Limited Asset Market Participation and the Euler Equation Implied Rate

Pearl Li

April 6, 2016

Previously: Aggregate Analysis

- Data from NIPA
- Estimated VAR(4) for consumption, inflation, leisure, FFR, ...
- Computed implied interest rates with and without
  1. Habit formation
  2. Nonseparability in consumption and leisure
- Regressed (implied - observed) spread against stance of monetary policy
- Computed impulse response functions for implied rates

Limited Asset Market Participation

- Inspired by
  - Campbell and Mankiw (1989): estimated half of aggregate consumption undertaken by households who don't optimize
  - Vissing-Jorgensen (2002): estimated EIS separately for stock-, bond-, and non-assetholders
- Aggregate household-level data for bondholders and nonbondholders
- Repeat analysis from before, comparing bondholders and nonbondholders
- **Hypothesis: interest rates implied by bondholders' consumption paths will more resemble observed rates than those from nonbondholders**

Data

- Consumer Expenditure Survey, 1996.I to 2012.IV
- Rotating panel of representative households, interviewed for 5 quarters (1 practice)
- Very detailed household-level expenditure categories
- Demographic and income data collected in 2nd and 5th interviews

Bondholder Criteria

- Following Vissing-Jorgensen (2002)
- Asset holdings information only collected in 5th interview
- Positive response to at least one of:
  1. Stock, bonds, and mutual funds category
  2. U.S. savings bond category
- Household classified as bondholder if at least one of:
  1. Same amount of asset as a year ago and positive amount in interview
  2. Lower holdings of asset than a year ago
  3. Increase in holdings by less than reported holdings in interview

More Specifications

- Following Heathcote et al. (2010):
  - Nondurable consumption := food, clothing, gasoline, household operation, transportation, medical care, recreation, tobacco, and education
- Following Hai et al. (2015):
  - Disposable income := after-tax income
- Following Vissing-Jorgensen (2002):
  - Consumption and income deflated using CPI-U nondurables (2009 dollars)

More Specifications

- Output less consumption := before-tax income - consumption
- Aggregated using CEX-provided population weights
- Inflation, FFR, and CCI series from aggregate analysis
- Log of real consumption seasonally-adjusted by hand

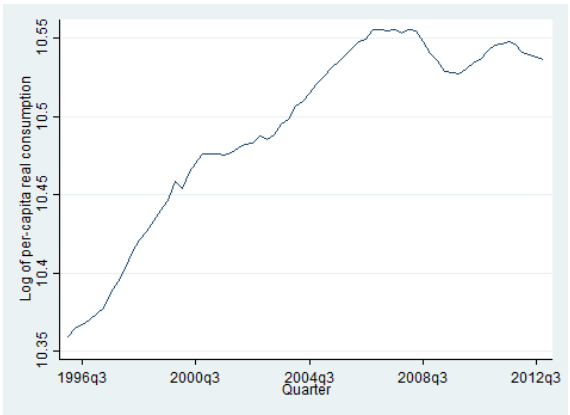
Household-Level Summary Stats

	Bondholders		Nonbondholders	
	Mean	SD	Mean	SD
Consumption	1,774	1,886	1,245	1,339
After-Tax Income	70,641	64,604	48,288	50,043
Hours Worked/Week	41.1	13.1	40.5	12.3
Observations	167,541		1,009,032	
Households	16,959		125,895	

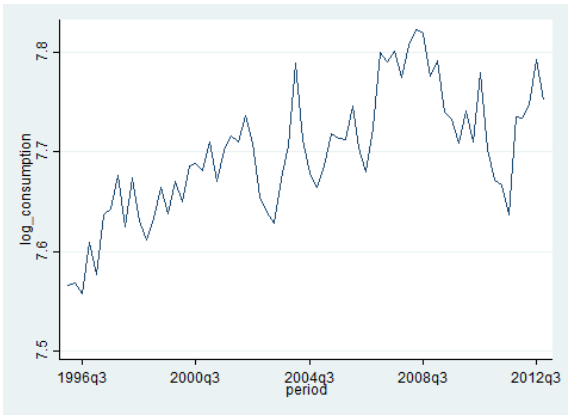
(All dollar amounts nominal)

Volatility Problem

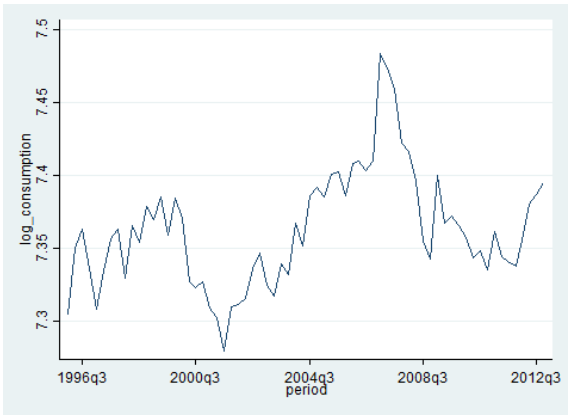
NIPA

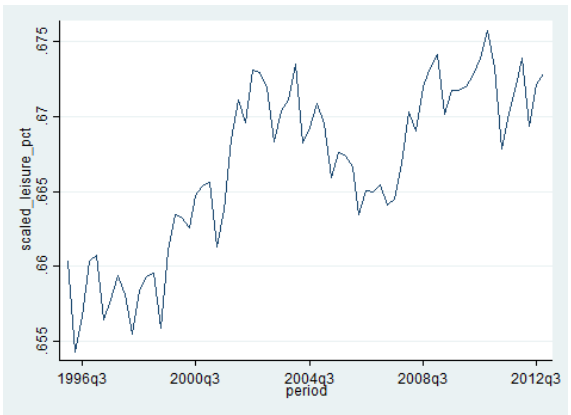


CEX Bond



CEX Nonbond





Need much lower risk aversion to accommodate these consumption fluctuations...

CRRA Implied Rates

- Implied rates computed only from CRRA utility (no habit formation or nonseparability)

$$u(C_t) = \frac{C_t^{1-\alpha}}{1-\alpha}$$

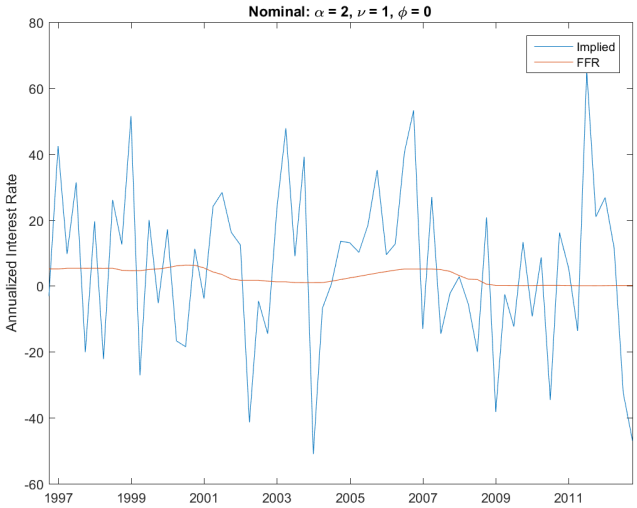
- Euler equation

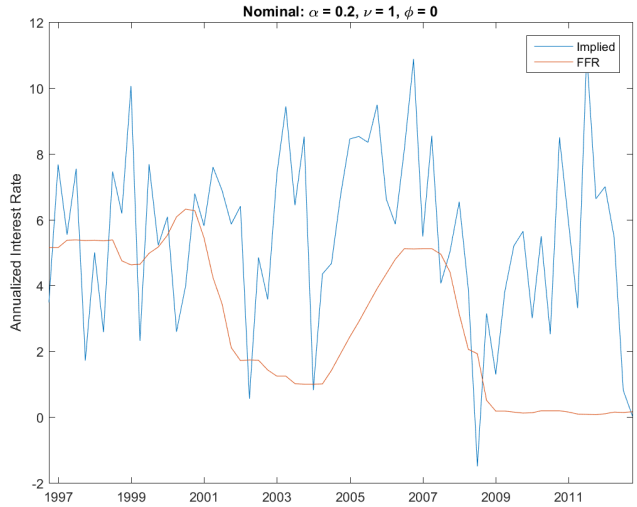
$$\frac{1}{1+r_t} = \beta \frac{\mathbb{E}_t u'(C_{t+1})}{u'(C_t)} = \beta \left(\frac{\mathbb{E}_t C_{t+1}}{C_t} \right)^{-\alpha}$$

- Coefficient of relative risk aversion α

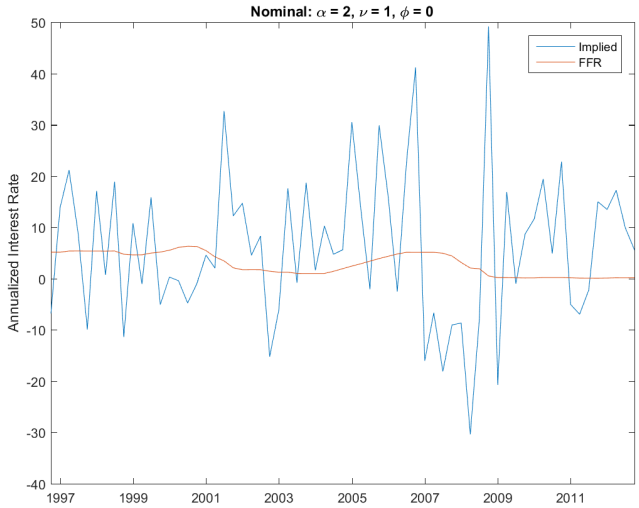
Results: Nominal

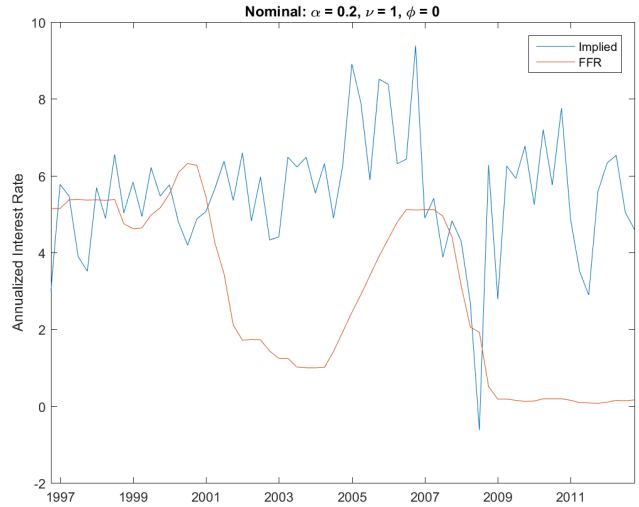
Bondholders





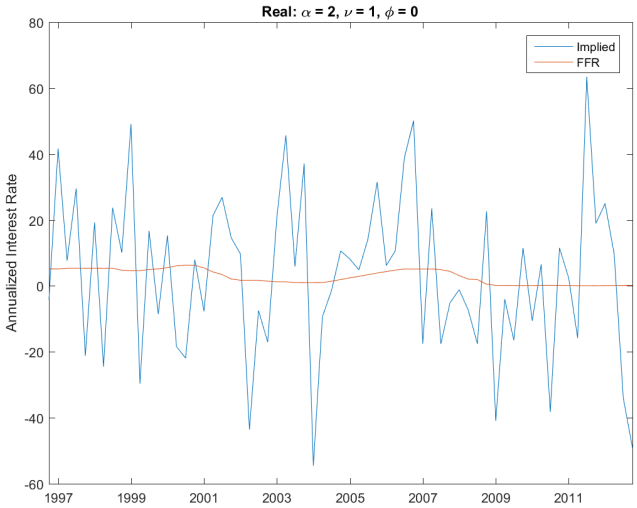
Nonbondholders

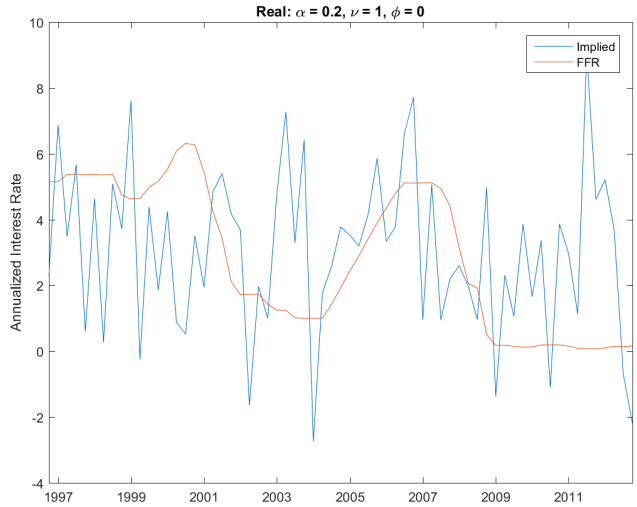




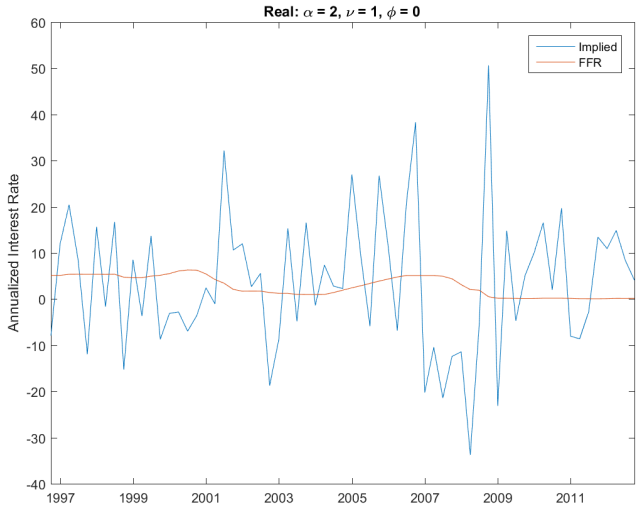
Results: Real

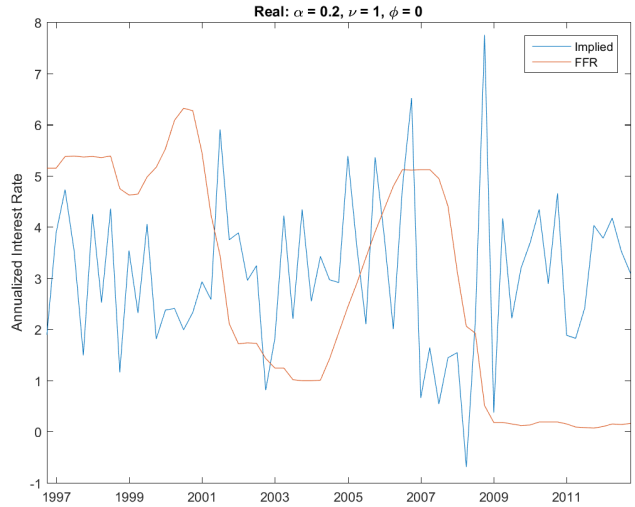
Bondholders





Nonbondholders





Results: Nominal ($\alpha = 0.2$)

	FFR	CEX Bond	CEX Nonbond
Mean	2.83	5.52	5.49
SD	2.19	1.91	1.59
Corr(Implied, FFR)	—	**0.193**	**-0.015**
Coef(Spread, FFR)	—	-0.549	-0.647
		(0.199)	(0.135)

Results: Real ($\alpha = 0.2$)

	FFR	CEX Bond	CEX Nonbond
Mean	0.353	3.06	3.05
SD	2.58	2.50	1.50
Corr(Implied, FFR)	—	**0.235**	**0.268**
Coef(Spread, FFR)	—	-0.527	-0.650
		(0.204)	(0.149)

Conclusions

- Clear difference between bondholders and nonbonders in correlations of nominal rates; no difference for real rates
- Aggregating household-level consumption at quarter level still very noisy
- Small sample size even with most generous definition of bondholders
- EIS ($= \frac{1}{\alpha}$) of 5 not out of the realm of possibility in estimates in literature
- Negative correlation of spread and FFR seems unavoidable
- Results not very conclusive

References

Campbell, John Y. and N. Gregory Mankiw (1989) "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," *NBER Macroeconomics Annual*.

Hai, Rong, Dirk Krueger, and Andrew Postlewaite (2015) "On the Welfare Cost of Consumption Fluctuations in the Presence of Memorable Goods," `http://economics.sas.upenn.edu/~dkrueger/research/Memories.pdf`.

Heathcote, Jonathan, Fabrizio Perri, and Giovanni L. Violante (2010) "Unequal We Stand: An Empirical Analysis of Economic Inequality in the United States: 1967-2006," *Review of Economic Dynamics*.

Vissing-Jorgensen, Annette (2002) "Limited Asset Market Participation and the Elasticity of Intertemporal Substitution," *Journal of Political Economy*.