - Bergman et al. (2020) – add school-quality information for a random sample of searcher using Housing Choice Vouchers.
  - Bergman et al. (2024) – housing mobility programs providing information, short term financial assistance and other help in search process.

Intermediaries and Discrimination

- Housing decisions require search, person-to-person and/or via intermediaries.
- *Discriminatory steering* of home-buyer: minorities are shown similar numbers of homes but in worse neighborhoods (Christensen and Timmins 2022).
- Renters with minority names are less likely to receive responses for properties from good locations (Christensen and Timmins 2022 & 2023).
- Relative to an integrated housing market, segregation lowers Black households welfare by 5 percent in 1960, 1 in 2019 (Higgens 2022).

US National Association of Realtors, Code of Ethic, Article 34, 1924–49
"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."

1924 Code of Ethic, altered in 1950, deletion of the phrase on race. In 1959, court case in favor of realtor who introduced nonwhite buyer into a white neighborhood. (Brown 1972).

Segregation: Homophily vs. Discrimination

- Modernization of Schelling's models of neighborhood location decisions and neighborhood tipping: segregation as a stable outcome even when homophily is weak.
- Schelling: "[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). Card *et al.* (2008, 2011): support Schelling.
- Aggregate social outcomes reflect magnification of individual propensities, may well be *unintended*.
- **Self-organization**: prosperous Black households may, in the presence of racially motivated restrictive policies, be better off in Black neighborhoods where they may live near others like themselves while accessing good schools.
  Segregation reflects homophily (Bayer *et al.* (2014), Aliprantis et al. *JUE,* Forthcoming, Logan and Parman, *JEL*, Forthcoming; patterns cannot be explained by financial constraints alone. Important Measurement issues.

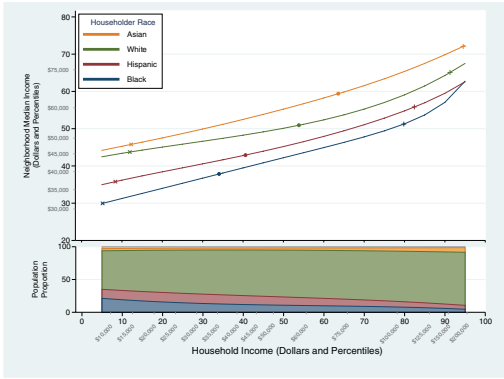
Neighborhood Income Distributions and Overall Inequality

Contribution of neighborhood income, Wealth Distributions and Overall Inequality: not well understood.
Reardon et al. (2015):

- criticize 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.
- Implement a new non-parametric measure of segregation; data from US Census and ACS, they measure households' incomes in terms of percentile rank relative to the national income distribution and then plot the median income of their census tracts as functions of the percentile rank of households' incomes.
- Precursors: Hardman and Ioannides (2004), Schmidheiny (2006), Wheeler and La Jeunesse (2008).

Neighborhood Median Income against Household Income, by Race

FIGURE 3
Neighborhood Median Income, by Household Income and Race, All Households in United States, 2009



Reardon AAAPSS2015.pdf

Neighborhood Median Income against Household Income, by Race, cont'd

- For distinct racial/ethnic groups (White, Black, Hispanic and Asian), plot: neighborhood median against against household income, in percentiles:
  1. 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 Figure 3).
  2. for Asian and White households much higher than those for Black and Hispanic households. I.e., even after controlling for household income, Black and Hispanic households live disproportionally in neighborhoods with substantially lower median incomes.
     difference in neighborhood median income between Black and White households: about 10 percentage points across the entire distribution of household income.
- Properties of the tool:
  horizontal line — no segregation, everyone has same neighborhood median.
  45^o **line** — maximum segregation, identical household together.

Conclusion

- Housing is a bundle: consumption, location and capital.
  $\rightarrow$ providing shelters, access to jobs, wealth and collateral.
- Housing reflects and acts as sources and propagation mechanisms for inequality.
- GE effects: mobility decisions, tenure choices, house prices and rents, important for understanding functioning of the housing market and policy impacts.
- Search frictions important for mobility and tenure decisions.
  $\rightarrow$ access better matched locations and housing wealth.
- Working-from-home: smaller importance of job access but not an option for all workers, see Brueckner et al. (2023), Davis et al. (2023).

Review of Resources

There is a massive amount of research material, but what is new?

1. Lack of information on opportunities
   Bergman, Peter, Raj Chetty, *et al.* 2020. "Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice." *American Economic Review (2024).*
2. Role of intermediaries
   US National Association of Realtors, *Code of Ethics,* Article 34: "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."
   Christensen, Peter, and Christopher Timmins. 2022. "Sorting or Steering: The Effects of Housing Discrimination on Neighborhood Choice." *The Journal of Political Economy.* 130(8):2110-2163.

Review of Resources: cont/d

1. Quantitative evaluation of welfare loss
   Christensen, Peter, and Christopher Timmins. 2021. "The Damages and Distortions from Discrimination in the Rental Housing Market." NBER Working Paper 29049. July.
2. Homophily vs. sorting by income and race
   Aliprantis, Dionissi *et al.* 2019. "What Explains Neighborhood Sorting by Income and Race?" Cleveland Fed working paper. *Journal of Urban Economics*, forthcoming.

Policy Impacts on Housing and Inequality

Massive literature on housing policies and a broad set of public policies:

- Saiz (2023) surveys 290+ papers to address global housing affordability crisis.
- For the US alone, Olsen and Zabel (2015) reference more than 200 papers.
- For Europe, Egner and Krapp (2025), *Housing in Crisis: Policies and Challenges in Europe.* Palgrave-McMillan.

Focus on policies related to the three features of housing:

- Affordable housing consumption – providing shelter.
- Affordable housing location – providing opportunities.
- Accessible housing wealth – promoting homeownership.

Affordable Housing Consumption

- The global housing affordability crisis: inequality in housing consumption.
- Housing is a necessity: public view, and estimate of income elasticity.
- Cash versus in-kind housing benefits:
  - Dutch Housing Association, Swedish housing cooperatives, UK council housing.
  - Berard and Trannoy (2023) conduct an accounting exercise using imputed rent from social housing, find that cash benefits are more effective, especially in reducing poverty. Good to have a general equilibrium version .
- Homelessness: extreme form of housing inequality, policies on foreclosures.
  - Diamond et al. (2020), Towe and Lawley (2013), Kermani and Wong (2021).

Housing Mobility Policies in the U.S.

- Moving to Opportunity program: randomized housing mobility experiment, low-income families with children living in public housing in disadvantaged neighborhoods to move to private-market housing in better neighborhoods.
  - Start in 1994, families were interviewed in 2002 and 2008-2010.
  - Many studies used this program to estimate neighborhood effects.

- A range of housing mobility programs: help low-income families with children use Housing Choice Vouchers to move to high-opportunity neighborhoods.
  - services: housing search assistance, information briefings on neighborhoods.
  - short-term financial assistance to help with moving costs

  See recent examples, Bergman et al 2023, Aliprantis et al. 2023

MTO (1990s): randomly assigned a group of households with children eligible to live in low income housing projects in five US cities to three different groups: (1) housing voucher with location restriction (2) housing voucher with no location restriction and (3) control group with no voucher.

Accessible Housing Wealth: Homeownership

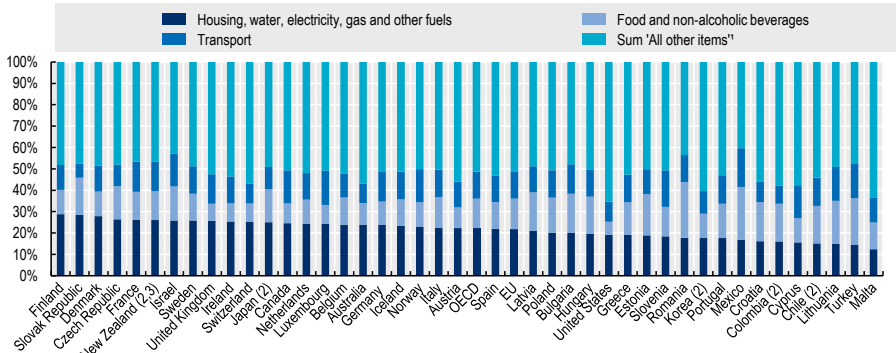
- Tax-deductibility of mortgage interest, aim to promote homeownership but:
  - eliminating it may increase homeownership: lower house prices in GE eases downpayment constraints (Sommer & Sullivan 2018).
  - distributional implications of removing it, especially across old v.s. young (Fiagari et al 2017, Kiyotaki et al 2023)
- Transaction taxes on properties lower homeownership: lower price-to-rent ratio in GE $\uparrow$ buy-to-let and $\downarrow$ buy-to-own transactions (Han et al. 2023).
- Monetary policies and the interest rate channels:
  - Distributional effects across adjustable-rate mortgages vs fixed-rate mortgages.(Garriga et al. 2017, Auclert 2019).
  - Higher interest rate can lower mobility as moving is an investment (Ngai and Sheedy 2020).

Housing Market Regulations

- Affordable housing interventions must confront issues such as dedicated low-income vs income-mixing, tradeoffs with local economic development, etc – often involves conflict of objectives.
- Saiz (2023) lists 30 affordable housing strategies and looks at 9 case studies. Conclude that housing programs should target the poor, policy makers must understand their goals & country-specific context and use a ranges of tools.
- Macro models is useful in spelling out GE effects, see Favilukis et al. (2023) for studying zoning, rent control, housing vouchers and tax credits.

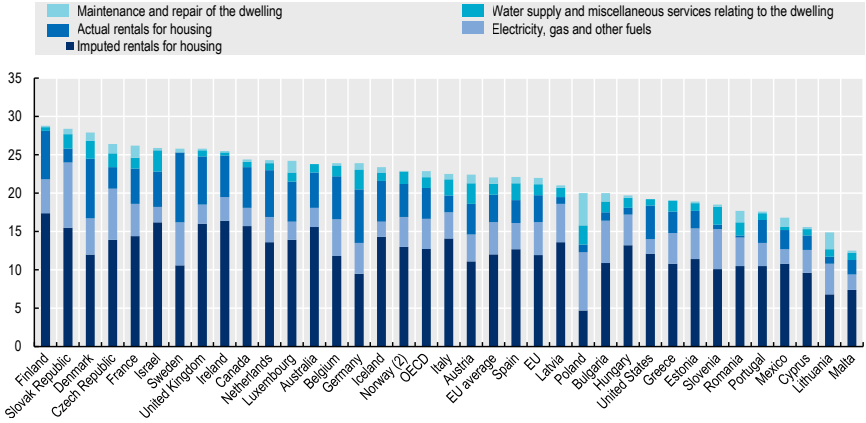
Additional Slides

Housing expenditure shares 2019



Source: OECD Affordable Housing Database. back

Breakdown of housing expenditure 2019



Source: OECD Affordable Housing Database.

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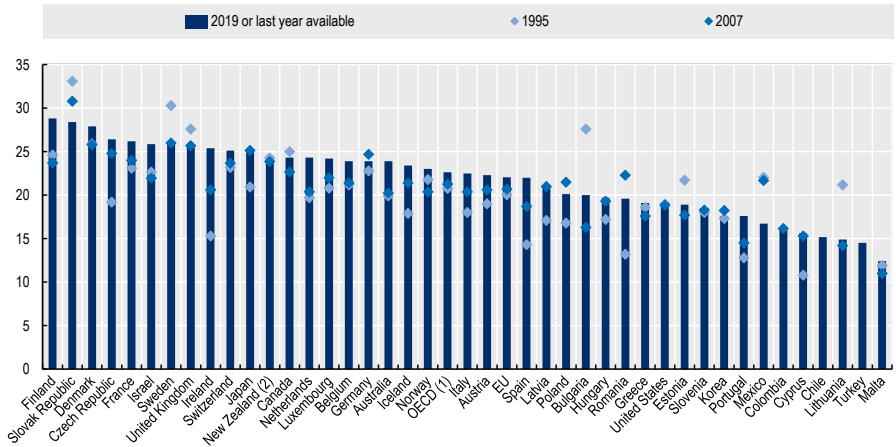
Rise in housing expenditure shares 1995 – 2019



Source: OECD Affordable Housing Database.

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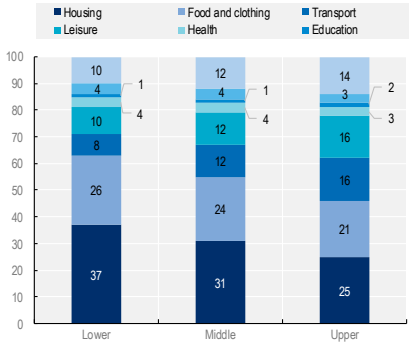
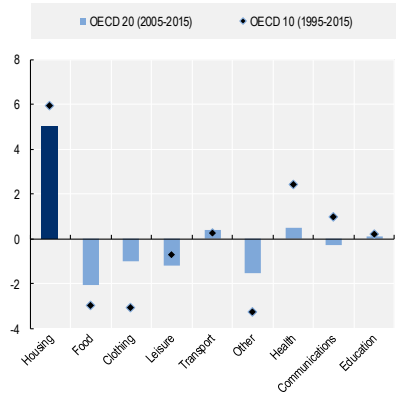
Housing expenditure shares across income distribution





Source: OECD (2020).

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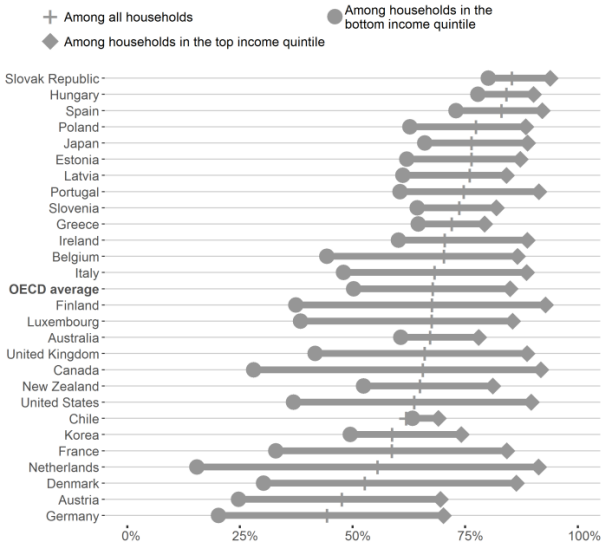
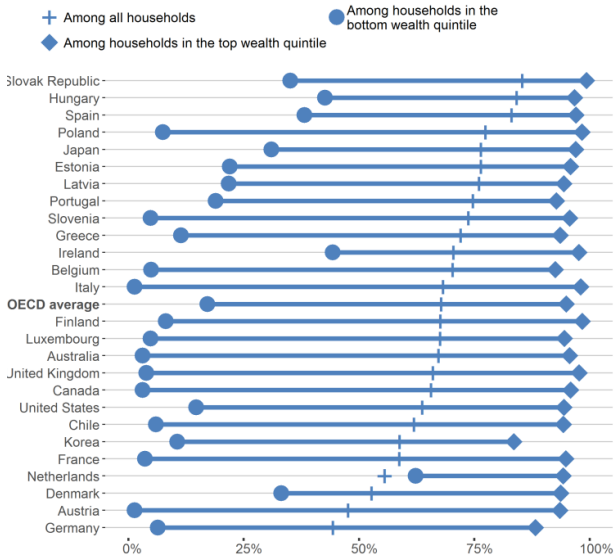
Homeowernship rates across income distribution



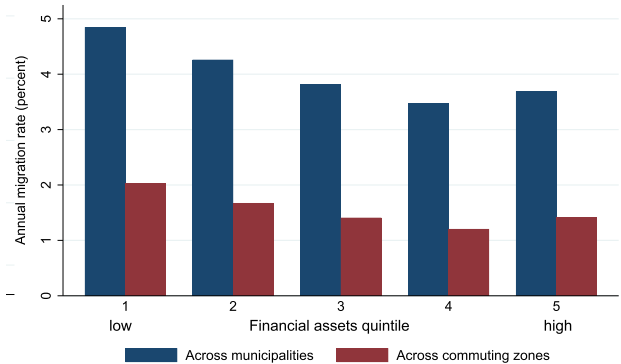
Source: Causa et al (2019). back

Homeowernship rates across wealth distribution



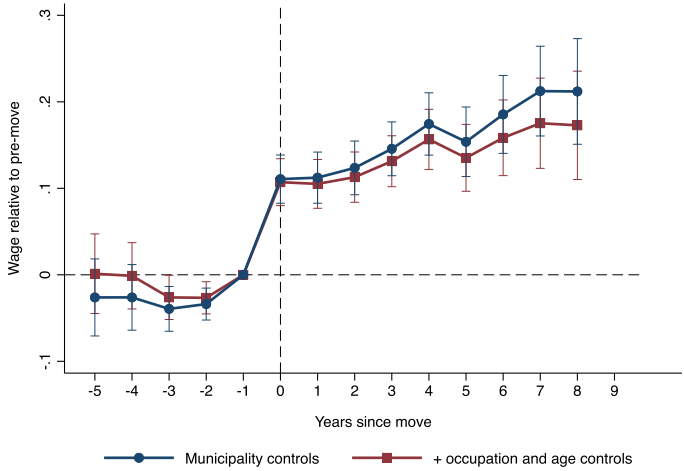
Source: Causa et al (2019). back

French migration rate



Source: Bilal and Rossi-Hansberg (2021). Fraction of movers in a year by financial assets quintile, 2008 to 2015. 36,569 municipalities. Financial assets are slightly negative for the bottom. back

Effect of migration on wages over time



Source: Bilal and Rossi-Hansberg (2021). Clustered by commuting zone (local labor market) and 2-digit occupation.

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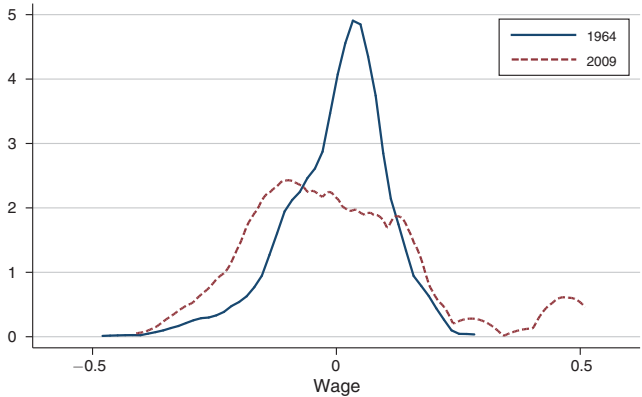
Spatial variation of nominal wages

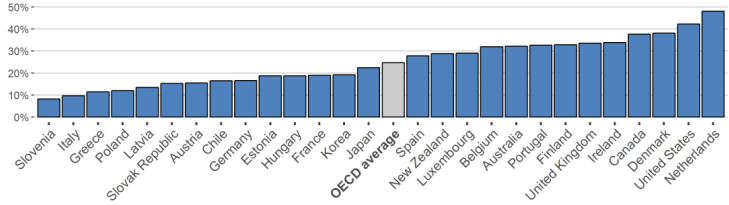


Source: Hsieh and Moretti (2019). Employment-weighted distribution of de-meaned log wages across MSAs weighted by MSA employment, controls for three levels of educational attainment (high school dropout, high, school, college), race, gender, age, and union status in each metropolitan area. The sample includes 220 metropolitan areas.

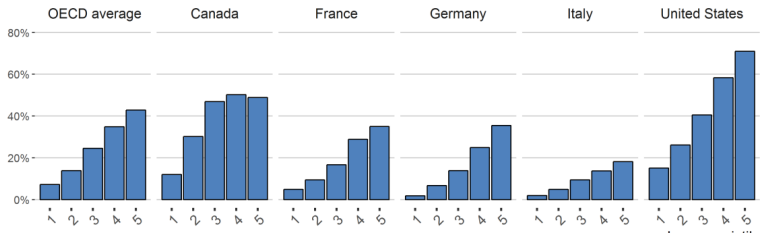
back

Proportion of households with mortgage debt

Panel A. Proportion of households with mortgage debt across OECD countries (%)



Panel B. Proportion of households with mortgage debt across the income distribution, OECD average and selected countries (%)



Source: Causa et al 2019, OECD Wealth Distribution Database.

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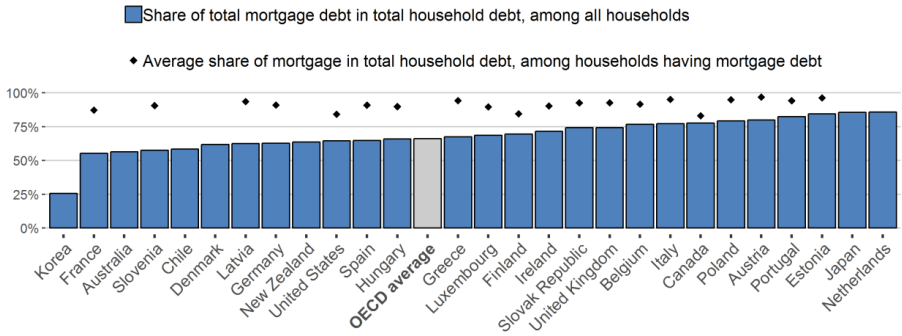
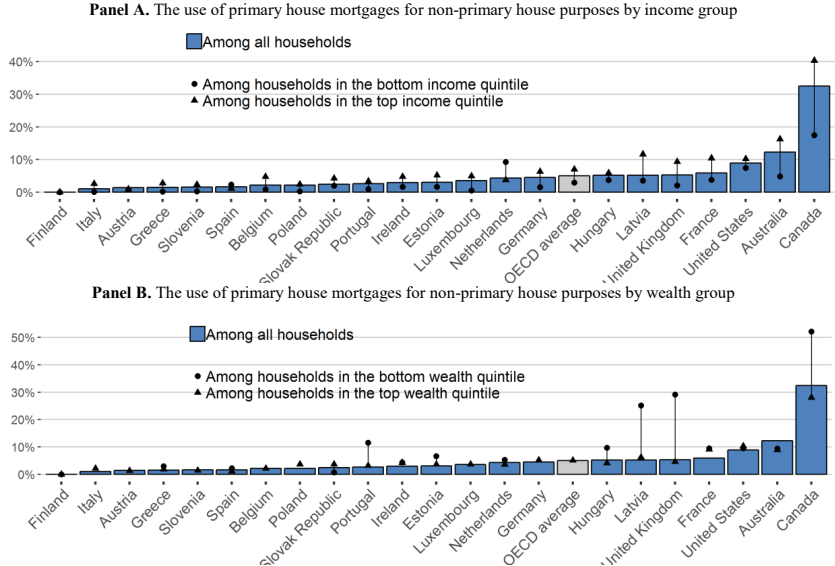
OECD mortgage debt



Source: Causa et al 2019, OECD Wealth Distribution Database and Household Finance and Consumption Survey. The numbers refer to principal residence debt only.

back

Housing as collateral



Source: Causa et al 2019, Household Finance and Consumption Survey and Luxembourg Wealth Survey

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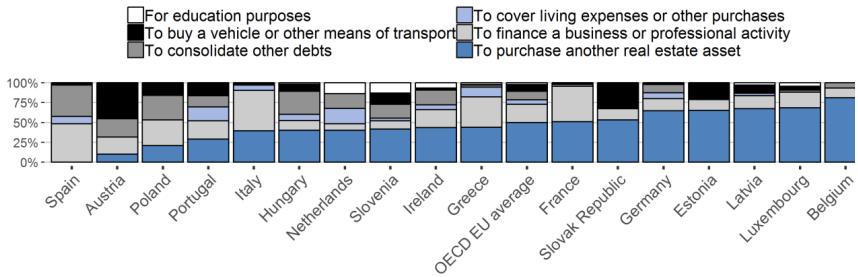
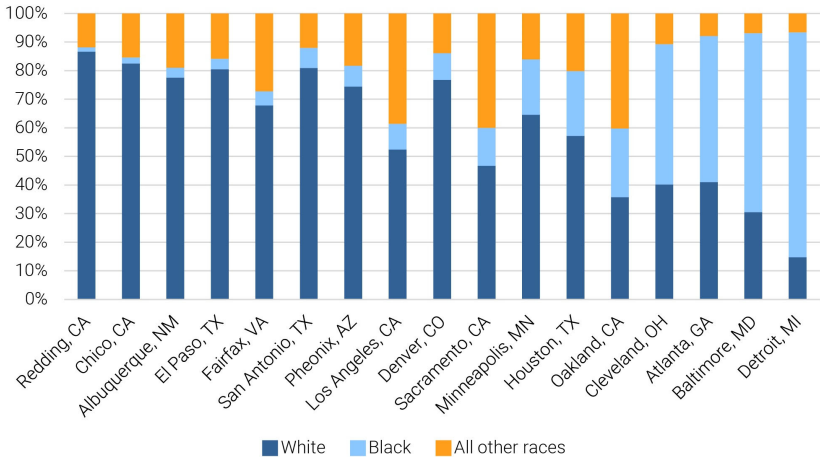
Housing as collateral



Source: Causa et al 2019, Household Finance and Consumption Survey, in % of primary house mortgage loans.

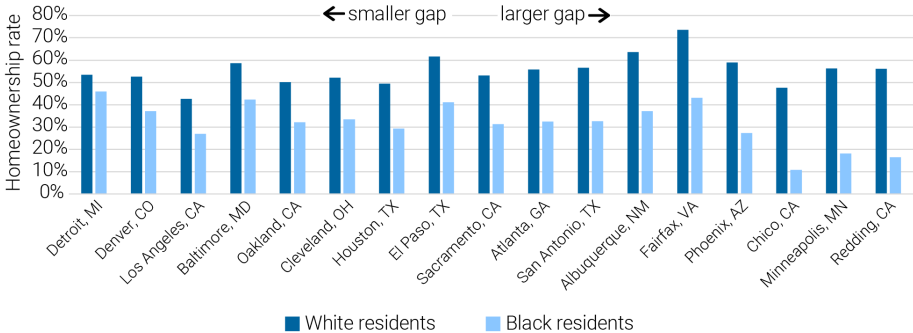
back

Racial segregation in the U.S.



Source: Ray et. al (2021), Brookings, based on 2019 5-year ACS estimates. back

Racial housing wealth in US cities



Source: Ray et. al (2021), Brookings, based on 2019 5-year ACS estimates. back