"Housing Finance, Boom-Bust Episodes, and Macroeconomic Fragility"

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Overview

- Question
- Model
- Answer

Question

- Awesome Abstract:
  - boom-bust cycles
  - fragility
  - incomplete markets
  - types of mortgages
- Goal:
  - understand dynamics of housing
  - response to credit shocks

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Evaluation

- boom-bust- boom feelings about paper
- great topic,
- GE model with Heterogeneous Agents!!, But
  - methodological concerns over experiments
  - not enough data on the table

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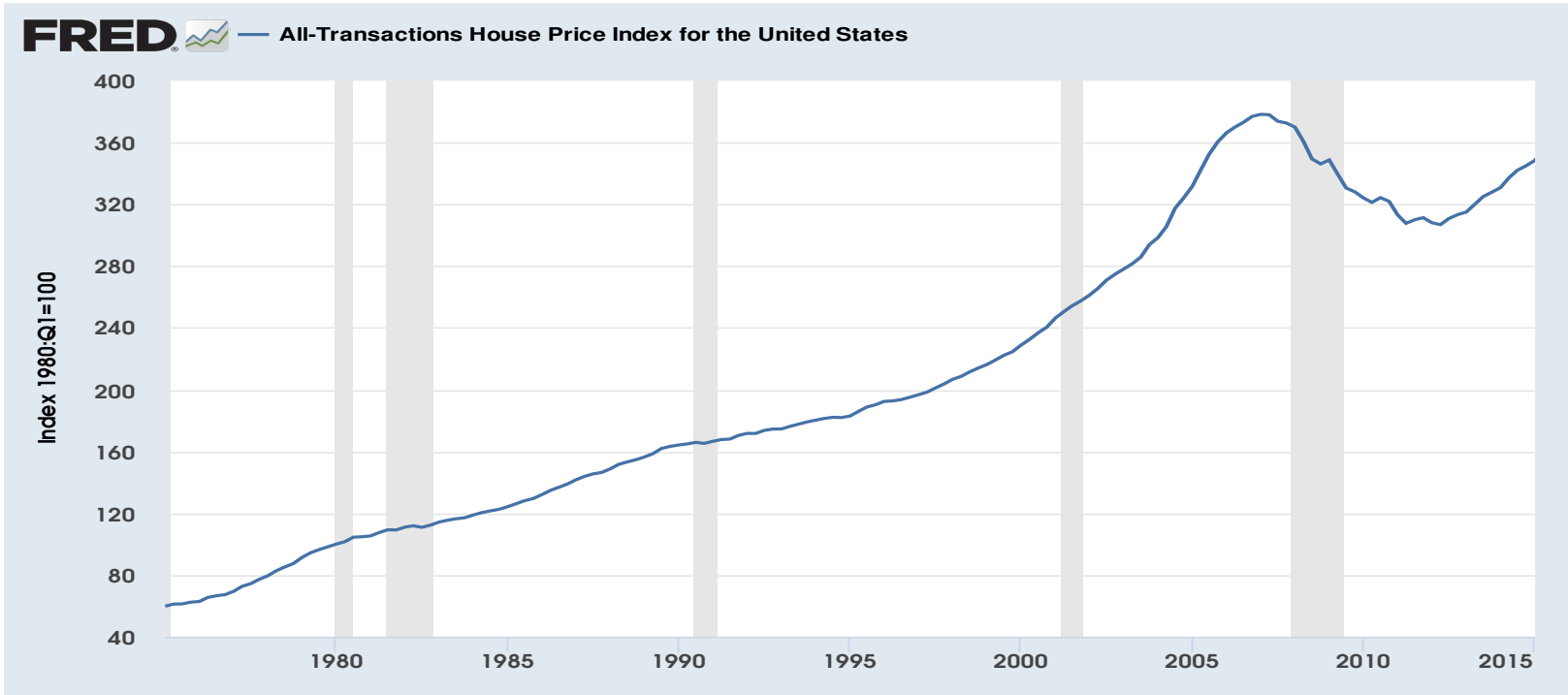
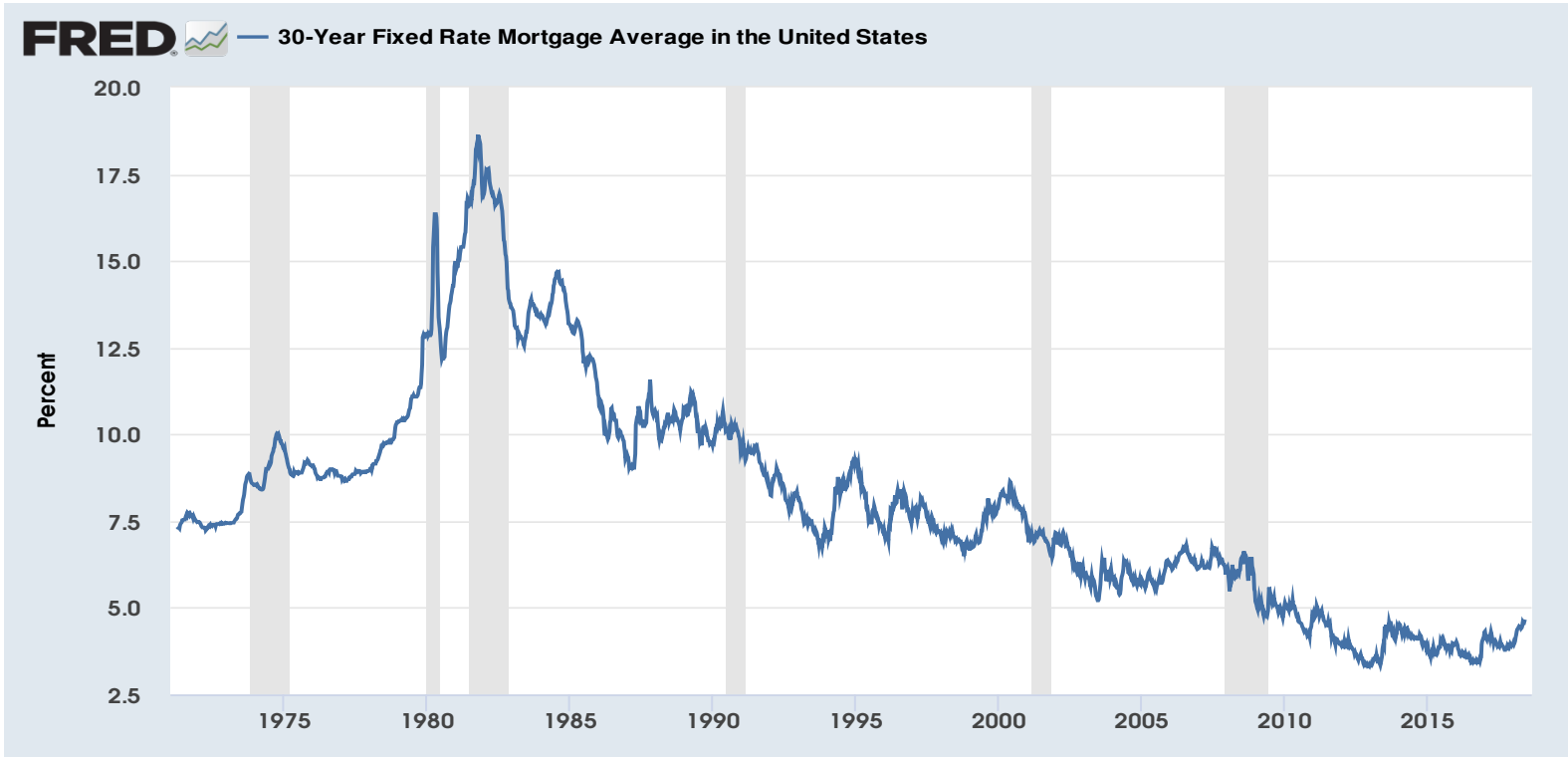
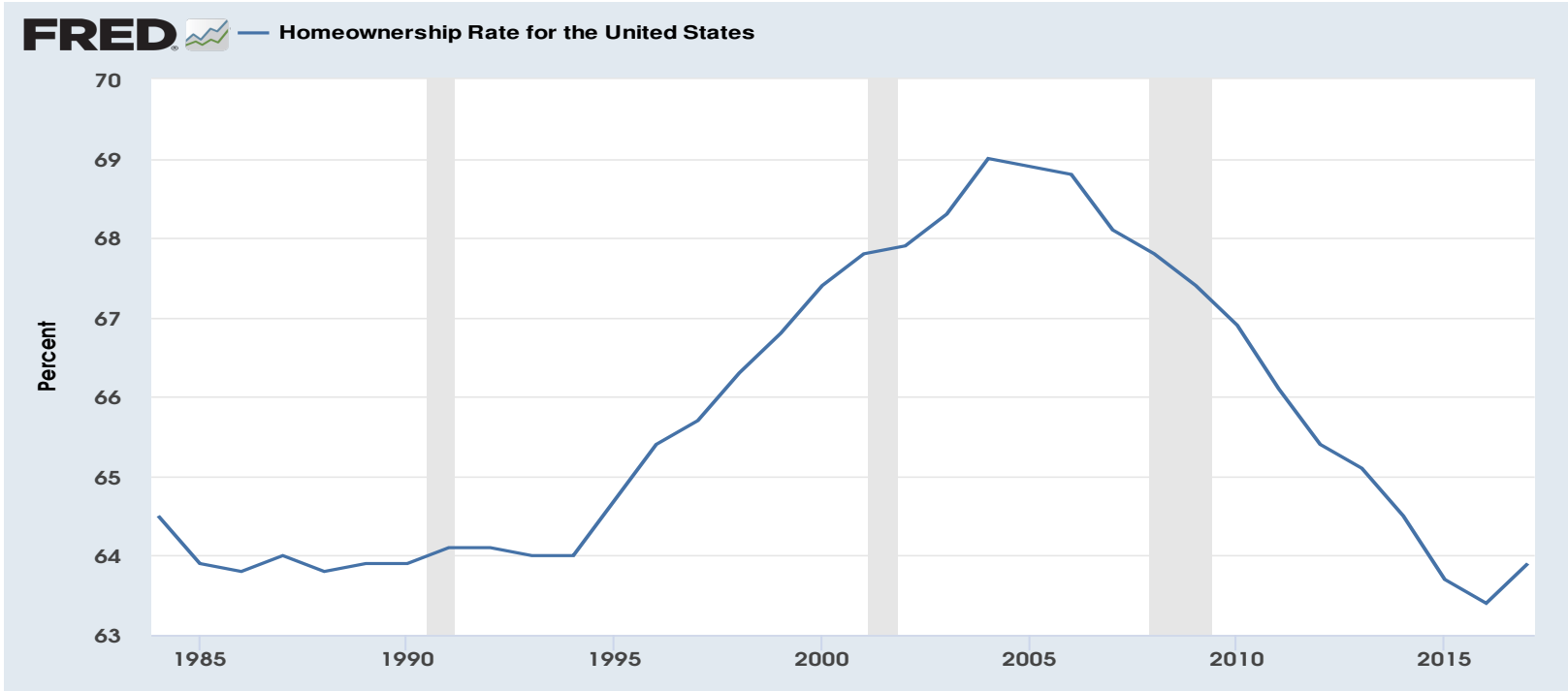
1998 Calibration, 2001-2006 is “Boom”




FRED
30-Year Fixed Rate Mortgage Average in the United States
Percent
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
1975
1980
1985
1990
1995
2000
2005
2010
2015
Shaded areas indicate U.S. recessions
Source: Freddie Mac
myf.red/g/jYnv


FRED
Homeownership Rate for the United States
Percent
70
69
68
67
66
65
64
63
1985
1990
1995
2000
2005
2010
2015
Shaded areas indicate U.S. recessions
Source: U.S. Bureau of the Census
myf.red/g/jcRJ

Model: Key Elements

- Household
  - choice of housing type: rent vs own
  - idiosyncratic income shocks
  - infinitely lived
- pricing of mortgages with refinance (big deal in crisis)
- endogenous trading frictions in housing markets: market makers (Yavas)
- cdf over income and wealth can matter in equilibrium

Mortgage Prices: WOW!

- Household Choice problem is complex
- Mortgage Pricing reflects these options
- Indicative of complexity of analysis

$$q_m^0((\overline{r}_m, m'), b', h, s)m' = \frac{1-\delta_h}{(1+\zeta)(1+\phi)(1+r)}\mathbb{E}\left\{\overbrace{\eta_s(\theta_s(p'_s,h))m'}^{\text{sell + repay}} + \overbrace{[1-\eta_s(\theta_s(p'_s,h))]}^{\text{no sale (do not try/fail)}}\right.$$

$$\times\left[\underbrace{d'\varphi\min\{J_{REO}(h), m'\}}_{\text{default + repossession}} + \underbrace{d'(1-\varphi)}_{\text{no repossession}}\left(-\phi m' + \underbrace{(1+\zeta)(1+\phi)q_m^0((\overline{r}_m, m'), b'', h, s')m'}_{\text{continuation value of current } m'}\right)\right.$$

$$\left.\left.+(1-d')\left\{m'\mathbf{1}_{[\text{Refi}]} + \mathbf{1}_{[\text{No Refi}]}\left(\underbrace{l - \frac{\phi}{1+\overline{r}_m}m''}_{\text{payment - servicing costs}} + \underbrace{(1+\zeta)(1+\phi)q_m^0((\overline{r}_m, m''), b'', h, s')m''}_{\text{continuation value of new } m''}\right)\right\}\right]\right\} \quad (6$$

Model: Concerns

- lifecycle patterns missed: important for matching dynamics in housing?
- technology for apartments vs houses
- market makers seem constrained in arbitrage
- HH borrowing only against equity: IC?
- no bubbles or fragility in stationary equilibrium
- analysis of shocks comes after

Parameterization

- mixture of calibration and estimation (matching moments)
- which parameters matter for the dynamics: not clear
- fit seems very impressive
- moments from cdf over assets, wealth and debt are where???
- moments from 2003-2005 or 1998 ??
- turnover of housing?

Intuition on Boom-Bust

Relax downpayment and lower rates as "shock"

- demand shift outs for housing
- ownership rate increases, price increases
- equity rises so easier to smooth through these loans: neat
- equity interacts with mortgage type
- roll over risk and multiplicity?
- Richness of response is impressive.
- Ponder: relative to data, what happens to
  - the distribution of housing prices?
  - distribution of time on market?
  - cdf
  - effects on $q(\cdot)$

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Methodology: Boom-Bust

- paper could be clearer on how this was done
- is this it?
  - parameterize by matching a stationary equilibrium
  - decision rules determined for fixed productivity and credit conditions
  - economy "shocked" by productivity and credit booms, then turned off
  - mortgage rates are surprisingly decreased
- is this more than a simple shift in a demand curve? Yes AND No!

Methodology: Concerns

- non-linearities ought to be key: where are they?
  - individual choice
  - evolution of the cdf
  - interaction of cdf with, say, equity drawdowns, refinancing, etc.
- prices of new or all homes? supply of new?
- agents are surprised multiple times: but market makers are SMART
- risk free rate is exogenous
- preferred alternative is to estimate a RCE and then study response to shocks

Methodology: Alternative I

$$V(s|\Theta) = max_c u(c, s|\Theta) + \beta E_{s'|s,c} V(s'|\Theta), \forall s. \qquad (1)$$

- Θ is a parameter vector
- estimate Θ^* to match moments, for a given environment
- decision rule: $c = \phi(s|\Theta^*)$
- introduce a new environment: use Θ^* to obtain new decision rules
- $c = \phi(s|\Theta^*)$ is not robust across environments: do not use it

  but ponder "Counterfactural Equivalence in Macroeconomics" by Martin Beraja
- easier for individual optimization than RCE!

Methodology: Alternative II

- HH optimzation
- Stationary Equilibrium
- Transition Dynamics: highlight role of CDF
- Shocks: Either
  - Analyze SREE for experiments
    - Solve model with stochastic processes from data
    - estimate parms in that environment
    - experiments on domain of model
    - hard: talk is cheap! python ???
  - Convincing argument that "MIT shocks" suffice

Evidence

- consumption response: type of expenditure?
- VAR evidence:
  - IRF wrt credit shock
  - estimate by matching these moments as well
  - thus match both "periods"
- micro data: on mortgage type, equity, etc.
- credit conditions are not exogenous, what drives them?
- what about regional markets? driven by local credit conditions? bursting bubbles?
- what is the period for the experiment? 2001-2006? or the crash too?

Suggested Improvements

- Sharpen Focus
- Data, data, data: in Motivation, Estimation, Experiments
- Only essential elements in the model
- Do analysis in a Stationary Rational Expectations Equilibrium
- Study response to changes in exogenous variables
- write "Sunspots and Cycle: Durable Goods and Credit Conditions"