

Renting vs owning: The role of (income) risk

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Introduction

Why might renting (not) be preferred to home-ownership?

- ▶ supply constraints
- ▶ consumption motives
- ▶ tax treatment
- ▶ different risks associated with either tenure mode

Asset price risk vs rent risk

Owner-occupied house is single most important asset for average household:

- ▶ owners are exposed to asset price risk at resale
- ▶ however, resale risk might be small in present value . . .
- ▶ delivers guaranteed stream of housing for known up-front price

Rents account for large share of average household's consumption:

- ▶ renters are exposed to fluctuating rents
- ▶ rent risk is more important if expected horizon is long

Risky labor income and tenure mode choice

Earned income constitutes uninsurable (non-tradable) background risk:

- ▶ therefore, household's period per period consumption is uncertain

Income shocks may have different effects on non-housing consumption for renters and owners:

- ▶ positive correlation between rents and income allows renters to smooth consumption
- ▶ fixed housing expenditures for owners don't provide a hedge against income risk

Portfolio choice and housing

- ▶ Berkovec and Fullerton (1992) A general equilibrium model of housing, taxes, and portfolio choice, *Journal of Political Economy*, 390–429.
- ▶ Flavin and Yamashita (2002) Owner-occupied housing and the composition of the household portfolio, *American Economic Review* 92, 345–362.
- ▶ Davidoff (2003) Labor income, housing prices and homeownership, *Fisher Center for Real Estate and Urban Economics, Working Papers* No 289.
- ▶ Campbell and Cocco (2003) Household risk management and optimal mortgage choice, *Quarterly Journal of Economics*, 1449–1494.

Tenure (mode) choice under uncertainty

- ▶ Ortalo-Magné and Rady (2002) Tenure choice and the riskiness of non-housing consumption, *Journal of Housing Economics* 11, 266–279.
- ▶ Sinai and Souleles (2005) Owner-occupied housing as a hedge against rent risk, *Quarterly Journal of Economics* 120, 763–789.

Theory

▶ Households

- risk averse and heterogenous with respect to their income risk
- decision in $t = 0$ whether to rent or own until T
- homogenous dwellings
- additive and time-separable utility function

▶ Landlords

- risk neutral and competitive

Household's utility

Expected utility in period $t = 0$ is approximately:

$$U = \mathcal{E}_0 \left[\sum_{t=0}^T \beta^t U(C_t) \right]$$
$$\approx U(C_0) + \sum_{t=1}^T \beta^t \{ U(\mathcal{E}_0[C_t]) + 0.5U''(\mathcal{E}_0[C_t])\sigma_{C,t}^2 \}$$

C_t consumption in period t

$\sigma_{C,t}^2 = \mathcal{V}_0[C_t]$ consumption variance

$0 < \beta < 1$ discount factor

Tenure mode and consumption

- ▶ Renter's non-housing consumption

$$C_t = Y_t - D_t \quad \text{for } t \in \{1, \dots, T\}$$

Y_t and D_t denote income and rent

- ▶ Owner's non-housing consumption

$$C_t = Y_t - iM \quad \text{for } t \in \{1, \dots, T - 1\}$$

$$C_T = Y_T - (1 + i)M + P_T$$

M and i loan value and interest rate

P_T house price in T

Household's tenure mode decision

If $Y_t = Y + \varepsilon_t$, where $Y = \mathcal{E}_0[Y_t]$ and ε_t is white noise and

if $D_t = D + \phi(D_{t-1} - D) + \nu_t$, where $|\phi| < 1$ and ν_t is white noise

$$U_{own} - U_{rent} \approx -0.5U''(Y - D) \times \left\{ \sum_{t=1}^T \beta^t (\sigma_{D,t}^2 - 2\sigma_{YD}) - \beta^T (\sigma_{P,T}^2 + 2\sigma_{YP,T}) \right\}$$

$\sigma_{D,t}^2$ rent variance = rent risk

$\sigma_{P,T}^2$ price variance = asset price risk

σ_{YD} covariance between income and rents

$\sigma_{YP,T}$ covariance between income and house price

Implications

$$U_{own} - U_{rent} \approx -0.5U''(Y - D) \times \left\{ \sum_{t=1}^T \beta^t (\sigma_{D,t}^2 - 2\sigma_{YD}) - \beta^T (\sigma_{P,T}^2 + 2\sigma_{YP,T}) \right\}$$

According to our model, owning is the better

- ▶ the higher the rent risk σ_D^2
- ▶ the lower the covariance between rents and income σ_{YD}
- ▶ the longer the horizon T
- ▶ the lower the asset price risk $\sigma_{P,T}^2$
- ▶ the lower the covariance between prices and income $\sigma_{YP,T}$

Data

Main data source: German Socio-Economic Panel (GSOEP)
which has rich longitudinal information on

- ▶ households' housing cost, housing consumption and tenure (mode)
- ▶ household members' income and employment histories
- ▶ household composition and characteristics

We augment the GSOEP by aggregate data on regional income fluctuations.

Empirical approach

Probit analysis of household's **tenure mode** in GSOEP's 2004 wave

$$P(OWN_i) = \Phi(\beta_0 + \beta_1 \sigma_{D,k} + \beta_2 N_i + \beta_3 \sigma_{YD,k} + \theta \mathbf{X}_i + \Psi \mathbf{Z}_k + \varepsilon_{i,k})$$

- $\sigma_{D,k}$ regional **rent volatility**
from hedonic rent regression using 1996-2003 GSOEP
- $\sigma_{YD,k}$ regional **covariance between rents and income**
correlation between regional rent series and VGR labor income series
- N_i expected **horizon**
 $\hat{P}(STAY_{03,04} | AGE, OCCUP, FAMILY)$
 $\hat{E}(T - t | T > t) = 1/\hat{S}(t) \int_t^\infty \hat{S}(u) du$
- \mathbf{Z}_k regional controls (rent level in 2003, rent growth rate)
- \mathbf{X}_i household controls (age, income, educ., occup., family)

Empirical results

Dependent variable is one if household is homeowner

Variable	Marg. Effect	S. E.	Z-Value
<i>risk variables</i>			
$\sigma_{D,k}$	0.0194	0.0020	9.40
$\sigma_{YD,k}$	-0.0505	0.0156	-3.23
$P(Stays)$	0.6152	0.1679	3.67
<i>regional controls</i>			
log rent level in 2003	-0.2247	0.0473	-4.74
rent growth 1996-2003	-0.3810	0.0670	-5.69
<i>household controls</i>			
hh income	0.0001	0.00001	9.13
age (7 groups, +), education (6 groups, +), occupation (9 groups, \pm)			
family status (5 groups, \pm), hh size (5 groups, +), hh head atypical (3 vars, -)			
<i>Number of obs.</i> = 9664, <i>Pseudo R</i> ² = 0.2015			
Huber/White/sandwich estimator is used to estimate robust s.e.			

Conclusions

Using 2004 GSOEP we find evidence that –controlling for regional and household characteristics– that risk variables help to explain households' observed tenure modes.

In particular, probability of being an owner

- ▶ increases with rent risk σ_D^2
- ▶ increases with horizon T (if we use $\hat{P}(STAY_{03,04})$)
- ▶ decreases with the correlation between rents and income ρ_{YD}

Next Steps

Improve measurement of risk variables and alignment of theory (exogenous horizon, mode choice at $t = 0$) and empirical model.

In particular,

- ▶ improve measurement of **income risk** (detailed occupation/skill categories, incorporate conditional risk of unemployment)
- ▶ “personalize” correlation between rent and income fluctuations
- ▶ incorporate **asset price risk**
- ▶ resolve measurement of expected **horizon**
- ▶ improve **Rent index**

$$U \approx U(C_0) + \sum_{t=1}^T \beta^t \{U(\mathcal{E}_0[C_t]) + 0.5U''(\mathcal{E}_0[C_t])\sigma_{C,t}^2\}$$

Owner	Renter
$C_t = Y_t - iM$	$C_t = Y_t - D_t$
$C_T = Y_T - (1 + i)M + P_T$	
$\mathcal{E}_0[C_t] = Y_t - iM = Y - D$	$\mathcal{E}_0[C_t] = Y - D$
$\mathcal{E}_0[C_T] = Y - M - D + M = Y - D$	
$\mathcal{V}_0[C_t] = \sigma_Y$	$\mathcal{V}_0[C_t] = \sigma_Y + \sigma_{D,T}^2 - 2\sigma_{YD,T}$
$\mathcal{V}_0[C_T] = \sigma_Y + \sigma_{P,T}^2 + 2\sigma_{YP,T}$	

$$\Rightarrow U_{own} - U_{rent} \approx -0.5U''(Y - D) \times \left\{ \sum_{t=1}^T \beta^t (\sigma_{D,t}^2 - 2\sigma_{YD}) - \beta^T (\sigma_{P,T}^2 + 2\sigma_{YP,T}) \right\}$$

Using $Y_t = Y + \varepsilon_t$, with $\varepsilon_t \stackrel{iid}{\sim} (0, \sigma_\varepsilon^2)$

and $D_t = D + \phi(D_{t-1} - D) + \nu_t = D + \sum_{k=0}^{t-1} \phi^k \nu_{t-k}$, with $\nu_t \stackrel{iid}{\sim} (0, \sigma_\nu^2)$

$$\mathcal{E}_0[D_t] = D$$

$$\mathcal{V}_0[D_t] = \sigma_{D,t}^2 = \frac{1 - \phi^{2t}}{1 - \phi^2} \sigma_\nu^2$$

$$\mathcal{E}_T[D_{T+j}] = D + \sum_{k=0}^{T-1} \phi^{(j+k)} \nu_{T-k}$$

$$\mathcal{E}_0[P_T] = M$$

$$\mathcal{V}_0[P_T] = \sigma_{P,T}^2 = \left(\frac{\phi}{1 + i - \phi} \right)^2 \frac{1 - \phi^{2T}}{1 - \phi^2} \sigma_\nu^2 = \left(\frac{\phi}{1 + i - \phi} \right)^2 \sigma_{D,T}^2$$

$$\sigma_{YP,T} = \frac{\phi}{1 + i - \phi} \sigma_{\varepsilon\nu}$$

$$\sigma_{YD} = \sigma_{\varepsilon\nu}$$

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