Financial Literacy Seminar Series

The Riskiness of Owning vs. Renting Housing

Scott Baker, Northwestern University

Thursday, November 21, 2019 Duquès Hall 451
Seminar 3:30 - 5:00 PM, Reception 5:00 – 6:00 PM

The Riskiness of Owning vs. Renting

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FRB/GW GFLEC, November 2019

Riskiness of owning vs. renting housing

Why focusing on housing?

- ▶ Housing: major consumption good and asset
  - ▶ ~1/4 of expenditures and
  - ▶ ~1/2 of non-human net assets (owners)

- ▶ Substantial risk, different exposures of owners vs. renters

- ⇒ Own/rent decision crucial portfolio choice driver of risk exposure

Which is safer: owning or renting?

- ► Owners exposed to substantial wealth risk (sale price)

- ► Renters exposed to substantial cost-of-living risk (rents)

- ► Lengthen housing 'tenure' and sale horizon $\Rightarrow$ $\downarrow$ sale price risk, $\uparrow$ rent risk

Dominant view: Owning is safer

Widely-held view by:

- financial advisers
- academics
- public

- Financial advice: Burton Malkiel, *A Random Walk Down Wall-Street*, 2012

  "My advice is: Own your own home if you can possibly afford it. Real estate returns have often exhibited only a low correlation with other assets, thereby reducing the overall risk of an investment program."

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Dominant view: Owning is safer

- **Academia:** Sinai and Souleles, *Owner Occupied Housing as a Hedge Against Rent Risk*, QJE 2005 (SS'05)

  "If residence spells were infinite (or in a dynastic setting, if descendants live in the same houses as their parents), homeownership would not be risky at all, since there would be no sale price risk."

- **Public:** Adelino, Schoar and Severino, *Perception of House Price Risk and Homeownership*, NBERwp 2019

  "In fact, a large majority of households (about 71%) view an investment in housing as safe [...] In contrast, only 18% of respondents consider stocks a safe investment, and 55% of respondents consider (government and corporate) bonds safe."

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Owning, Renting, and Human Capital Insurance

- ▶ Care about risk of entire portfolio, not any one position
- ▶ Earnings risk is biggest financial risk for most households
  - ▶ E.g. industry decline, outsourcing, displacement risk
- ▶ Difficult to insure with legal contracts b/c of economic and legal frictions
  - ▶ E.g. moral hazard & adverse selection, voluntary servitude is illegal
  - ▶ Especially difficult over long horizons

"We need to extend the domain of finance beyond that of physical capital to human capital. Livelihood insurance would protect against long-term risks.

In today's world we cannot insure against risk to our paychecks over years and decades, against the economic risk that our neighborhoods will gradually decay."

THE NEW
FINANCIAL
RISK IN THE 21st CENTURY
ORDER

ROBERT J.
SHILLER
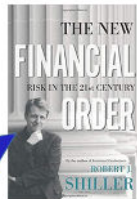
This paper: Role of exposure to local wages

▶ Rent risk is a valuable hedge against earnings risk

▶ Owning: lose hedge and exposed to house price risk
  ▶ House price risk: large and highly correlated with earnings
  ▶ "Doubles down" on wage and location-specific risks

  $\Rightarrow$ **Owning much riskier for typical households**

▶ Import. heterogeneity by location & HH characteristics
  ▶ Elasticity of housing supply, industrial composition, etc.
  ▶ Age, labor supply, housing demand, occupation, etc.

Contributions and Summary of Results

- ▶ Analyze evolution of wages, rents, house p's 1940–2010
  - ▶ Housing covaries strongly with wages over all horizons
  - ▶ Key role of location-specific changes

- ▶ Illuminate primary mechanisms and derive implications
  - ▶ Mech.: Location-specific shocks in spatial equilibrium

  - → Systematic heterog. in riskiness of owning vs. renting

  - → May increase efficiency costs of home-ownership subsidies, building restrictions

What this paper is NOT about

This paper does NOT...
- ...explain homeownership (positively or normatively)
  - We ignore many important aspects of ownership choice!
  - Instead, **focus on portfolio implication** of HO choice, taking into account local labor and housing markets
  - Focus is tenure choice's impact on budget constraint; preferences play secondary role

- ...identify shocks
  - We interpret long-run changes in (hedonic) prices as risk
  - Mostly focus on location-specific risk
  - Households take these local prices as given

Outline

Outline

Housing risk exposures

- ▶ Renting, owning create mirror-image exposures

  - ▶ Renter: short housing during stay, $\{-R_1, \ldots -R_T\}$

  - ▶ Owner: long housing after stay, P_T

- ▶ Costs depend on correlation with rest of portfolio

  - ▶ Crucial element: Human capital (wage risk)

  - ▶ Assume costly to trade these exposures to wage risk
    - $\rightarrow$ incomplete markets: nonmarketed income
    - $\rightarrow$ implicit hedging demand

Housing exposures and consumption risk

▶ Start off with intuition using static portfolio choice

▶ Recent literature collapses intertemporal portfolio to choosing PVs (e.g. Cochrane 2014)

Notation:*

▶ P_0: home price in t=0 (known)

▶ $P_T^{pv} \equiv P_T/(1+r)^T$: PV home price in t=$T$ (uncertain)

▶ $R \equiv PV(\{R_t\}) = \sum_{t=1}^{T} R_t/(1+r)^t$: PV of rents

▶ $Y \equiv PV(\{Y_t\})$: PV of outside income (human capital)

▶ $C \equiv PV(\{C_t\})$: PV of (non-housing) consumption

* We will account for homeowner's carrying costs in the empirical analysis.

Housing exposures and consumption risk

▶ Budget constraints of renter, owner, and "pre-payer":

$$C_{rent} = Y - R$$
$$C_{own} = Y + (P_T^{pv} - P_0)$$
$$C_{prepay} = Y - E(R)$$

▶ Pre-payer helps to separate housing risk exposures

  ▶ Fully hedged against housing risk (eg. lifetime lease)

▶ Consumption risk (e.g., mean-variance preferences):

$$V(C_{prepay}) = V(Y)$$
$$V(C_{rent}) = V(Y) - 2Cov(Y, R) + V(R)$$
$$V(C_{own}) = V(Y) + 2Cov(Y, P_T^{pv}) + V(P_T^{pv})$$

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Housing exposures and consumption risk

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- Covariance and variance of housing cost with human capital are key

- $Cov(Y, R)$, $Cov(Y, P_T^{pv})$ enter with opposite signs
  - $Cov(Y, R) > 0$ good, since renter is short housing
  - $Cov(Y, P_T^{pv}) > 0$ bad, since owner is long housing

- Variances affected in opposite ways by increase in horizon
  - $V(R)$ increasing, $V(P_T^{pv})$ decreasing in horizon
  - $V(P) \gg V(R)$ in data ("excess volatility")

Dominant View: Sinai and Souleles (2005)

SS'05 ("Owner-Occupied Housing as a Hedge against Rent Risk") focus on **special case**:
$Cov(Y, R) = Cov(Y, P_T^{pv}) = 0$

$$V(C_{rent}) = V(Y) - 2\,Cov(Y, R) + V(R)$$
$$V(C_{own}) = V(Y) + 2\,Cov(Y, P_T^{pv}) + V(P_T^{pv})$$

$$\Rightarrow V(C_{own}) - V(C_{rent}) = V(P_T^{pv}) - V(R)$$

$\Rightarrow$ Owning riskier for small T, safer for large T:
$V(C_{own}) < V(C_{rent})$

Housing exposures and consumption risk

$$V(C_{rent}) = V(Y) \; -2\,Cov(Y, R) \; + V(R)$$
$$V(C_{own}) = V(Y) \; +2\,Cov(Y, P_T^{pv}) + V(P_T^{pv})$$

▶ With positive covariances:
  → renting hedges income risk
  → owning exacerbates income risk

Renter Rent risk can even *reduce* consumption risk relative to having no housing risk exposure (i.e., prepaying):

$$V(C_{rent}) < V(C_{prepay}) \iff \frac{\sigma_{YR}}{\sigma_R^2} \equiv \beta_{Y|R}^{ols} > 1/2$$

Owner Housing risk exposure $\to 0$ as $T \to \infty$

Intuition of Primary Results

- Buying vs. Renting in Detroit in 1950
  - Some of highest prices and wages in the nation
  - Owners: large declines in both their primary asset as well as their wages!
  - Renters: wage decreases partially offset by rent decreases

- Buying vs. Renting in Seattle in 1980
  - Seattle in 1980 had very low wages and rents prior to a multi-decade boom
  - Owners: dramatic increases in both their primary asset as well as their wages!
  - Renters: wage increases partially offset by rent increases

- In each case, owning doubles down on local/regional risk, while renting hedges it

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Outline

Evolution of wages, rents, and house prices

▶ Wages dominant determinant of income for most HHs, especially over life-cycle

▶ *Goal of this section:* Summarize evolution of (Y, R, P) in local markets throughout the US over horizons of up to 70 years

▶ Caveats:
  ▶ Doesn't distinguish risk from predictable changes (for now; we use VAR in life-cycle model in appendix)
  ▶ Less of an issue over long horizon (e.g., momentum small over 20 years)
  ▶ Ignores within-market risk (large for house prices)

Data

- Main data: wages, rents, house prices from Decennial Census IPUMS, 1940–2010
    - Long coverage, rent data
    - Good match to FHFA, Corelogic, Zillow during overlaps

- Geographic units: commuting zones (CZs)
    - CZs: groups of counties meant to approximate labor markets; similar to MSAs but consistent over time

- Mostly expenditures (P x Q), not prices
    - We project off age and size effects
    - E.g., "wage" = residualized salary of full-time workers
    - Better-measured; key qs likely evolve slowly

Substantial Amounts of Risk

Table 2 – Wage, rent and home price risk

	Standard deviation of growth rates over		
A. Overall risk	10 years	40 years	70 years
Full-time wage	17.8%	60.3%	43.5%
Rent	17.7%	67.4%	112.6%
Home value	33.3%	185.4%	303.7%
B. Location-level risk	10 years	40 years	70 years
Full-time wage	5.9%	11.9%	18.2%
Rent	12.3%	25.0%	38.8%
Home value	21.5%	36.2%	48.5%

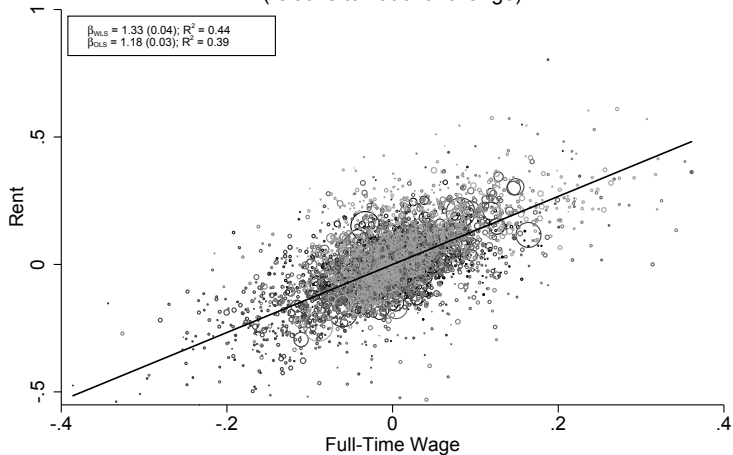# Rent vs. wage growth: Decades – all variation

1940 - 2010: 10-year growth rate (real $)

β_{WLS} = 0.62 (0.03); R^2 = 0.41
β_{OLS} = 0.85 (0.01); R^2 = 0.65
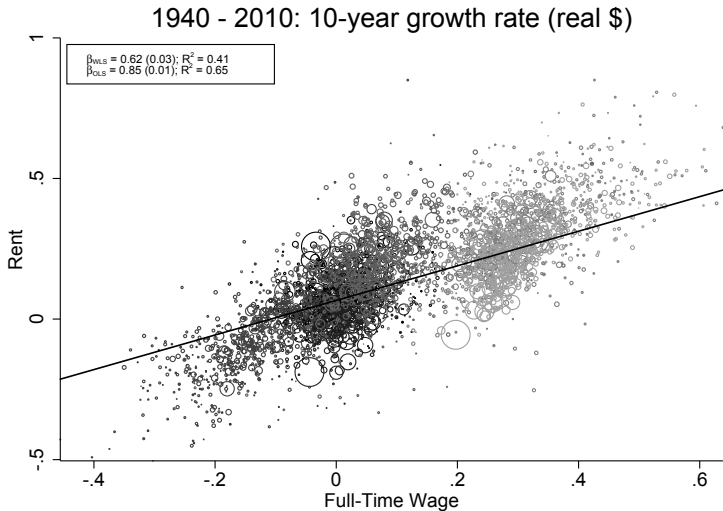
(Each circle represents a 10-year log change of rents and wages in a CZ, weighted by population.)

Home price vs. wage growth: all variation
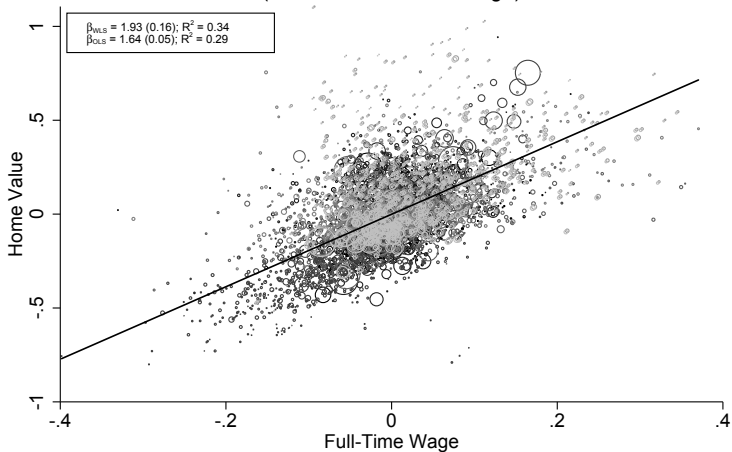

1940 - 2010: 10-year growth rate (real $)
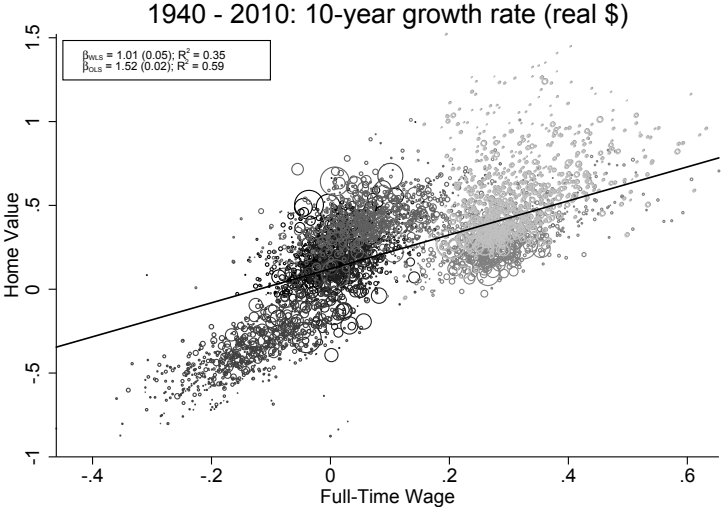
Rent vs. wage growth: local variation

1940 - 2010: 10-year growth rate (real $)
(relative to national change)
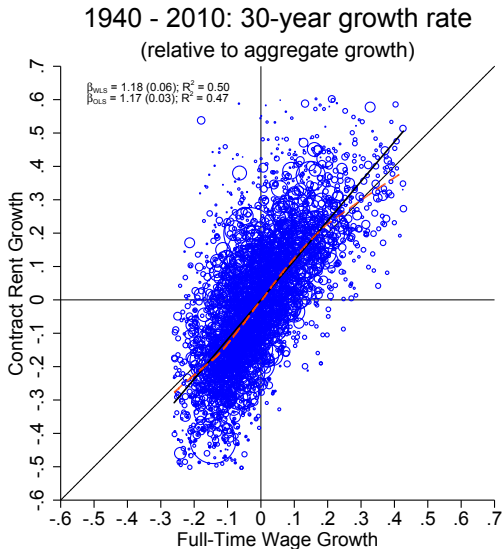
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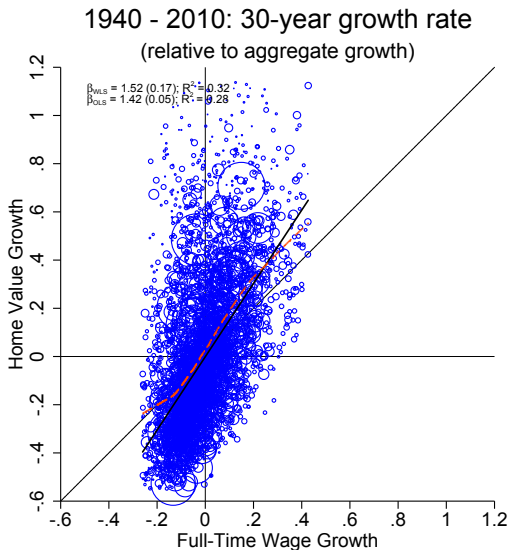(relative to national change)
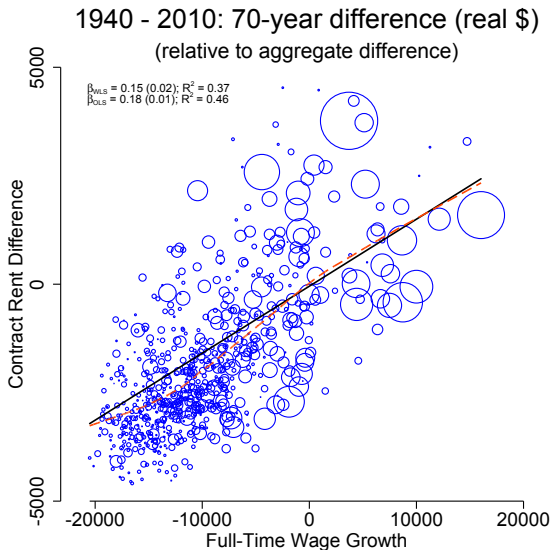
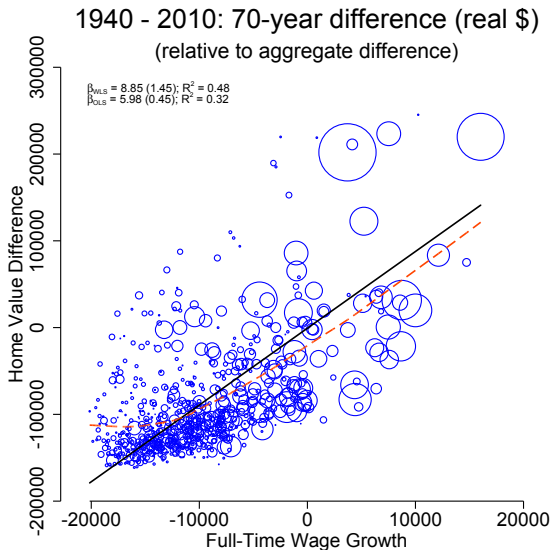# Rent vs. wage growth: Full 1940–2010 period

1940 - 2010: 70-year growth rate (real $)

β_{WLS} = 1.34 (0.13); R^2 = 0.45
β_{OLS} = 1.26 (0.04); R^2 = 0.54

Rent vs. wage growth: 30-year changes

1940 - 2010: 30-year growth rate
(relative to aggregate growth)

β_{WLS} = 1.18 (0.06); R^2 = 0.50
β_{OLS} = 1.17 (0.03); R^2 = 0.47

Contract Rent Growth

Full-Time Wage Growth

Home price vs. wage growth: 30-year changes

1940 - 2010: 30-year growth rate
(relative to aggregate growth)

$\beta_{WLS} = 1.52\ (0.17);\ R^2 = 0.32$
$\beta_{OLS} = 1.42\ (0.05);\ R^2 = 0.28$

Home Value Growth

Full-Time Wage Growth

Rent vs. wage growth in Dollars: Full 1940–2010

1940 - 2010: 70-year difference (real $)
(relative to aggregate difference)

Price vs. wage growth in Dollars: Full 1940–2010

1940 - 2010: 70-year difference (real $)
(relative to aggregate difference)

$\beta_{WLS} = 8.85$ (1.45); $R^2 = 0.48$
$\beta_{OLS} = 5.98$ (0.45); $R^2 = 0.32$

Home Value Difference

Full-Time Wage Growth

Correlation with wage risk

Table 2 – Wage, rent and home price risk

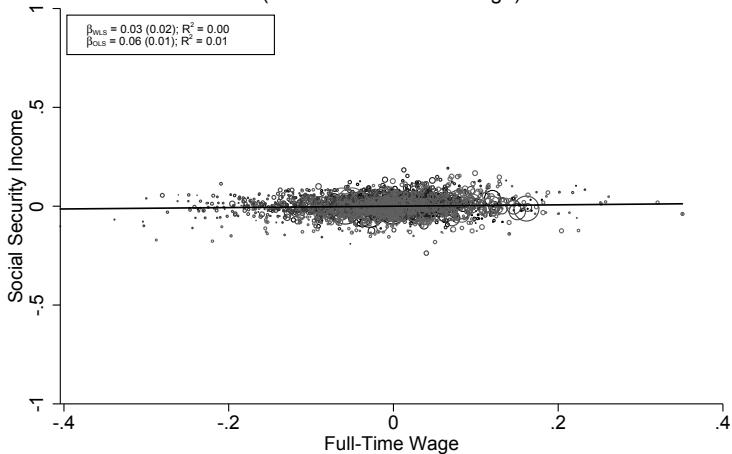|	Correlation with wage growth rate over		
A. Overall risk	10 years	40 years	70 years
Full-time wage	100.0%	100.0%	100.0%
Rent	64.5%	76.3%	73.1%
Home value	55.6%	70.7%	33.5%
B. Location-level risk	10 years	40 years	70 years
Full-time wage	100.0%	100.0%	100.0%
Rent	66.7%	71.9%	73.1%
Home value	58.6%	46.9%	33.5%

Heterogeneity Across Counties/CZs

- ▶ Unsurprisingly, locations with more inelastic housing supply tend to have steeper price-wage relationships:

  - ▶ Saiz geographic land constraints index

  - ▶ Wharton Residential Land Use Regulation Index

  - ▶ Guren/McKay/Nakamura/Steinsson home price volatility

Patterns are Highly Robust

- **Period**: exclude Great Recession, post-war boom, etc.

- **Market definition**: CZs, counties, MSAs

- **Migration & composition**: drop movers, control for Δpop

- **Key variables**: total family income, gross rents; unadjusted values; distribution (p25, p50, μ, p75)

- **Market segmentation**: restrict to modal 5-room homes

- **Survey responses**: transaction prices from Zillow, FHFA

- **"Placebos"**: nominal variables that should not vary as strongly with local demand: Social Security & utilities

"Placebo": SS income vs. wage (pooled decades)

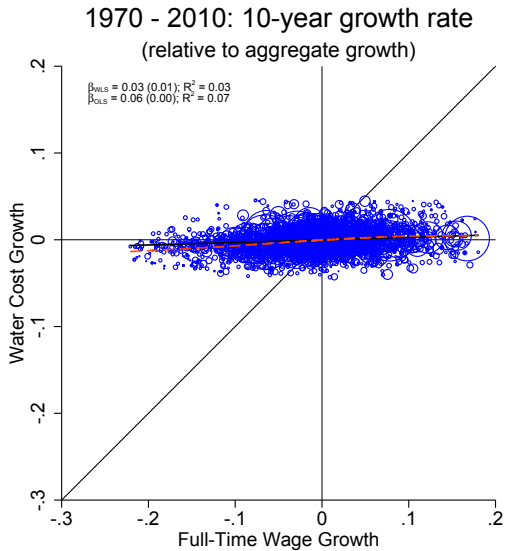1970 - 2010: 10-year growth rate (real $)
(relative to national change)

$\beta_{WLS} = 0.03\ (0.02);\ R^2 = 0.00$
$\beta_{OLS} = 0.06\ (0.01);\ R^2 = 0.01$

Social Security Income

Full-Time Wage

"Placebo": Electricity cost vs. wage

1970 - 2010: 10-year growth rate (real $)
(relative to national change)

"Placebo": Water vs. Wage

1970 - 2010: 10-year growth rate
(relative to aggregate growth)
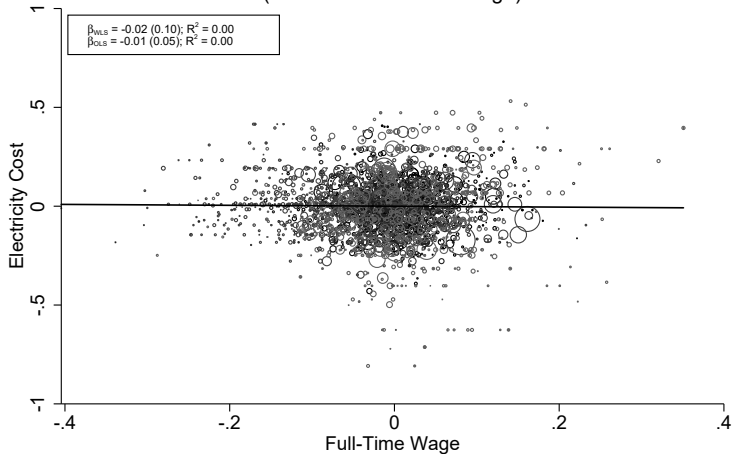
Annual Data Generating Process?

$\rightarrow$ Use annual BLS data for (Y, R) and Shiller's HPI for P

▶ Main findings

1. High correlations (R, P, Y) also at annual frequency
   ▶ $Cov(R, Y)$ similar at all horizons
   ▶ $Cov(P, Y)$ "attenuated" over short horizon, larger over longer horizon
   ▶ $Cov(P, Y)$ also more sensitive to sample period

2. Relation similar in BLS and Census data
   ▶ To compare 10-year changes, we estimate annual VAR(2) and simulate 10-year changes for 500 locations

Rent vs. wage - Annual (BLS)

1980 - 2017: National 1-year growth rate (real $)

$\beta_{OLS} = 0.84$ (0.08); $R^2 = 0.67$
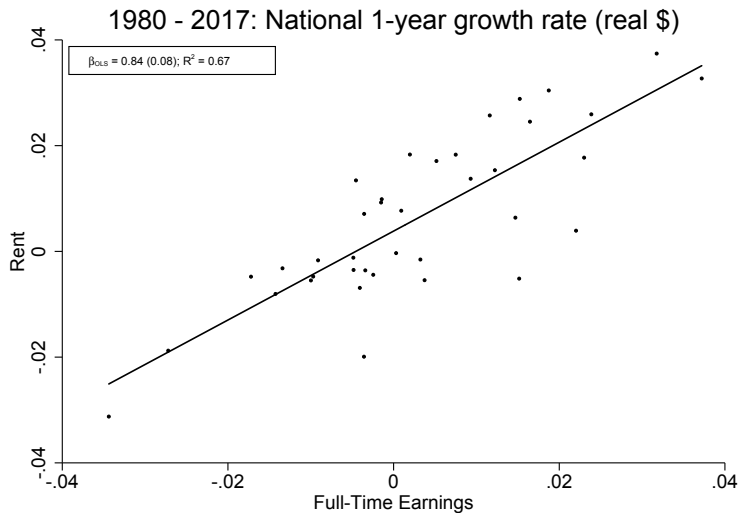
Empirical Findings and Implications: Summary

Findings:

- $Cov(w, R)$, $Cov(w, P) \gg 0$ and $V(P) \gg V(w) \gg V(R)$
- Key role of across-location heterogeneity, 1940–2010 Δs:
  $\Delta w \in [\$15k, \$55k]$, $\Delta R \in [\$2k, \$9k]$, $\Delta P \in [\$50k, \$350k]$

Implications:

- For typical working HH, owning is riskier than believed
  - Rent risk likely reduces total risk: $\beta_{Y \to R}^{ols} > 1/2$
  - House price risk substantial (even CZ medians) and highly corr'd with wages
  - Owning eliminates rent risk hedge, $\uparrow$ exposure to wages

Outline

Quantify welfare effects

How big of a deal is this? What would the WTP of a HH be to switch from lifetime owning to renting?

► We do simple welfare calculation here (dynamic model in appendix yields similar results)

Compensating variation CV = WTP to eliminate all of the risk HH faces (in income as well as in housing costs),

$$v_0 \left(E(Y - H) - CV \right) = E \left[v_0 \left(Y - H \right) \right]$$

► H is housing cost
  ► R for renter
  ► $P_0 - P_T^{pv} + PV$(carrying costs) for owner
► $Y - H$ is non-housing consumption C (i.e., net income)

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Model

Transparent, focus on role of housing cost and wage risk

- ▶ Frictionless model for now (no credit constraints)
- ▶ One-time resolution of uncertainty (in t=1)
- → Only uncertainty *across* locations
  - ▶ No aggregate risk
  - ▶ No idiosyncratic within-location risk
- ▶ Non-parametric, using observed relative growth across CZs from 1940-2010
- ▶ Household either owns or rents for 70 years
- ▶ Utility is CRRA over non-housing consumption

Specification of lifetime PVs

- $T = 70$ year horizon, $r = 3\%$
- Start from same location in $t = 0$
  - Median income household in 2018
  - Obtain home value for median HH
  - Rent using price-rent ratio $= 11$ (Willen et al (2019))
  - Draw 70-year (Y, R, P) from empirical distribution

- Full-time wage from age 25 to 64 (half in retirement)
- Annual carrying costs (in % of home price)
  - maintenance cost: 1.7%
  - property taxes: 2.0%
- Consumption floor at 1st percentile of C distribution

Stochastic processes

Earnings (Distribution)

Rents (Distribution)

House Price (Distribution)
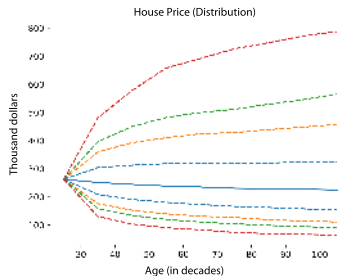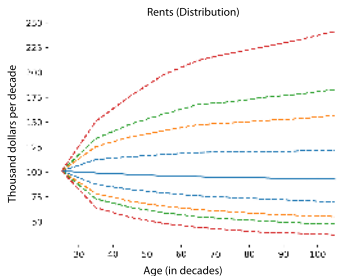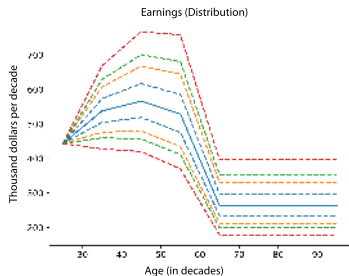
Certainty equivalents in static model

- Ex-post, after prices are revealed, household solves

$$\max v_0 = \sum_{t=1}^{T} (1+r)^{-t} u(C_t)$$

$$\text{s.t. } C \leq Y - H$$

- $C_{rent} = Y - R$
- $C_{own} = Y - P_0 + P_T^{pv} + PV(\text{carrying costs})$

- Certainty equivalent: Willingness to pay at $t = 0$ to eliminate all consumption risk

$$CV = E[C] - E\left[C(\omega)^{1-\sigma}\right]^{1/(1-\sigma)}$$

Quantify welfare effects

Table 4 – WTP to avoid consumption risk (in % of lifetime consuption)

A. Forever stayers	Relative risk aversion (σ)			
	0.5	1	**3**	5
Renting	0.21	0.43	1.34	2.31
Prepaying housing costs (rent or own)	0.44	0.85	2.32	3.54
Owning	0.46	0.89	2.41	3.64
Prepaying - Renting	0.22	0.42	0.99	1.23
Owning - Prepaying	0.02	0.04	0.09	0.10
Owning - Renter	0.25	0.46	**1.07**	1.33

Quantify welfare effects

Table 4 – WTP to avoid consumption risk (in % of lifetime consuption)

	Relative risk aversion (σ)			
A. Forever stayers	0.5	1	**3**	5
Prepaying - Renting	0.22	0.42	0.99	1.23
Owning - Prepaying	0.02	0.04	0.09	0.10
Owning - Renter	0.25	0.46	**1.07**	1.33
B. Moving randomly to new location every 10 years				
Prepaying - Renter	0.05	0.10	0.27	0.42
Owner - Prepaying	0.08	0.16	0.47	0.77
Owner - Renter	0.13	0.26	**0.74**	1.19
C. Moving randomly to new location every 40 years				
Prepaying - Renter	0.18	0.34	0.78	0.96
Owner - Prepaying	0.16	0.31	0.83	1.24
Owner - Renter	0.34	0.65	**1.61**	2.20

Outline

Things We are Working on...

- Heterogeneity across households: Exposure to local wages (relative to housing)
  - Non-workers (e.g., retirees): Ideal housing exposure = 0
  - "Power couples": Ideal = rent + sell rent insurance
  - Extent to which own wage covaries with local wages

- Heterogeneity across locations
  - Housing supply elasticity
    - ↓ elasticity ⇒ ↑ relative risk of owning
  - Labor demand: industry concentration/corr. & volatility
    - ↑ risk ⇒ ↑ ben. to workers of renting, retirees of RM

Policy Implications

- Are people making mistaken own/rent choices?
  - 71% of US HHs believe housing is a "safe" investment
  - Own/rent decisions & intentions strongly correlated with perceptions of house price risk (Adelino et al 2018)

- Such mistakes could greatly increase efficiency costs of:
  - Homeownership subsidies
  - Building restrictions (increase relative risk of owning)

- In the paper, we quantify the:
  - increase in the deadweight loss of housing subsidies (first-order effect!)
  - cost from misperceiving risk (eg. ignoring $Cov(Y, H)$)

Housing as an Asset Class

- Analogous to investing in equity markets
  - Buying equities is a good investment!
  - But households are commonly advised to avoid investing in their employer's stock
  - More likely should short employer and invest in broad range of equity

$\rightarrow$ Real estate may still be a desirable investment!

$\rightarrow$ But likely optimal to hold diverse portfolio or concentrated position in location with uncorrelated/negatively correlated business cycle

Conclusion

▶ Evolution of wages, rents, house prices 1940–2010

    ▶ Housing p's covary strongly with wages over all horizons

    ▶ Important role of location-specific changes

    ▶ Suggests large location-specific labor demand shocks

▶ Key factor for own vs. rent risk: exposure to local wages

    ▶ For many HHs, owning riskier than renting ($\sim$1-2% of C)

    ▶ Major caveat to commonly-cited benefits of owning

    ▶ Exacerbates several policy distortions

    ▶ HHs make potentially sizable mistake by misperceiving correlation

Spatial equilibrium

- In equilibrium, occupied cities must be equally attractive

    - Higher wages $\leftrightarrow$ higher cost-of-living (ceteris paribus)

    - Better amenities $\leftrightarrow$ lower real wage (ceteris paribus)

- Features of spatial equilibrium

    - Especially powerful at life cycle-relevant horizons

    - Does not require perfect mobility, etc.

Roback 1982
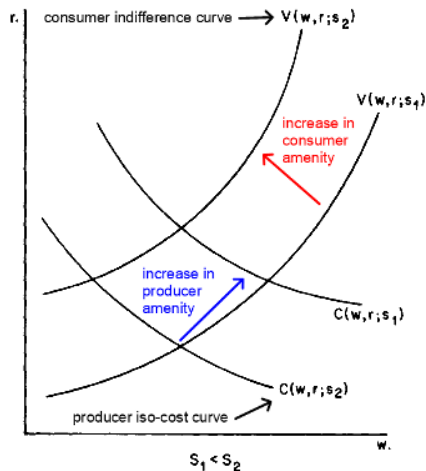
→ Prod. shock: $Cov(w, R) > 0$. ΔAmenity: $Cov(w, R) < 0$
→ Data suggestive of labor demand risk (ie. productivity shocks) $\gg$ amenity risk case

Lifetime PVs within location

Table 3 – Lifetime present values within location

A. Income and Housing Costs	Mean	Median	StDev	CoefVar	Corr(x,Y)
Full-time wage, Y	1,696,919	1,657,647	150,601	8.9%	100.0%
Rent, R	608,429	571,061	137,048	22.5%	74.6%
Capital gain	-200,614	-203,656	14,912	-7.4%	25.2%
Carrying costs: certain / risk-free	249,560	249,560	0	0.0%	0.0%
B. Non-Housing Consumption					
Renting	1,088,489	1,089,045	99,713	9.2%	47.6%
Prepaying housing costs (rent or own)	1,088,489	1,048,905	150,126	13.8%	100.0%
Owning	1,088,489	1,047,926	154,393	14.2%	99.5%

Financial Literacy Seminar Series

The Riskiness of Owning vs. Renting Housing

Scott Baker, Northwestern University

Thursday, November 21, 2019 Duquès Hall 451
Seminar 3:30 - 5:00 PM, Reception 5:00 – 6:00 PM