

Appendix I: Calculating the user cost of owner-occupied housing

The model is similar to Poterba's (2008). The model calculates the user cost of owner-occupied housing:

$$c=r+\beta+m+\tau_{prop}-\pi_e$$

where the pre-tax cost of funds is simply the risk-free interest rate plus a risk premium as well as house-specific risk which includes maintenance costs, property taxes net of expected home appreciation.

Adding income tax rates, the model becomes:

$$c=[1-\tau_y(1-\lambda)]r+(1-\tau_y)\beta+m+\tau_{prop}-\pi_e$$

The cost of funds is the opportunity cost of investing in housing + , the cost of maintenance , property tax rates , net the expected home value appreciation .

c = user cost of homeownership

τ_y = effective income tax rate

λ = loan to value ratio

r = risk-free interest rate measured using the 10-year treasury bond rate

β = pre-tax risk premium 2%

m = maintenance cost of homeownership as a proportion of home value

τ_{PROP} = property tax rate

π_e = expected home value appreciation rate

We consider two time periods for our analysis – the pre-housing bubble period and the post-recession period. The pre-housing bubble period covers the years 2002, 2003 and 2004. The post-recession period includes the years 2013, 2014 and 2015.

Appendix II: Data

The loan-to-home-value ratios (λ) come from the Federal Housing Finance Agency. These data are provided quarterly for each year since 1999. The data are collected for the 2002-2004 period (pre-housing bubble) and the 2013-2015 period (post-recession).

The U.S. Census Bureau – American Community Survey (ACS) and Current Population Survey (CPS) report effective income tax rate before credits (τ_y), property tax rate (τ_{PROP}) and maintenance costs of homeownership (m). The sample is restricted to those individuals who are classified as heads of household. Only households with at least one mortgage payment over the course of the year and positive adjusted gross income are included. Property taxes are computed as the average of the property tax range provided in the ACS data. The data are truncated to omit outliers.

The risk-free interest rate (r) is computed as the annualized geometric average of daily 10-year treasury constant maturity rate as provided by the Economic Research Division of Federal Bank of St. Louis. Finally, the expected long-run home price appreciation rate is the long-run average of the all-transactions house price index from 1975-1999, omitting inflated housing prices caused by the housing bubble.

Variable names and sources

Variable	Values	Source
τ_y	[Federal tax before credits (FEDTAX) + State tax before credits (STATETAX)]/adjusted gross income (ADJGINC)	CPS
λ	The ratio is calculated by the agency and is provided as a percentage of loan value to home value	Federal Housing Finance Agency (FHFA) - Freddie Mac data
r	10 year treasury bond yield to maturity rate is provided at a monthly frequency. This has been annualized using geometric mean for the 12 months in a given year.	Federal Bank of St. Louis
β	Pre-tax risk premium - 2%	Poterba and Sinai (2008)
m	A sum of CONDOFEE (monthly condominium fee), COSTELEC (annual electricity cost), COSTFUEL (annual home heating fuel cost), MORTAMT1 (monthly first mortgage payment obligations), MORTAMT2 (second or junior mortgage monthly payment obligations, if any), COSTWATR (annual water costs), COSTGAS (annual gas costs), PROPINSR (annual property insurance cost). The monthly fees/costs have been converted to annual fees/costs.	ACS
τ_{PROP}	A proportion of the midpoint of the property tax range variable (PROPTX99) to home value (VALUEH)	ACS
π_e	long run (1975 - 1999) average appreciation of HPI All Transactions Index.	Federal Bank of St. Louis

Appendix III: Descriptive Statistics

The tables below provide the descriptive statistics of our sample for the Illinois and rest of the U.S. It is interesting to note that Illinois resembled the rest of the U.S. in the pre-housing bubble period. In fact, the cost to rent, and the maintenance costs were lower in Illinois than in the U.S. However, divergences appear in the post-recession period. Illinois has become a more expensive state to live in. The effective income tax rates, loan-to-value ratio, maintenance cost, property tax rate, and cost of rent as a percentage of home value have all increased significantly relative to the rest of the country.

Descriptive Statistics

Variables	Illinois				Rate of the US			
	Mean	Median	Min	Max	Mean	Median	Min	Max
Effective Income Tax Rate	9.5%	9.2%	8.9%	10.5%	9.3%	9.2%	8.1%	10.6%
Loan to Value Ratio	77.9%	78.5%	76.0%	79.3%	78.8%	79.5%	77.0%	80.0%
Maintenance Cost	7.9%	8.0%	7.4%	8.2%	9.2%	9.3%	9.0%	9.3%
Property Tax	1.7%	1.6%	1.6%	1.8%	2.3%	2.3%	2.3%	2.3%
Rent	4.2%	4.3%	3.8%	4.4%	5.2%	5.1%	5.1%	5.2%
Cost of Homeownership	10.1%	10.3%	9.6%	10.5%	10.2%	10.3%	9.8%	10.4%
Bond Rate	4.3%	4.3%	4.0%	4.6%	2.3%	2.3%	2.1%	2.5%
Expected Home Value Appreciation Rate	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%

Variables	2002-2004				2013-2015			
	Mean	Median	Min	Max	Mean	Median	Min	Max
Effective Income Tax Rate	9.5%	9.2%	8.9%	10.5%	11.3%	11.3%	11.3%	11.4%