House Prices and Risk Sharing

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The question

- Home equity is the largest asset for many households.
- The popular press depicts home equity savings as "piggy banks"...(well, used to)
- Then, do consumers, smooth non-housing consumption more (less) when house prices go up (down)? I.e., *collateral effect* of house-price appreciation?
- Empirically: is there a differential effect for home owners and renters? (should be!)
- Is the effect of negative income shocks such as displacement and disability (exogenous!) mitigated (worsened) when house price appreciate (depreciate)?

Finding

Home owners smooth consumption more than renters, and smoothing improves (worsens) when houses appreciate (depreciate).

What we do

- ⋆ Examine the sensitivity of consumption to income by estimating regressions on PSID data.
- ⋆ Simulate a model of home ownership since the tenure choice is endogenous.
- ⋆ Estimate regressions using simulated data to interpret our results and orders of magnitude.
- ⋆ Focus on deviations from countrywide fluctuations or 'risk sharing'.

Very brief literature review

- ★ Large literature on risk sharing: household-level, regional-level, international-level.
- ★ Literature on heterogenous-agent models with housing, Chambers et al., Rios-Rull and Sanchez-Marcos (2008), Diaz and Luengo-Prado, etc.
- ★ Li, Liu and Yao (2008). Structural estimation.
- ★ Lustig and Van Nieuwerburgh; risk sharing with housing at the regional level. (Not micro data.) Implications for asset returns.
- ★ Literature on wealth effects of housing: Attanasio and Weber (1994), Campbell and Cocco (2007), Attanasio et al. (2005), etc. (Most related in terms of empirical approach but focus on *wealth effect*—no agreement).

Regression specification: Risk Sharing

★ Notation:

- ✎ i is an individual, m is a region/MSA.
- ✎ c is nondurable consumption growth, y is income growth, and h is growth of house prices.
- ✎ $\bar{z}_t$ is the period t mean of a generic variable z.

★ Run panel regression:

$$c_{it} - \bar{c}_t = \mu + \alpha \left(y_{it} - \bar{y}_t \right) + \varepsilon_{it},$$

α is a measure of deviation from full risk sharing.
$\alpha = 0$ full risk sharing.
$\alpha = 1$ consumption follows income perfectly.

Risk sharing and house prices

★ We estimate:

$$c_{it} - \bar{c}_t = \mu + \alpha\left(y_{it} - \bar{y}_t\right) + \beta\left(h_{mt} - \bar{h}_t\right) + \gamma\left(y_{it} - \bar{y}_t\right) \times \left(h_{mt} - \bar{h}_t\right) + \varepsilon_{it},$$

- Risk sharing measure: $\alpha + \gamma\left(h_{mt} - \bar{h}_t\right)$.
- $\gamma < 0$: more risk sharing with house price increase.
- We subtract average house prices ($\bar{h}_t$), may be correlated with interest rates, stock prices, etc.

We control for age in simulated data and age and family size when using actual data.

Risk sharing, displacement and house prices

★ We also estimate:

$$c_{it} - \bar{c}_t = \mu + \alpha \left(y_{it} - \bar{y}_t\right) + \beta \left(h_{mt} - \bar{h}_t\right) + \xi \left(D_{it} - \bar{D}_t\right)$$

$$+\zeta \left(D_{it} - \bar{D}_t\right) \times \left(h_{mt} - \bar{h}_t\right) + \varepsilon_{it},$$

- D_{it}: indicator for displacement/disability (exogenous).
- Effect of disability on consumption: $\xi + \zeta \times \left(h_{mt} - \bar{h}_t\right)$.
- $\zeta > 0$: more risk sharing when house prices appreciate.

Risk sharing: Owners vs. Renters

- If we are capturing the effect of collateral, interaction terms should only be significant for owners!
- Estimate equations from owners and renters separately, but $\bar{c}_t$, $\bar{y}_t$ are for the full sample.
- Interpretation: deviation from perfect risk sharing between U.S. residents.
- Renter and owner over the entire period.

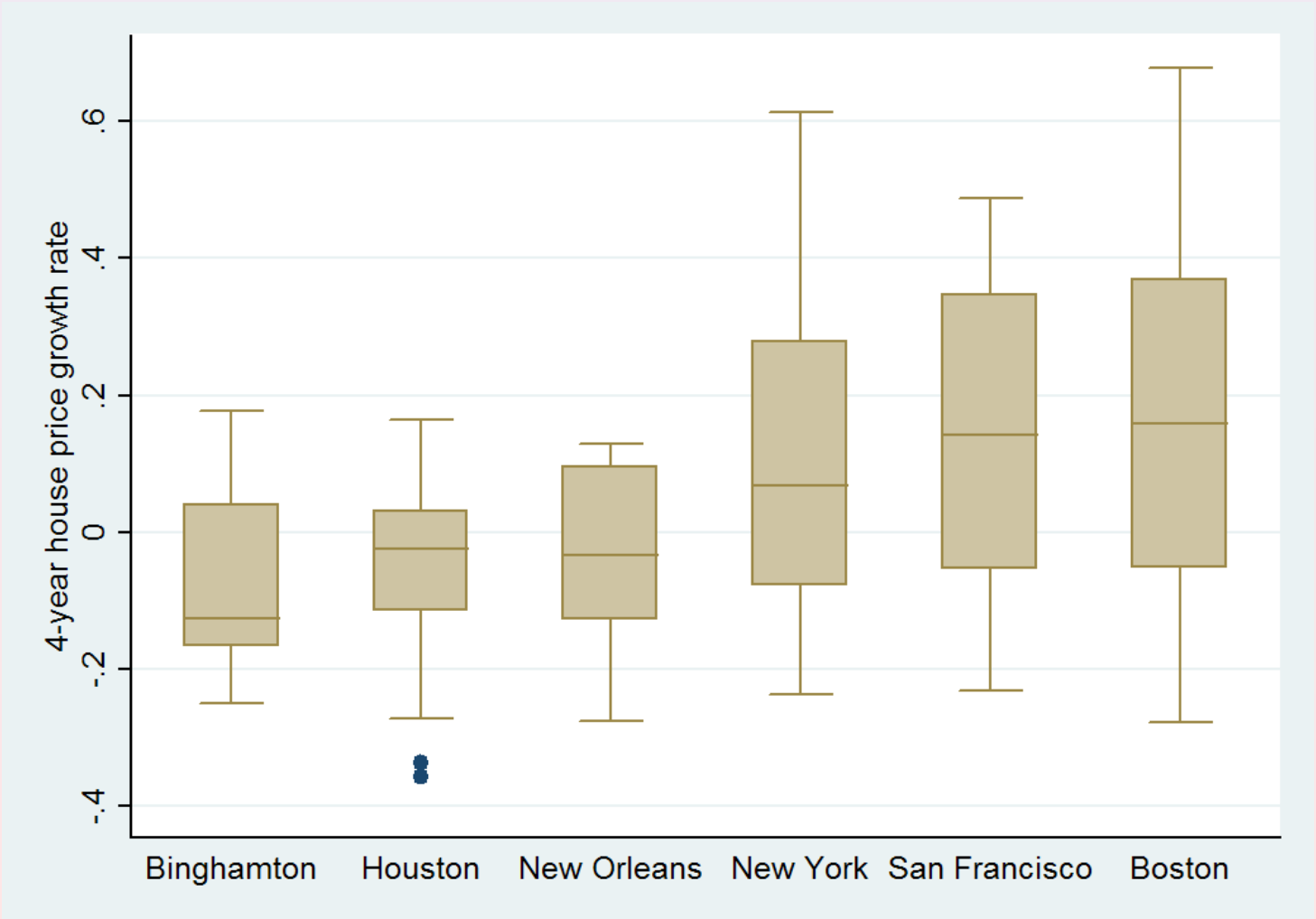
The data

Data are from the PSID (1968-), except house prices for metro areas from the FHFA (1975-): repeat sales of houses with mortgages bought by Fannie Mae or Freddie Mac). Sample 1980-2003.

- Households with heads aged 25–65.
- Stable family composition.
- Food consumption [data break in 1993].
- Displacement: plant relocation/employer died or fired.
- Disability: physical or nervous condition which limits work.
- Income: labor and transfer income of head and wife.
- Regressions over 4-year periods (better signal-to-noise than annual; overlapping growth rates).

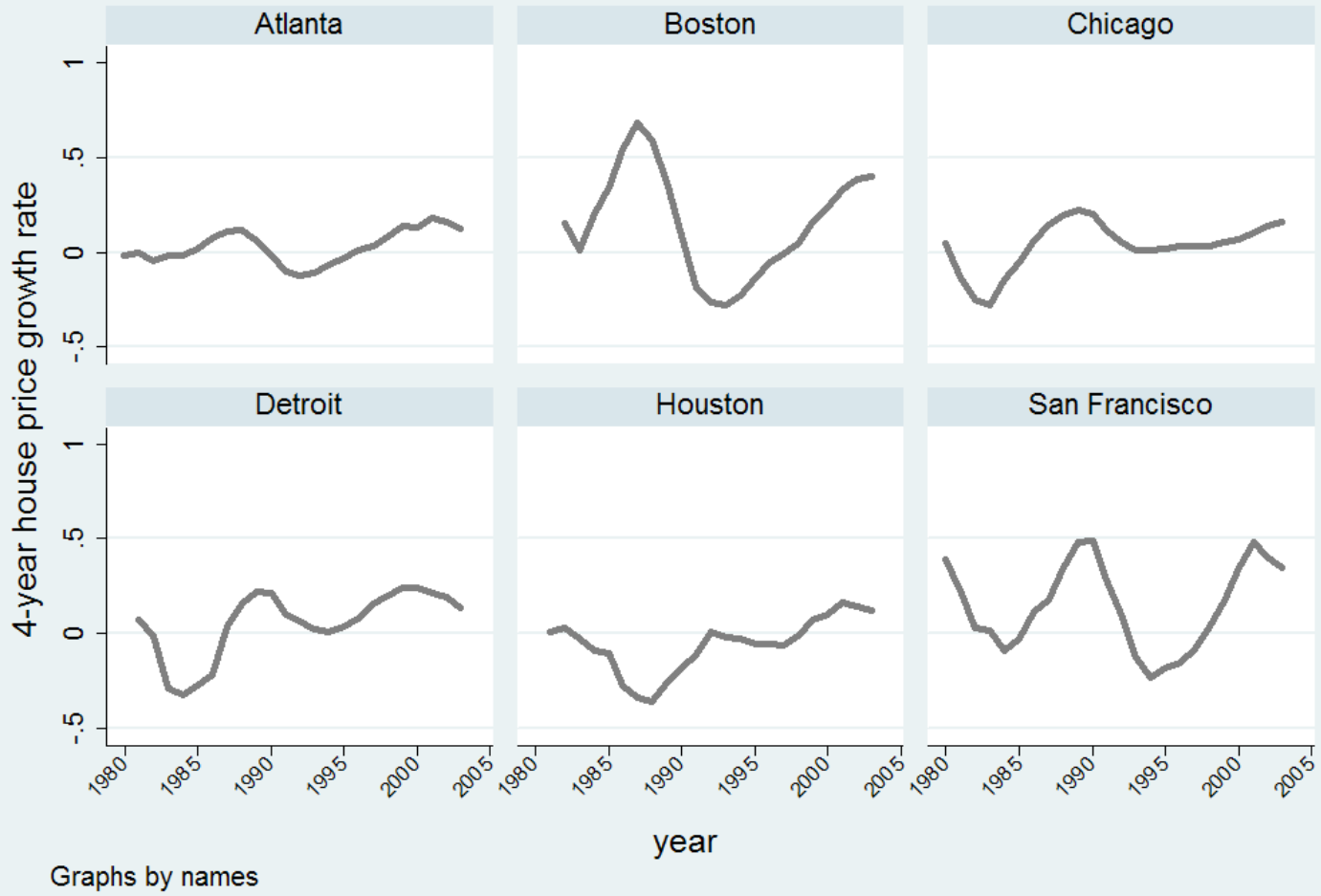
House price appreciation

Figure 1: MSA (real) house-price appreciation. Selected MSAs



House price appreciation

Figure 2: MSA (real) house-price appreciation over time



Estimations for owners and renters. Total Food Consumption

Table 3: Risk Sharing in Data. All shocks

	Owners	Renters
Income G.	0.095***	0.176***
	(10.79)	(11.56)
House price G.	0.113***	0.130***
	(5.28)	(3.06)
Inc. G. x House price G.	–0.153**	–0.098
	(–2.56)	(–0.87)
Adj. R sq.	0.090	0.059
F	177.8	95.9
N	17,277	7,487

Notes: Controls include age, age sq. and family size growth. Prais-Wisten regressions; robust standard errors clustering by MSA.

Estimations for owners and renters. Total Food Consumption

Table 3: Risk Sharing-Data–Negative Shocks

	Owner			Renter		
Income G.	0.095***	0.094***		0.167***	0.174***	
	(9.76)	(10.46)		(10.51)	(11.20)	
House price G.	0.117***	0.115***	0.130***	0.120***	0.125***	0.149***
	(5.27)	(5.36)	(5.80)	(2.93)	(3.01)	(3.49)
Displaced	–0.035***		–0.044***	–0.057***		–0.081***
	(–2.94)		(–3.70)	(–3.23)		(–4.61)
Disp. x House P. G.	0.137*		0.132*	0.076		0.075
	(1.81)		(1.72)	(0.70)		(0.69)
Disabled		–0.029**	–0.034***		–0.043**	–0.055**
		(–2.51)	(–2.97)		(–2.07)	(–2.47)
Disa. x House P. G.		0.246***	0.252***		–0.163	–0.184
		(3.30)	(3.24)		(–1.05)	(–1.11)
Adj. R sq.	0.090	0.090	0.081	0.060	0.059	0.040
N	135.6	177.6	131.1	84.3	84.7	36.9
	16,288	17,273	16,284	7,202	7,487	7,202

Notes: Controls include age, age sq. and family size growth. Prais-Wisten regressions; robust standard errors clustering by MSA.

Robustness

- Non-overlapping growth rates. (Very similar results).
- House price residual. (Income correlated with metro house prices. But results similar.)
- Food at home vs. food away. (Food away very elastic. Home price appreciation "insures" food at home.)
- Imputed total nondurable consumption. (Also similar, except very high "wealth effect" for renters.)
- IV regressions (but instrument for income only...results similar).
- Young vs. old (effect stronger for older homeowners)
- Rich vs. poor in liquid wealth (no effect for renters regardless).

Model

In order to interpret our empirical results we need a model with somewhat realistic features.
We use a framework based on by Díaz and Luengo-Prado (2008).

Salient features:

- Life cycle model with house ownership and rental housing.
- Income shocks and house price appreciation.

Preferences, endowments and demography

Households live for up to T periods. Each period they face an exogenous probability of dying. Expected lifetime utility of a household born in period 1:

$$E\sum_{t=0}^{T}\frac{1}{(1+\rho)^t}\zeta_t u\left(c_t, s_t\right),$$

- c_t: Non housing consumption.
- $s_t = x_t f_t + (1 - x_t)h_t$: Housing services.
- f_t: Housing services purchased in the market.
- h_t: Services yielded by owner occupied housing.
- $x_t = \{0, 1\}$: Households cannot rent and be homeowners at the same time.
- ζ: probability of being alive at t. ρ: discount rate. No bequest motive.

Preferences, endowments and demography

- If age $\leq R$, households are workers and receive idiosyncratic stochastic labor earnings.
- Working-age households are subject to moving shocks.
- At age R, households retire and receive a pension. Retirees are not subject to moving shocks.
- When a household dies, it is replaced by a newborn.
  - wealth is liquidated and passed to the descendant (accidental bequests).

Labor Income

Working-age individuals: Labor earnings:

$$w_t = P_t \nu_t, \quad P_t = P_{t-1} \gamma \epsilon_t \, s_t, \quad s_t = \begin{cases} \lambda < 1, & p, \\ 1 & 1-p. \end{cases}$$

Retirees: $w_t = bP_R$; pension proportional to permanent earnings in last period of working life.

- γ: Non stochastic life cycle component.
- $\log \epsilon \sim N\left(-\frac{\sigma_\epsilon^2}{2}, \sigma_\epsilon^2\right)$, permanent shock.
- $\log \nu \sim N\left(-\frac{\sigma_\nu^2}{2}, \sigma_\nu^2\right)$, transitory shock.
- s_t: displacement shock. p, probability of "displacement."

Market arrangements

At the beginning of period t, a household has:

- $h_{t-1} \geq 0$ in housing stock.
- $d_{t-1} \geq 0$ in deposits, with interest rate r_t^d.
- $m_{t-1} \geq 0$ in mortgage debt ; interest rate is r_t^m.

Market arrangements

Houses serve as collateral for loans

Whenever a household buys a house:

$$m_t \leq (1-\theta)\, q_t\, h_t$$

θ : down payment

q_t : housing price

- Must also be satisfied for home equity loans of existing home owners.
- Existing homeowners who do not move and have negative equity can simply service debt ($m_t < m_{t-1}$).

Market arrangements

Owner occupied housing is an illiquid asset

- When moving household pays a selling cost, $\chi\ q_t(1-\delta^h)h_{t-1}$, and a buying cost $\kappa\ q_t h_t$.
- Maintenance cost equal to the fraction δ^h of the housing stock.

Tax arrangements

Tax-free imputed rents and deductible interest mortgage payments

Income : labor earnings plus interest income.

$$y_t = w_t + r_t^d d_{t-1}.$$

Taxable income : income minus mortgage interest deduction.

$$y_t^\tau = y_t - \tau_m r_t^m m_{t-1}.$$

Proportional income taxation at the rate τ_y.

Calibration

We choose 3 parameters to match 3 targets from the SCF. Other parameters calibrated using various sources.

Housing weight in utility function: $\alpha = 0.2$ to match the the median H/W ratio.

Discount rate: 3.15% is set to match the median ratio W/Y.

Size of smallest house: 1.65 permanent income, set to obtain a 70% ownership rate.

Calibration: Preferences

Utility function:

$$u(c_t, s_t) = \frac{\left[c_t^{\alpha} s_t^{1-\alpha}\right]^{1-\sigma}}{1-\sigma}$$

$$\sigma = 2$$

Calibration: Demography

Households are born at 24, die by 86, retire at 66.

One period is two years.

Survival Probabilities : U.S. Vital Statistics (for females in 2003)

Moving shocks: CPS.

Calibration: Endowments

- Endowments (in annual terms):

  Permanent shock: $\sigma_\epsilon = 0.01$ (Li and Yao 2005)
  Transitory shock: $\sigma_\nu = 0.073$ (Li and Yao 2005)
  Displacement shock: $p = 0.03$, income loss 25%
  Pension: 50% of permanent income in the last period

Calibration: House prices

The housing price follows (Li and Yao 2005)

$$\frac{q_{t+1}}{q_t} - 1 = \varrho, \quad \varrho \sim N\left(0, \sigma_\varrho^2\right)$$

where $\sigma_\varrho = 0.0132$.

Serially uncorrelated and not correlated with households' earnings.

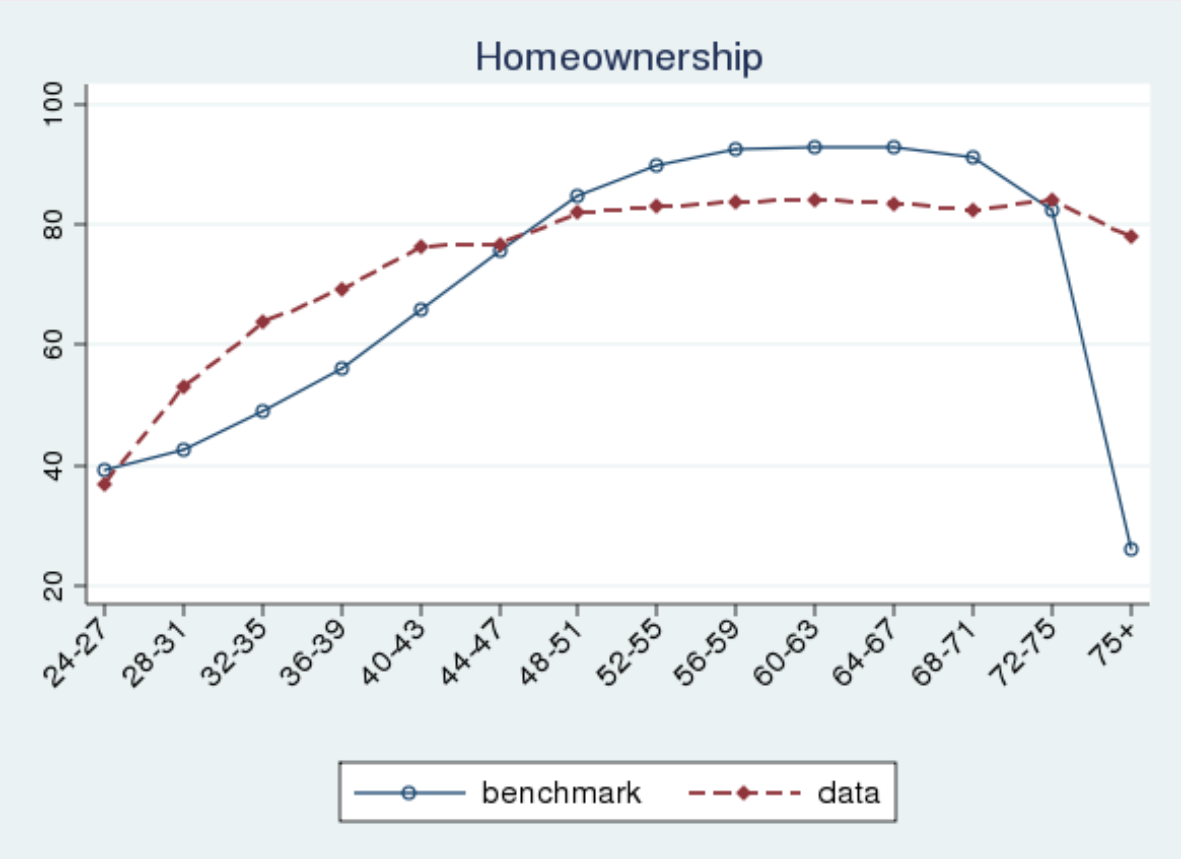
Calibration: Market arrangements

In annual terms

- The return to deposits is $r^d = 4\%$
- The mortgage interest rate is $r^m = r^d + 0.5\%$
- The down payment, $\theta = 20\%$
- The adjustment costs in houses, 6% selling cost, 2% buying cost. The depreciation rate: $\delta^h = 1.5\%$.
- The rental price proportional to house prices: 5.7%

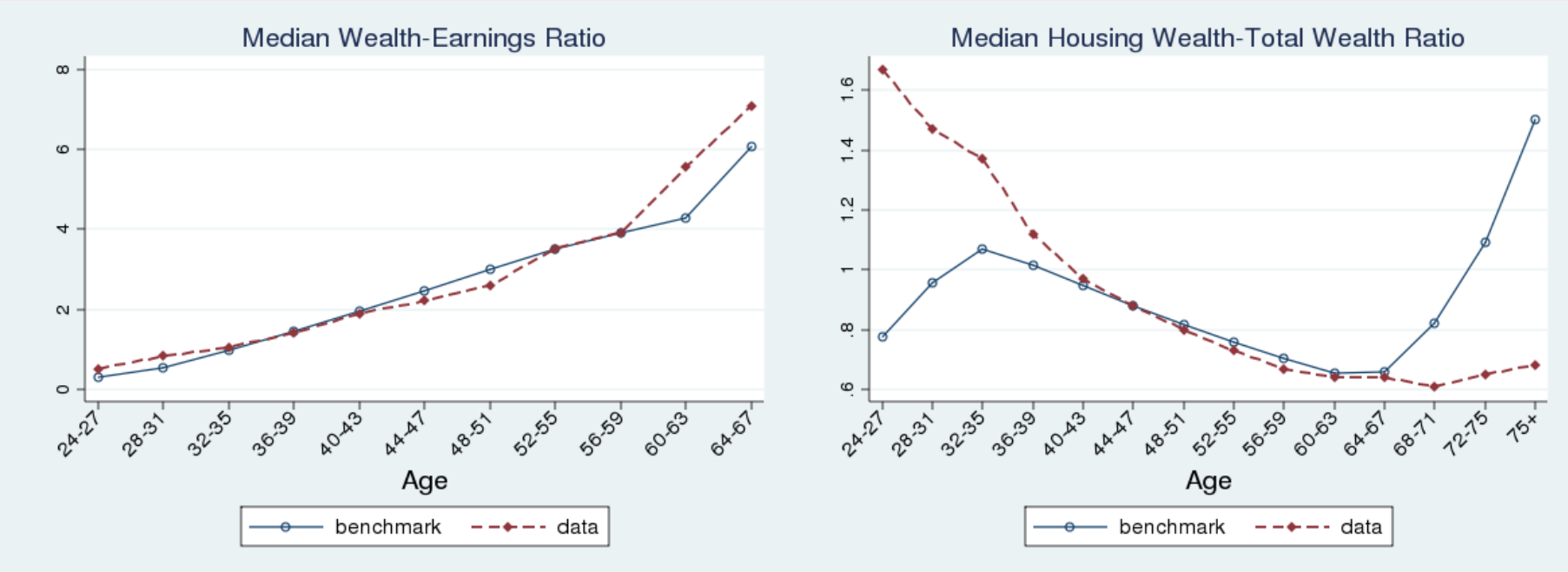
Home Ownership over the Life Cycle

Figure 3: Life-cycle Profiles



Other Ratios

Figure 4: Life-cycle Profiles



Simulations

- Given a set of parameters, we solve the household problem numerically.
- Then, we generate shocks to income, etc., for 27 regions of 5,000 individuals for for several periods.
- Individuals in a given region share the house price shocks. In the last 5 periods of the simulations one third of the regions experiences house price depreciation, one third house price appreciation and one third no house price changes. (4-year overlapping growth rates for those 5 periods are used for estimations on simulated data.)

Regressions on simulated data. Owners vs. Renters (ages 24-65)

Table 4: Risk Sharing in Model. All Shocks

	Owners	Renters
Income Growth	0.13***	0.29****
	(213.07)	(213.95)
House Price Growth	0.22***	0.00
	(132.99)	(0.94)
Income G. x House Price G.	–0.02***	0.01***
	(–13.28)	(2.80)
Adj. R sq.	0.301	0.436
N	176,246	69,329

Overlapping 4-year log differences. Prais-Wisten estimation, robust s.e. clustering by region. Age and age sq. controls.

Regressions on simulated data. Owners vs. Renters (ages 24-65)

Table 3: Risk Sharing in Model. Negative Shocks

	Owners	Renters
Income Growth	0.12***	0.28***
	(102.04)	(175.62)
House Price Growth	0.22***	0.00
	(135.15)	(1.44)
Displaced	–0.16***	–0.20***
	(–93.34)	(–51.52)
Displaced x House Price G.	0.04***	0.01
	(8.51)	(0.99)
Adj. R sq.	0.301	0.459
N	176,246	69,329

Overlapping 4-year log differences. Prais-Wisten estimation, robust s.e. clustering by region. Age and age sq. controls.

Model and Data

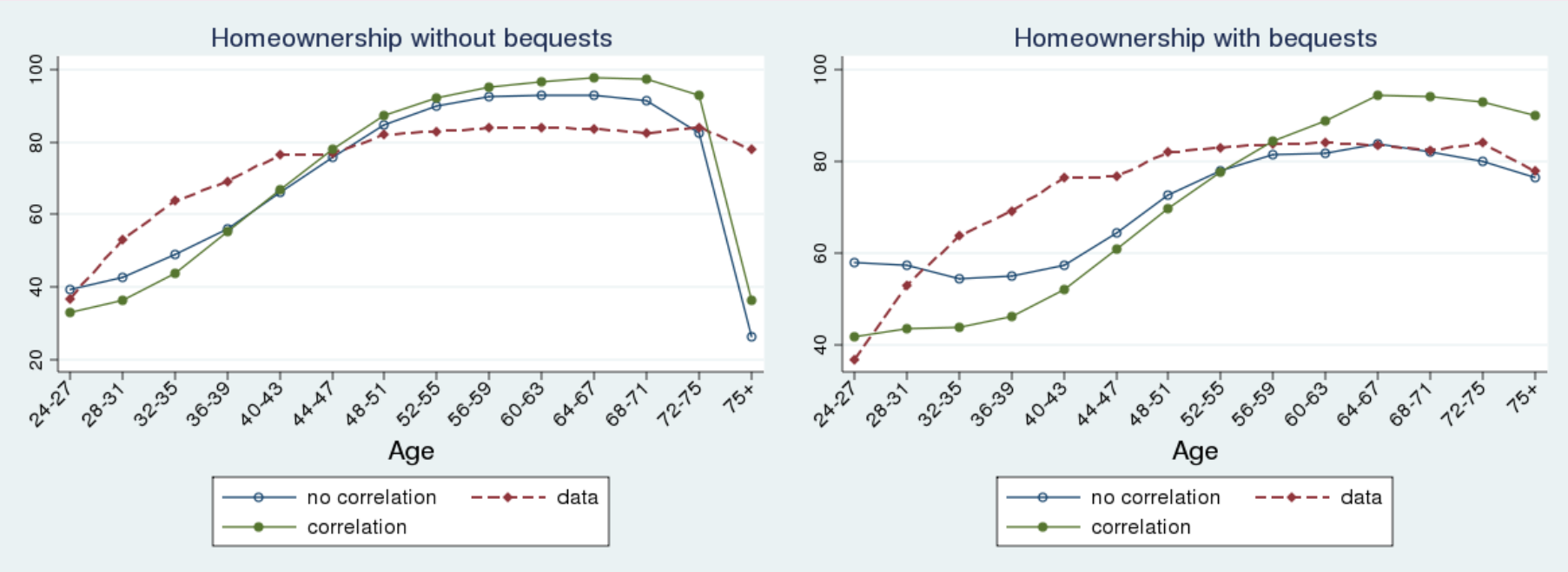
- Higher MPCs in the model (measurement error, other assets, family networks, bequests, etc.)
- No wealth effect for renters in model (income and house-price correlation)
- Wealth effect for owners larger in model (costly home equity extraction)
- Direct effect of disability stronger in model (add some transitory shocks)
- Interaction term coefficients much lower in model.

Model Extentions

- Correlation between income shocks and house price shocks (adding a regional permanent shock perfectly correlated with house price shock).
- A bequest motive.
- CES utility.
- Recalibration. Home ownership rate, median wealth to income and house value to wealth ratios constant.

Model Extensions. Home ownership

Figure 5: Life-cycle Profiles



Regressions on simulated data. Robustness. Owners

Table 5: Risk Sharing in Model: Owners

	Accidental Bequests		Bequest Motive	
	No co.	Co.	No Co.	Co.
Income Growth	0.12***	0.12***	0.12***	0.12***
	(195.58)	(283.39)	(175.42)	(196.57)
House Price Growth	0.22***	0.33***	0.24***	0.34***
	(136.08)	(201.60)	(153.65)	(204.75)
Income G. × House Price G.	–0.02***	0.00	–0.02***	0.00
	(–11.50)	(0.68)	(–11.64)	(0.80)
Displaced	–0.16***	–0.16***	–0.15***	–0.15***
	(–104.09)	(–122.21)	(–110.94)	(–91.59)
Displaced × House Price G.	0.03***	0.03***	0.03***	0.02***
	(7.04)	(5.75)	(6.37)	(4.19)
Adj. R sq.	0.348	0.443	0.364	0.460
N	176,246	177,508	164,513	154,230

Regressions on simulated data. Robustness. Renters

Table 6: Risk Sharing in Model: Renters

	Accidental Bequests		Bequest Motive	
	No co.	Co.	No Co.	Co.
Income Growth	0.28***	0.31***	0.19***	0.19***
	(195.78)	(213.17)	(136.12)	(138.85)
House Price Growth	0.00	0.13***	–0.00	0.15***
	(0.86)	(41.43)	(–0.40)	(57.54)
Income G. × House Price G.	0.01***	0.00	–0.00	0.01
	(2.80)	(0.38)	(–1.01)	(1.38)
Displaced	–0.20***	–0.18***	–0.20***	–0.20***
	(–51.65)	(–51.69)	(–83.68)	(–62.68)
Displaced × House Price G.	0.02	0.03**	0.01	0.02*
	(1.28)	(2.25)	(0.86)	(1.77)
Adj. R sq.	0.459	0.512	0.324	0.365
N	69,329	70,388	78,310	90,986

Conclusions

- Home owners are better able to share income risks than renters, particularly in periods of house price appreciation.
- Our interpretation: improved collateral.
- However, the consumption drop for homeowners who loose their job and home equity can be substantial.

Estimations for owners and renters. Rich vs. Poor

Table A-4: Risk Sharing Regressions. Wealth-rich vs. Wealth-poor

	Rich				Poor			
	Owner		Renter		Owner		Renter	
Income G.	0.092***	0.090***	0.111***	0.122***	0.135***	0.135***	0.232***	0.235***
	(7.91)	(8.08)	(3.13)	(3.74)	(4.49)	(4.84)	(9.39)	(10.19)
House price G.	0.112***	0.112***	–0.111*	–0.099	0.090	0.091	0.109	0.107
	(3.93)	(3.94)	(–1.84)	(–1.57)	(1.38)	(1.41)	(1.51)	(1.47)
Displaced	–0.051***		–0.063*		–0.001		–0.065**	
	(–4.23)		(–1.91)		(–0.02)		(–2.30)	
Displaced x House price G.	0.187*		0.007		–0.135		0.090	
	(1.69)		(0.04)		(–0.69)		(0.55)	
Disabled		–0.032**		–0.007		–0.018		–0.066*
		(–2.07)		(–0.10)		(–0.65)		(–1.83)
Disability x House price G.		0.101		–0.283		0.446**		–0.163
		(1.08)		(–0.53)		(2.24)		(–0.74)
Adj. R sq.	0.100	0.098	0.087	0.081	0.067	0.074	0.065	0.065
F	124.0	141.7	13.0	8.6	29.5	39.8	75.6	54.5
N	8,578	9,027	1,053	1,083	2,328	2,443	3,479	3,561

Notes: "rich" if liquid wealth (total net worth excluding housing equity and business wealth) in 1984 is above the 60th percentile of the wealth distribution in 1984. t-statistics in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Estimations for owners and renters. Food at home

Table 10: Risk Sharing-Data

	Owner		Renter	
	(1)	(4)	(5)	(8)
Income G.	0.070***		0.150***	
	(6.75)		(9.17)	
House price G.	0.123***	0.135***	0.153***	0.162***
	(5.31)	(5.48)	(3.57)	(3.59)
Inc. G. x H. price G.	–0.100		–0.118	
	(–1.52)		(–0.92)	
Displaced		–0.042***		–0.049***
		(–3.63)		(–2.82)
Disp. x H. price G.		0.154*		0.160
		(1.73)		(1.22)
Disabled		–0.027**		–0.035
		(–2.18)		(–1.34)
Disa. x H. price G.		0.289***		–0.310
		(3.28)		(–1.57)
Adj. R sq.	0.104	0.102	0.056	0.044
N	17,260	16,271	7,505	7,218

Estimations for owners and renters. Food away from home

Table 11: Risk Sharing-Data

	Owner		Renter	
	(1)	(4)	(5)	(8)
Income G.	0.178***		0.245***	
	(8.77)		(9.74)	
House price G.	–0.003	0.021	0.056	0.106
	(–0.06)	(0.38)	(0.58)	(1.11)
Inc. G. x H. price G.	–0.104		0.023	
	(–0.75)		(0.09)	
Displaced		–0.109***		–0.128***
		(–4.18)		(–4.37)
Disp. x H. price G.		–0.133		–0.203
		(–0.86)		(–0.82)
Disabled		–0.073***		–0.075
		(–2.69)		(–1.57)
Disa. x H. price G.		0.287		0.258
		(1.63)		(0.70)
Adj. R sq.	0.011	0.004	0.020	0.005
N	14,690	13,826	5,130	4,900

Estimations for owners and renters. Total Imputed Nondurable

Table A-3: Risk Sharing-Data

	Owner		Renter	
	(1)	(4)	(5)	(8)
Income G.	0.115***		0.204***	
	(9.04)		(11.13)	
House price G.	0.075**	0.090***	0.199***	0.227***
	(2.39)	(2.64)	(2.79)	(3.21)
Inc. G. x H. price G.	–0.214**		–0.067	
	(–2.27)		(–0.42)	
Displaced		–0.033*		–0.098***
		(–1.80)		(–3.73)
Disp. x H. price G.		0.101		0.135
		(0.78)		(0.69)
Disabled		–0.064***		–0.055*
		(–3.12)		(–1.89)
Disa. x H. price G.		0.317***		–0.170
		(2.73)		(–0.67)
Adj. R sq.	0.050	0.039	0.046	0.023
N	11,846	10,983	4,345	4,102

Estimations for owners and renters. Total Food Consumption

Table 5: Risk Sharing-Data–No overlapping growth rates

	Owner		Renter	
Income G.	0.088***		0.172***	
	(7.48)		(8.09)	
House price G.	0.108***	0.134***	0.121	0.147
	(2.91)	(3.61)	(1.12)	(1.37)
Inc. G. x House price G.	–0.259***		–0.056	
	(–2.70)		(–0.32)	
Displaced		–0.069***		–0.077***
		(–3.98)		(–2.62)
Displaced x House price G.		0.287**		–0.083
		(2.40)		(–0.42)
Disabled		–0.058***		–0.077**
		(–2.69)		(–2.15)
Disability x House price G.		0.315*		0.277
		(1.88)		(0.98)
Adj. R sq.	0.103	0.098	0.076	0.055
N	6,143	6,142	2,495	2,495

Notes: Controls include age, age sq. and family size growth. Robust standard errors clustering by MSA, 1980, 1984, 1990, 1994, 1999, 2003.

Estimations for owners and renters. Total Food Consumption

Table 6: Risk Sharing-Data–House Price Residuals

	Owner		Renter	
Income G.	0.096***		0.177***	
	(10.67)		(11.57)	
House price G.	0.101***	0.114***	0.100**	0.115***
	(4.54)	(4.88)	(2.41)	(2.67)
Inc. G. x House price G.	–0.131**		–0.104	
	(–2.26)		(–0.92)	
Displaced		–0.046***		–0.082***
		(–3.77)		(–4.69)
Displaced x House price G.		0.134*		0.063
		(1.65)		(0.47)
Disabled		–0.034***		–0.055**
		(–3.00)		(–2.45)
Disability x House price G.		0.261***		–0.162
		(3.05)		(–0.91)
Adj. R sq.	0.089	0.080	0.058	0.039
N	17,277	16,284	7,487	7,202

Notes: Controls include age, age sq. and family size growth. Prais-Wisten regressions; robust standard errors clustering by MSA.

IV-estimation

- Income may be endogenous to desired consumption.
- For IV: Instrument income of household i with $\frac{1}{N}\Sigma_{j \neq i} y_{it}$ where summation is over households in same education group/cohort and year, excluding i and MSA income growth.
- Instrument correlated with persistent component of income.

IV-estimation. First Stage

Table 7: First Stage Regression

	Owners	Renters
Income G. (coh/edu./year group)	0.222***	0.258***
	(4.66)	(2.95)
MSA Income G.	0.551***	0.575***
	(7.07)	(4.13)
F (instruments)	35.71	12.95
N	16,284	7,202

IV-estimation. Owners vs. Renters. Total Food Consumption

Table 8: Risk Sharing-Data. Negative Shocks

	Owner		Renter	
Income G.	0.469***	0.457***	0.563**	0.628*
	(3.27)	(3.01)	(2.29)	(1.92)
House price G.	0.056*	0.071**	0.031	0.043
	(1.79)	(2.22)	(0.61)	(0.73)
Displaced	0.008	0.006	0.002	0.008
	(0.36)	(0.29)	(0.05)	(0.16)
Displaced x House price G.	0.121	0.122	0.068	0.067
	(1.47)	(1.44)	(0.45)	(0.42)
Disable	0.012	0.012	–0.008	–0.001
	(0.68)	(0.62)	(–0.23)	(–0.01)
Disable x House price G.	0.194**	0.202**	–0.145	–0.122
	(1.99)	(2.05)	(–0.91)	(–0.78)
State effects Year effects N	16,284	16,281	7,202	7,200

Estimations for owners and renters. Young vs. Old

Table 9: Risk Sharing Regressions. Young vs. Old

	Young				Old			
	Owner		Renter		Owner		Renter	
Income G.	0.134***	0.126***	0.175***	0.183***	0.092***	0.092***	0.173***	0.181***
	(6.38)	(6.26)	(8.88)	(9.36)	(7.60)	(7.69)	(6.29)	(6.61)
House price G.	0.099**	0.098**	0.120**	0.114*	0.126***	0.117***	0.078	0.060
	(2.29)	(2.33)	(2.06)	(1.95)	(3.31)	(3.03)	(0.73)	(0.59)
Displaced	–0.011		–0.042*		–0.059***		–0.155***	
	(–0.53)		(–1.81)		(–3.58)		(–3.78)	
Displaced x House price G.	–0.035		–0.065		0.252		0.286	
	(–0.31)		(–0.46)		(1.61)		(0.92)	
Disabled		–0.040		–0.001		–0.038**		–0.075**
		(–1.38)		(–0.03)		(–2.37)		(–2.41)
Disability x House price G.		0.123		–0.527*		0.272***		–0.147
		(0.57)		(–1.74)		(2.71)		(–0.65)
Adj. R sq.	0.050	0.047	0.045	0.045	0.073	0.074	0.063	0.060
F	59.4	62.7	44.2	48.8	73.6	94.1	26.4	23.5
N	5,142	5,408	3,883	4,027	5,739	6,039	1,689	1,729

Notes: Young is up to 40 years old; old is above 50. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Regressions on Simulated Data. Young vs. Old

Table 16: Risk Sharing Regressions in the Model. Young vs. Old

	Young				Old			
	Owner		Renter		Owner		Renter	
Income Growth	0.13***	0.13***	0.37***	0.36***	0.12***	0.12***	0.13***	0.12***
	(120.59)	(90.35)	(230.48)	(182.56)	(163.91)	(86.30)	(24.61)	(22.42)
House Price Growth	0.18***	0.18***	0.00	0.01	0.24***	0.25***	0.01	0.01
	(73.12)	(78.17)	(0.67)	(1.66)	(95.89)	(94.66)	(1.68)	(1.22)
Income G. × House Price G.	–0.02***		0.02***		–0.02***		–0.03	
	(–5.95)		(3.22)		(–7.57)		(–1.65)	
Displaced		–0.18***		–0.16***		–0.14***		–0.25***
		(–55.76)		(–34.57)		(–58.69)		(–26.03)
Displaced × House Price G.		0.03**		0.02		0.05***		–0.04
		(2.26)		(1.37)		(6.51)		(–0.94)
Adj. R sq.	0.265	0.318	0.532	0.546	0.334	0.373	0.126	0.176
F	5179.7	5358.3	21189.5	12398.6	6542.7	7550.6	147.7	310.8
N	36,680	36,680	43,287	43,287	86,489	86,489	6,309	6,309

Notes: Young is 24-40, old is 50-65. Prais-Winsten regressions. Robust standard errors in the regressions clustered by region. t-statistics in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.