FTHB model regressions

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Model setup

Defined parameters

Note: The entire model is standardized to median household income in the 1998-2004 SCF (About $67,000 in 2013 dollars)

- $1 - \alpha = 0.859$: Cobb-Douglas parameter, share of expenditure in perishable consumption (i.e. α share in durables)
- $\gamma = 2$: Intertemporal elasticity of substitution
- $r = 2.4\%$: rate of return on the safe asset
- $r_{borrow} = r + 0.8\%$ interest rate on borrowing (if $q \leq (1 - \theta) * h * p$)
- $\delta = 2.2\%$: Depreciation rate of hdurable
- $F = 6\%$: total fixed cost on adjusting durable stock
- $\underline{s} = 0.8$: share of the fixed cost borne by the seller (i.e. she pays $\underline{s}F$)
- $\theta = 20\%$: Required down payment on durable
- $\rho_z = 0.91$: Persistence of AR(1) income process
- $\sigma_z = 0.20$: S.d. of shocks to income process
- $\epsilon = 2.5$: Price elasticity of supply for the representative housing firm

Calibrated parameters

Note: Unlikely that all the parameters below will be calibrated.

- $\beta = 0.915$: Discount rate.
- $\phi = 0.26\%$: Rental housing markup (added onto user cost of housing yields the rental price as a fraction of housing)
- $\phi_{ret} = 0.065\%$: Rental housing markup in retirement.
- $h_{min} = 0.78$: Minimum size for an owned house (no limits exist on renting)
- $\Xi = 2.00$: A lump sum transfer at retirement equal to a proportion of labour income before retirement
- $\Psi = 3.60$: Multiplicative factor on bequest utility (seems large, but maybe bequests are also defined differently?)
- ω : Disutility of rental housing ($= 1$ for owned housing)
- $\underline{b}$: Reference value for bequests: affects marginal utility of a unit increase in bequests.

Algorithmic details

- Search space over 120 uneven grid points for voluntary equity, $q = a + (1 - \theta) * h * p$, 90 grid points for h
- 9 grid points for income process (Tauchen '86 discretization), with a range of ± 2.5 the unconditional s.d of the AR(1)
- 38 working periods, 25 retirement periods. Correspond to ages 22-84 on data
- A steady-state general equilibrium is found by minimizing the deviation between the **average** excess demand for housing (see Kaplan, Mitman, Violante, eq. 6) and the average new construction supply.
  The minimizing price is found using Brent's method, with a liberal convergence threshold. However, the minimum deviation still usually reaches less than 1E-2.

Regression Tables, Baseline Model

Policy downscaling, inframarginal

Table: Policy downscaling, inframarginal

	Chg in house size under policy vs. previous rental housing	
	(1)	(2)
Income value, T (policy period)	-0.0604***	0.148***
	(0.00151)	(0.00182)
Income shock received, period T-1	0.157***	
	(0.000975)	
Existing Assets/Loans		-0.0600***
		(0.00237)
Assets change received, period T-1		-1.472***
		(0.0217)
Constant	0.0603***	-0.0711***
	(0.00405)	(0.00667)
Observations	6505	6505

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Policy downscaling, marginal

Table: Policy downscaling, Marginal

	Chg in house size under policy vs. previous rental housing	
	(1)	(2)
Income value, T (policy period)	-0.231***	-0.0926***
	(0.00140)	(0.00258)
Income shock received, period T-1	0.215***	
	(0.00104)	
Existing Assets/Loans		-0.169***
		(0.00213)
Assets change received, period T-1		-2.269***
		(0.0322)
Constant	0.0936***	-0.0706***
	(0.00316)	(0.00533)
Observations	12856	12856

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Timing margin, marginal

Table: Timing margin, marginal

	Chg in years purchase pulled forward				
	(1)	(2)	(3)	(4)	(5)
Income value, T (policy period)	-2.159***		-2.392***	-1.105***	-1.732***
	(0.0922)		(0.0894)	(0.104)	(0.168)
Income shock received, period T-1	0.0556			0.0131	0.215*
	(0.0568)			(0.0571)	(0.0964)
Existing Assets/Loans		0.402***	-0.295***		
		(0.0697)	(0.0722)		
Assets change received, period T-1		-1.925	0.207		
		(1.107)	(1.073)		
Income shock received, period T+1				-1.234***	-0.677***
				(0.0896)	(0.160)
Income shock received, period T+2				-0.382***	0.0858
				(0.0962)	(0.172)
Income shock received, period T+3				-0.301***	-0.335*
				(0.0761)	(0.135)
Age Minus 20 × Income value, T (policy period)					0.0452***
					(0.0107)
Age Minus 20 × Income shock received, period T-1					-0.0145*
					(0.00639)
Age Minus 20 × Income shock received, period T+1					-0.0384***
					(0.00922)
Age Minus 20 × Income shock received, period T+2					-0.0318**
					(0.00993)
Age Minus 20 × Income shock received, period T+3					0.00200
					(0.00780)
Constant	3.610***	2.964***	3.554***	5.319***	4.633***
	(0.165)	(0.167)	(0.163)	(0.176)	(0.198)
Observations	10119	10119	10119	9535	9535

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive margin reversion (T+1), inframarginal

Table: Extensive margin reversion, inframarginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	3.331***	-1.748***	3.324***	-1.742***		
	(0.203)	(0.131)	(0.203)	(0.134)		
Income value, T (policy period)	-0.604***	-0.670***	-0.738***	-0.534**	0.162	-1.332***
	(0.164)	(0.172)	(0.147)	(0.205)	(0.0891)	(0.169)
Income shock received, period T-1	-0.114	-0.00884			0.0149	-0.0149
	(0.111)	(0.128)			(0.0817)	(0.120)
Existing Assets/Loans			-0.206	0.284		
			(0.272)	(0.151)		
Assets change received, period T-1			-0.492	0.428		
			(1.970)	(1.670)		
Chg in Consumption vs. counterfactual, policy period					-0.0524	2.533
					(2.105)	(1.742)
Constant	-10.57***	-2.529***	-10.25***	-2.852***	-4.539***	-3.136***
	(0.753)	(0.558)	(0.701)	(0.582)	(0.478)	(0.506)
Observations	6548		6548		6794	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive margin reversion (T+1), marginal

Table: Extensive margin reversion, marginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	6.587***	-2.782***	6.595***	-2.991***		
	(0.374)	(0.0859)	(0.375)	(0.0925)		
Income value, T (policy period)	0.172	-1.664***	0.130	-0.570***	1.686***	-3.157***
	(0.261)	(0.0903)	(0.239)	(0.111)	(0.166)	(0.0769)
Income shock received, period T-1	0.000830	0.235***			-0.0771	0.167**
	(0.158)	(0.0671)			(0.0953)	(0.0591)
Existing Assets/Loans			-0.250	0.518***		
			(0.388)	(0.0589)		
Assets change received, period T-1			2.743	-2.813*		
			(4.792)	(1.114)		
Chg in Consumption vs. counterfactual, policy period					-1.154	2.465***
					(0.854)	(0.259)
Constant	-17.05***	-2.094***	-17.23***	-2.620***	-4.308***	-3.512***
	(0.994)	(0.259)	(1.007)	(0.289)	(0.304)	(0.229)
Observations	12645		12645		12856	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive margin reversion (T+2), inframarginal

Table: Extensive margin reversion, inframarginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	0.437***	-0.445**	0.422***	-0.439**		
	(0.119)	(0.146)	(0.120)	(0.148)		
Income shock received, period T+2	2.346***	-2.195***	2.357***	-2.226***		
	(0.123)	(0.145)	(0.124)	(0.147)		
Income value, T (policy period)	-0.903***	-0.785***	-0.957***	-0.275	-0.0708	-1.259***
	(0.107)	(0.160)	(0.0970)	(0.171)	(0.0659)	(0.126)
Income shock received, period T-1	0.0608	0.293**			0.0664	0.267**
	(0.0663)	(0.107)			(0.0510)	(0.0885)
Existing Assets/Loans			-0.499**	0.334**		
			(0.157)	(0.122)		
Assets change received, period T-1			0.0877	-1.395		
			(1.101)	(1.398)		
Chg in Consumption vs. counterfactual, period T+1					4.791	9.388***
					(3.160)	(1.950)
Chg in Consumption vs. counterfactual, policy period					-1.027	3.062*
					(1.135)	(1.425)
Constant	-5.969***	-2.333***	-6.036***	-2.994***	-2.509***	-2.756***
	(0.347)	(0.492)	(0.334)	(0.513)	(0.253)	(0.407)
Observations	6416		6416		6788	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive margin reversion (T+2), marginal

Table: Extensive margin reversion, marginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	0.259**	-0.932***	0.288**	-0.974***		
	(0.0974)	(0.0857)	(0.0973)	(0.0869)		
Income shock received, period T+2	3.232***	-2.677***	3.239***	-2.756***		
	(0.118)	(0.0896)	(0.118)	(0.0921)		
Income value, T (policy period)	-0.241	-1.640***	0.331**	-0.750***	0.901***	-2.492***
	(0.125)	(0.0946)	(0.114)	(0.106)	(0.0887)	(0.0660)
Income shock received, period T-1	0.263***	0.269***			0.168**	0.250***
	(0.0687)	(0.0617)			(0.0538)	(0.0489)
Existing Assets/Loans			0.435***	0.293***		
			(0.101)	(0.0587)		
Assets change received, period T-1			-3.318*	-3.419***		
			(1.581)	(1.018)		
Chg in Consumption vs. counterfactual, period T+1					-2.698***	-1.916***
					(0.450)	(0.269)
Chg in Consumption vs. counterfactual, policy period					0.639	1.172***
					(0.374)	(0.226)
Constant	-7.261***	-2.726***	-7.511***	-2.980***	-2.002***	-2.927***
	(0.268)	(0.254)	(0.267)	(0.264)	(0.147)	(0.193)
Observations	12385		12385		12855	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Extensive margin reversion (T+3), inframarginal

Table: Extensive margin reversion, inframarginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	0.162	-0.0271	0.153	0.000139		
	(0.0989)	(0.142)	(0.0993)	(0.141)		
Income shock received, period T+2	0.738***	-0.726***	0.740***	-0.718***		
	(0.116)	(0.155)	(0.116)	(0.156)		
Income shock received, period T+3	1.611***	-2.576***	1.623***	-2.625***		
	(0.0994)	(0.158)	(0.100)	(0.160)		
Income value, T (policy period)	-0.711***	-0.755***	-0.834***	-0.155	-0.0825	-0.819***
	(0.0803)	(0.146)	(0.0748)	(0.121)	(0.0500)	(0.103)
Income shock received, period T-1	-0.0302	0.423***			0.00357	0.276***
	(0.0516)	(0.0940)			(0.0405)	(0.0702)
Existing Assets/Loans			-0.472***	0.126		
			(0.112)	(0.117)		
Assets change received, period T-1			-0.983	-3.768**		
			(0.832)	(1.196)		
Chg in Consumption vs. counterfactual, period T+1					1.231	-9.328***
					(2.907)	(2.536)
Chg in Consumption vs. counterfactual, period T+2					2.630	17.43***
					(2.700)	(1.791)
Chg in Consumption vs. counterfactual, policy period					-2.036*	0.435
					(0.869)	(1.079)
Constant	-4.369***	-2.071***	-4.221***	-2.661***	-1.729***	-2.486***
	(0.261)	(0.408)	(0.248)	(0.412)	(0.193)	(0.324)
Observations	6294		6294		6779	

Extensive margin reversion (T+3), marginal

Table: Extensive margin reversion, marginal

	(1)		(2)		(3)	
	Adjustment	Rental	Adjustment	Rental	Adjustment	Rental
Income shock received, period T+1	0.164*	-0.259**	0.220**	-0.272**		
	(0.0819)	(0.0860)	(0.0827)	(0.0860)		
Income shock received, period T+2	0.669***	-1.072***	0.662***	-1.092***		
	(0.0907)	(0.0979)	(0.0918)	(0.0986)		
Income shock received, period T+3	2.464***	-2.744***	2.526***	-2.754***		
	(0.0907)	(0.0959)	(0.0920)	(0.0966)		
Income value, T (policy period)	-0.0691	-1.639***	0.525***	-1.044***	0.670***	-1.957***
	(0.0990)	(0.0989)	(0.0946)	(0.107)	(0.0695)	(0.0587)
Income shock received, period T-1	0.139**	0.185**			0.0440	0.210***
	(0.0535)	(0.0603)			(0.0416)	(0.0441)
Existing Assets/Loans			0.480***	0.177**		
			(0.0763)	(0.0612)		
Assets change received, period T-1			-4.203***	-2.607*		
			(1.202)	(1.019)		
Chg in Consumption vs. counterfactual, period T+1					0.292	-3.108***
					(0.366)	(0.271)
Chg in Consumption vs. counterfactual, period T+2					-3.492***	0.985**
					(0.462)	(0.317)
Chg in Consumption vs. counterfactual, policy period					1.348***	0.546**
					(0.292)	(0.211)
Constant	-4.553***	-3.181***	-4.775***	-3.318***	-0.738***	-2.389***
	(0.177)	(0.247)	(0.180)	(0.251)	(0.109)	(0.170)
Observations	12129		12129		12848	