WEALTH AND VOLATILITY

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Sources of Business Cycles

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- Problem: why now? why not after September 11?
- Our idea: extent to which these waves can generate fluctuations depends on the level of household wealth
- Decline in asset prices which occurred prior to the crisis left many economies fragile and susceptible to a confidence-driven recession

Sunspot-driven fluctuations

- Rise in expected unemployment
  $\rightarrow$ consumers reduce demand
  $\rightarrow$ firms reduce hiring
  $\rightarrow$ higher unemployment

- For a wave of self-fulfilling pessimism to get started need high sensitivity of demand to expected unemployment

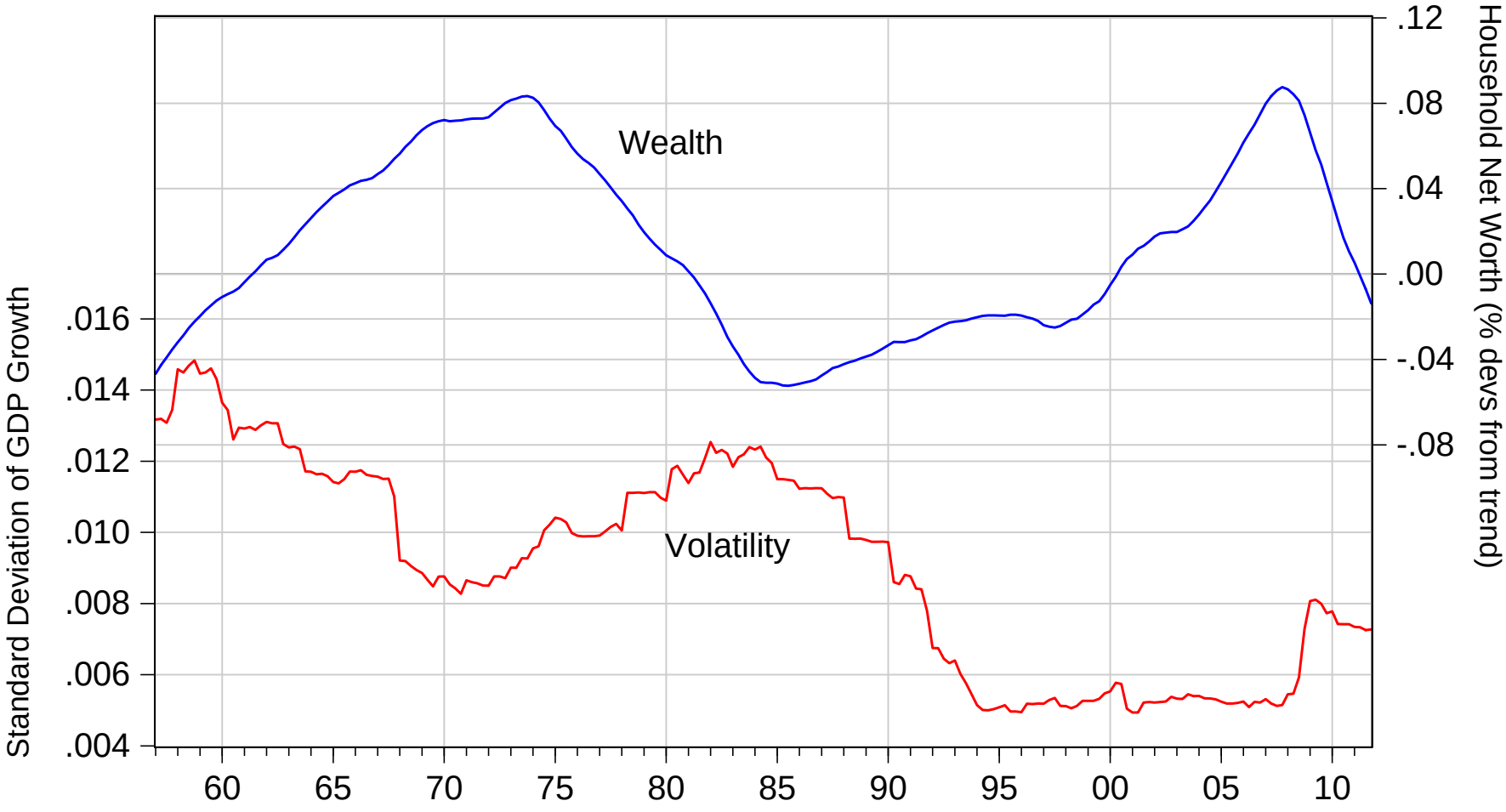
- High wealth:
  $\rightarrow$ demand less sensitive to expectations
  $\rightarrow$ no or small sunspot-driven fluctuations

- Low wealth:
  $\rightarrow$ demand more sensitive to expectations
  $\rightarrow$ sunspot-driven fluctuations

Outline

1. Some suggestive macro evidence
2. A stylized model of confidence driven recessions
3. Micro evidence on the mechanism
4. Policy

Wealth & GDP Volatility



Note: Standard deviation of GDP growth are computed over 40 quarters rolling windows.
Observations for net worth are average over the same windows

A Stylized Model

- Related to *Farmer* 2010, *Chamley* 2011, *Guerrieri and Lorenzoni* 2009

A Stylized Model

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- Non-durable consumption good
- Produced by competitive firms using labor

$$c + g = y = 1 - u$$

  where u is mass of workers unemployed
- Durable housing h, in fixed supply with relative price p
- Each representative household contains a continuum of workers

Household Problem

$$\max_{c_t^w, c_t^u} E \sum_{t=0}^{\infty} \beta^t \left[(1 - u_t) \log c_t^w + u_t \log c_t^u + \phi h_{t-1} \right]$$

s.t.

$$\begin{aligned} c_t^u &\leq p_t h_{t-1} \\ c_t^w &\leq p_t h_{t-1} + w_t \\ \left[1 - u_t\right] c_t^w + u_t c_t^u + p_t \left[h_t - h_{t-1}\right] &\leq \left[1 - u_t\right] \left[w_t\right] \end{aligned}$$

ϕ : Preference weight on housing

u_t : Fraction of unemployed

Note: no disutility from work, so unemployment inefficient

Timing and labor markets

1. Households co-ordinate expectations on current unemployment, distributions of future unemployment rates
2. Representative household sends out workers with contingent consumption orders (c_t^u, c_t^w), assets $p_t h_{t-1}$, and reservation wage w_t^*
3. Firms take orders as given and search for workers to fill them in decentralized labor markets
4. Firms and workers meet randomly, firms decide whether or not to hire at w_t^*
5. Firms pay wages, all agents consume
6. Household regroups, net resources determine h_t.

Wage Determination

Optimal firm strategy: hire worker iff aggregate order $c_t = (1 - u_t)c_t^w + u_t c_t^u$ not yet filled and $w_t^* \leq 1$

Optimal household strategy: set $w_t^* = 1$

Frictions and Features

1. Labor market friction: No role for labor supply in determining allocations $\Rightarrow$ equilibrium unemployment, multiplicity

    - Workers cannot affect probability of meeting a firm by asking a lower wage, and when meet ask for reservation wage (alternatively downward wage rigidity)

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2. Uninsurable unemployment risk: Can't transfer resources from employed to unemployed $\Rightarrow$ precautionary motive, low consumption demand with low wealth

First Order Conditions

$$\begin{aligned}
\frac{p_t}{c_t^w} &= \beta E\left[\frac{p_{t+1}}{c_{t+1}^w}\left(1+u_{t+1}\frac{\max\left\{c_{t+1}^w-c_{t+1}^u,0\right\}}{c_{t+1}^u}\right)\right]+\beta\phi \\
c_t^u &= p_t h_{t-1}
\end{aligned}$$

- Unemployment risk $\simeq$ tax on consumption, which depends on expected unemployment
  - Basis for self-fulfilling crisis: high expected unemployment $\rightarrow$ high tax $\rightarrow$ low consumption $\rightarrow$ high realized unemployment
- If low p_t -> low c_t^u, strong sensitivity of consumption (and thus u) to expected unemployment

Asset Prices

- Measure zero "marginal investor" same preferences as RA, faces no unemployment risk $(c = \bar{c} = 1)$
- In equilibrium no housing trade between the two types
- Marginal investor establishes a floor $\underline{p}$ for house prices:

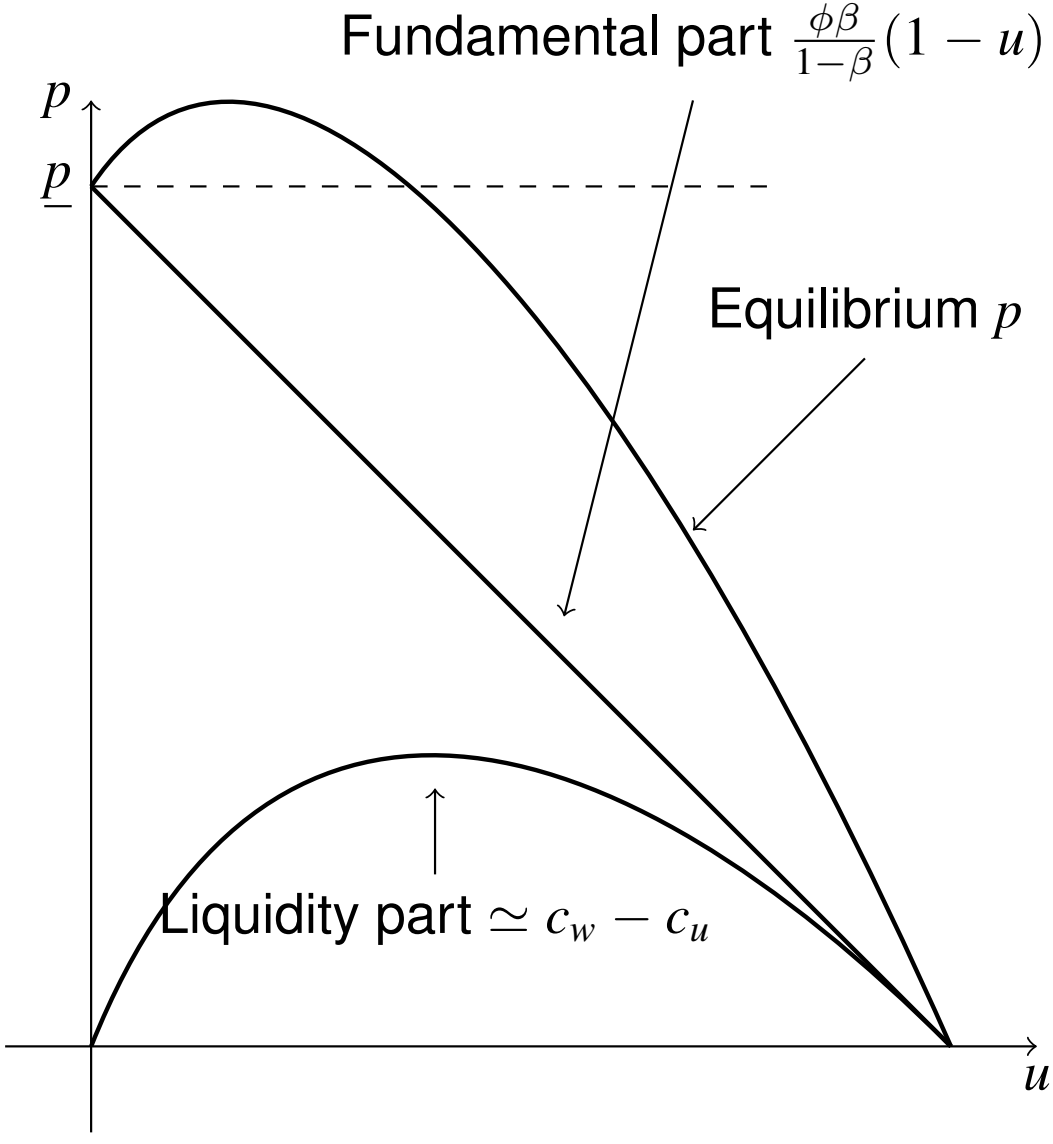
$$p_t \geq \underline{p} = \frac{\beta}{1-\beta}\phi$$

  - Price never go below $\underline{p}$

Characterizing Equilibria

- Characterize paths for unemployment that satisfy the inter-temporal FOC and the condition $c_t = 1 - u_t$
  - Unique Steady State
  - Multiple Steady States
  - Equilibria with unemployment dynamics
  - Sunspots

Steady state asset price decomposition



Unique full employment steady state

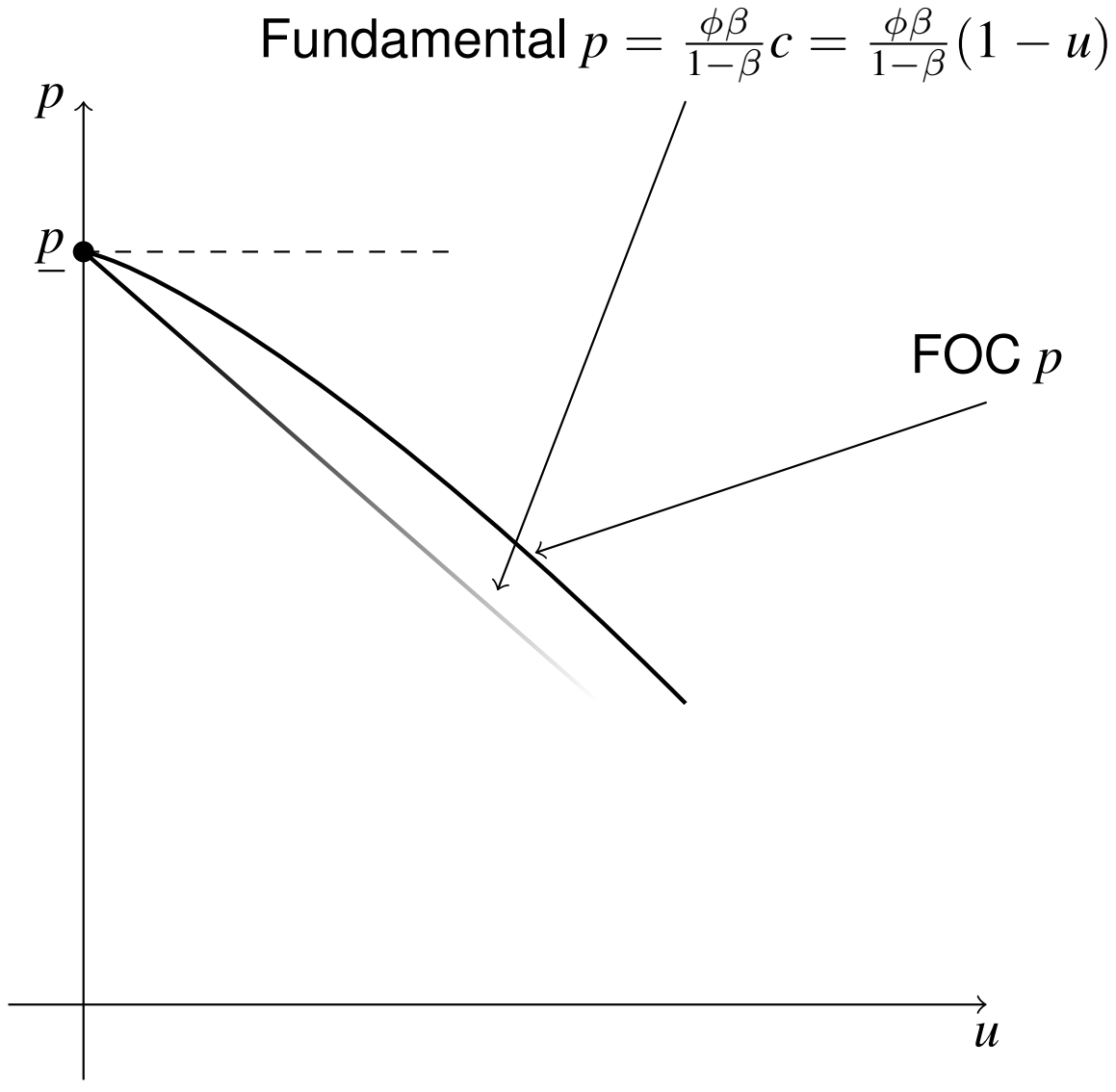
If $\phi \geq \bar{\phi} = f(\beta)$ then:

Only steady state is $p = \underline{p}$ and $u = 0$

Logic:

- when ϕ high, p high (because of marginal investor) $\Rightarrow c_u$ high $\Rightarrow$ small liquidity component of p,
- Suppose consumers expect high u
- Since c_u high, no much increase in saving, rather sell house -> Inconsistent with $p_t \geq \underline{p}$
- Unique equilibrium
- Pinning down p pins down u

Unique full employment equilibrium

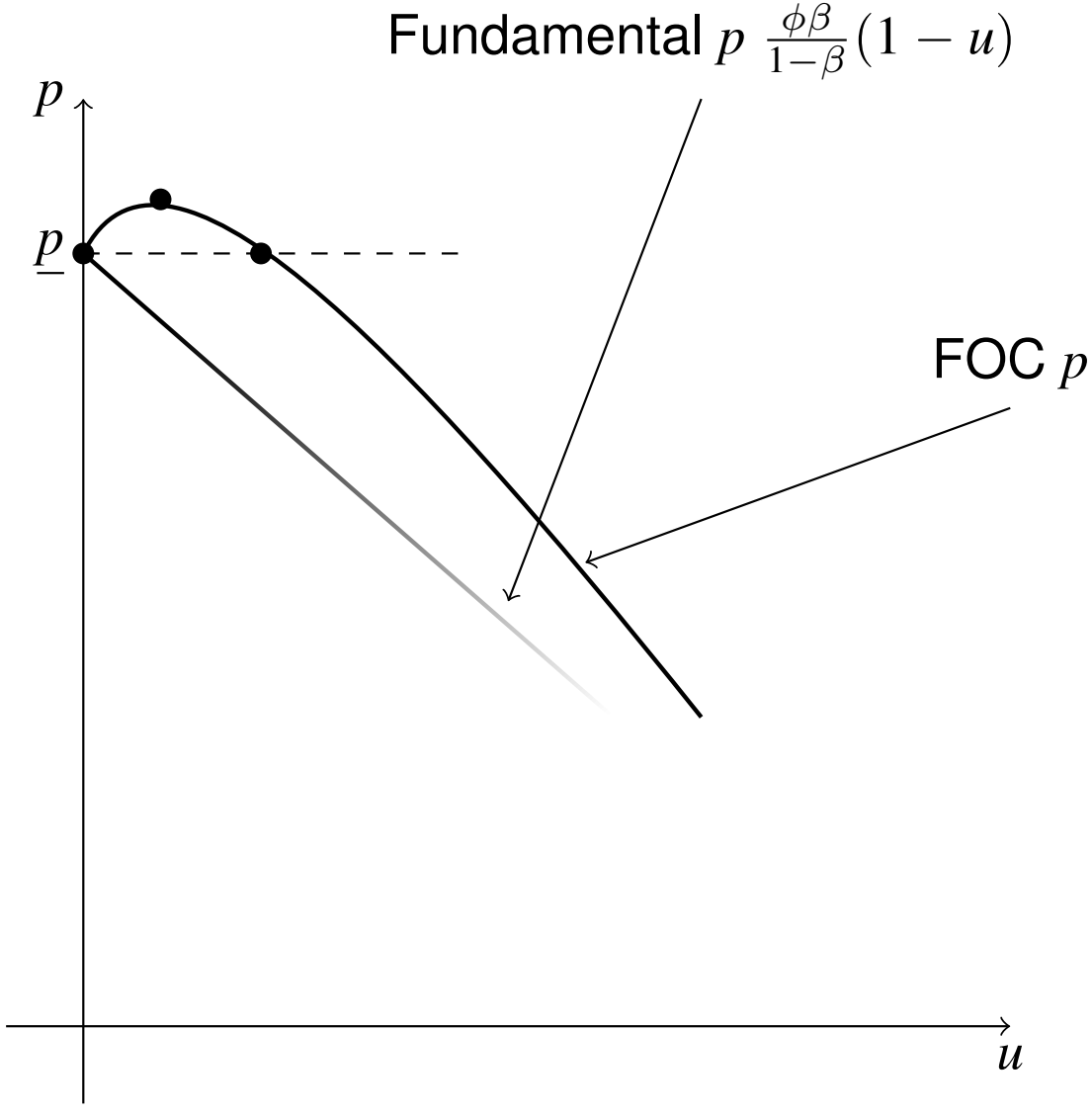


Multiple Steady States

If $\phi < \bar{\phi}$ then

1. There is (still) a steady state with $p = \underline{p}$ and $u = 0$
2. There is another steady state with $p = \underline{p}$ and $u > 0$
3. There are additional steady states with $p > \underline{p}$ and $u > 0$.

Multiple Steady States

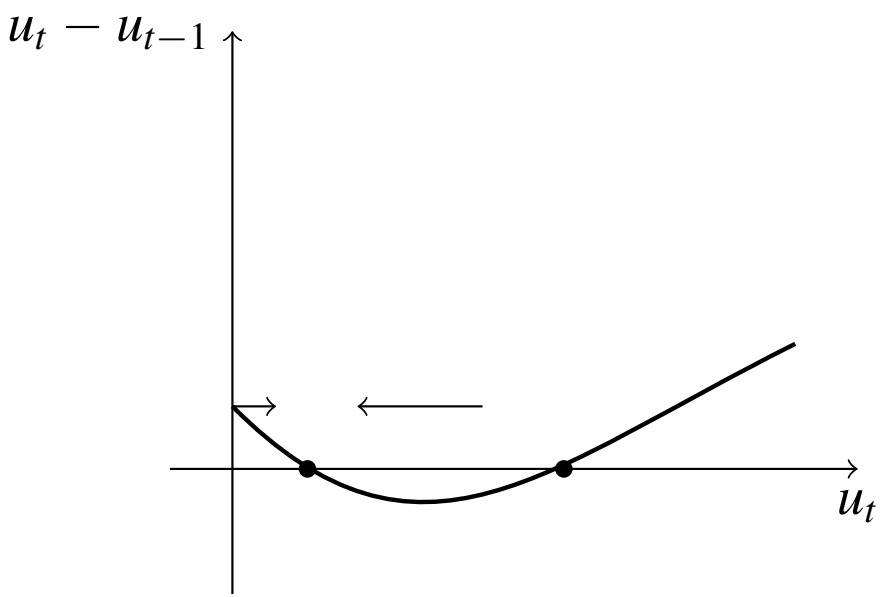


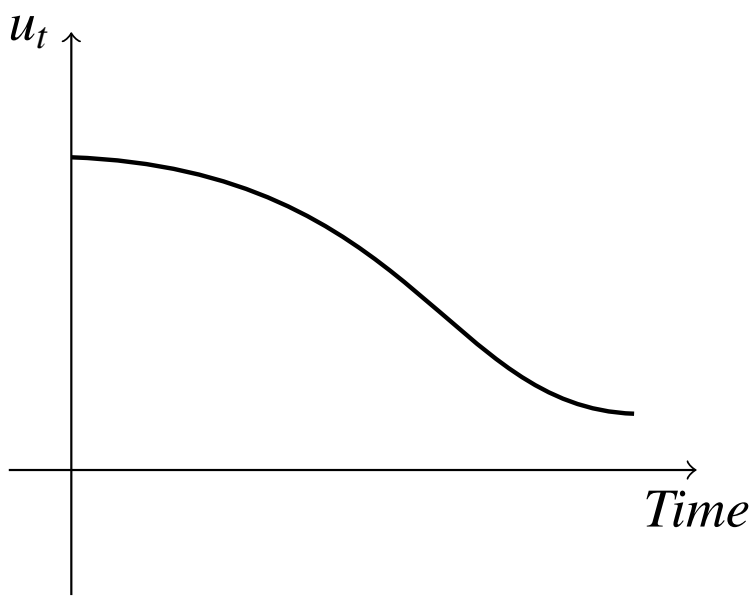
Multiple Steady States

Logic:

- When ϕ low, p low $\Rightarrow$ c_u low, high liquidity value of housing if $u > 0$
- Equilibrium 1: $(u = 0)$: price $=$ fundamental, no liquidity value of housing
- Equilibrium 2: $(u > 0)$: same price with lower fundamental, but higher liquidity

Unemployment dynamics with fixed prices

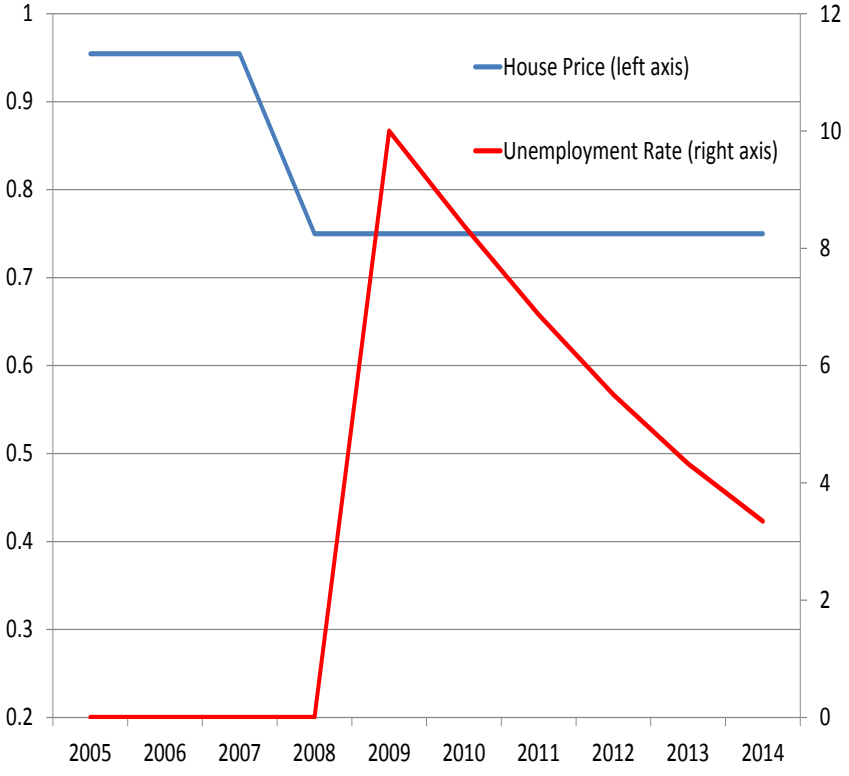




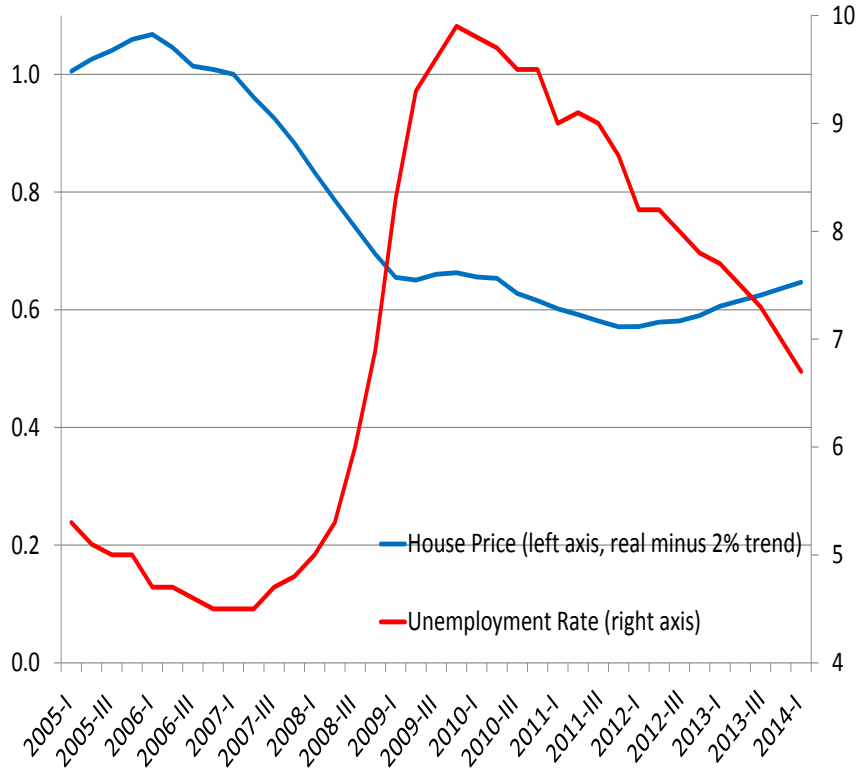
Intuition for Dynamics

- Consider the high unemployment phase
- Incentive to accumulate (because wealth helps reduce unemployment risk): low consumption/output
- Incentive to consume (because expected recovery): high consumption/output
- Two incentives balance out as unemployment declines $\Rightarrow$ stable demand for savings $\Rightarrow$ stable prices

The Great Recession?



Model

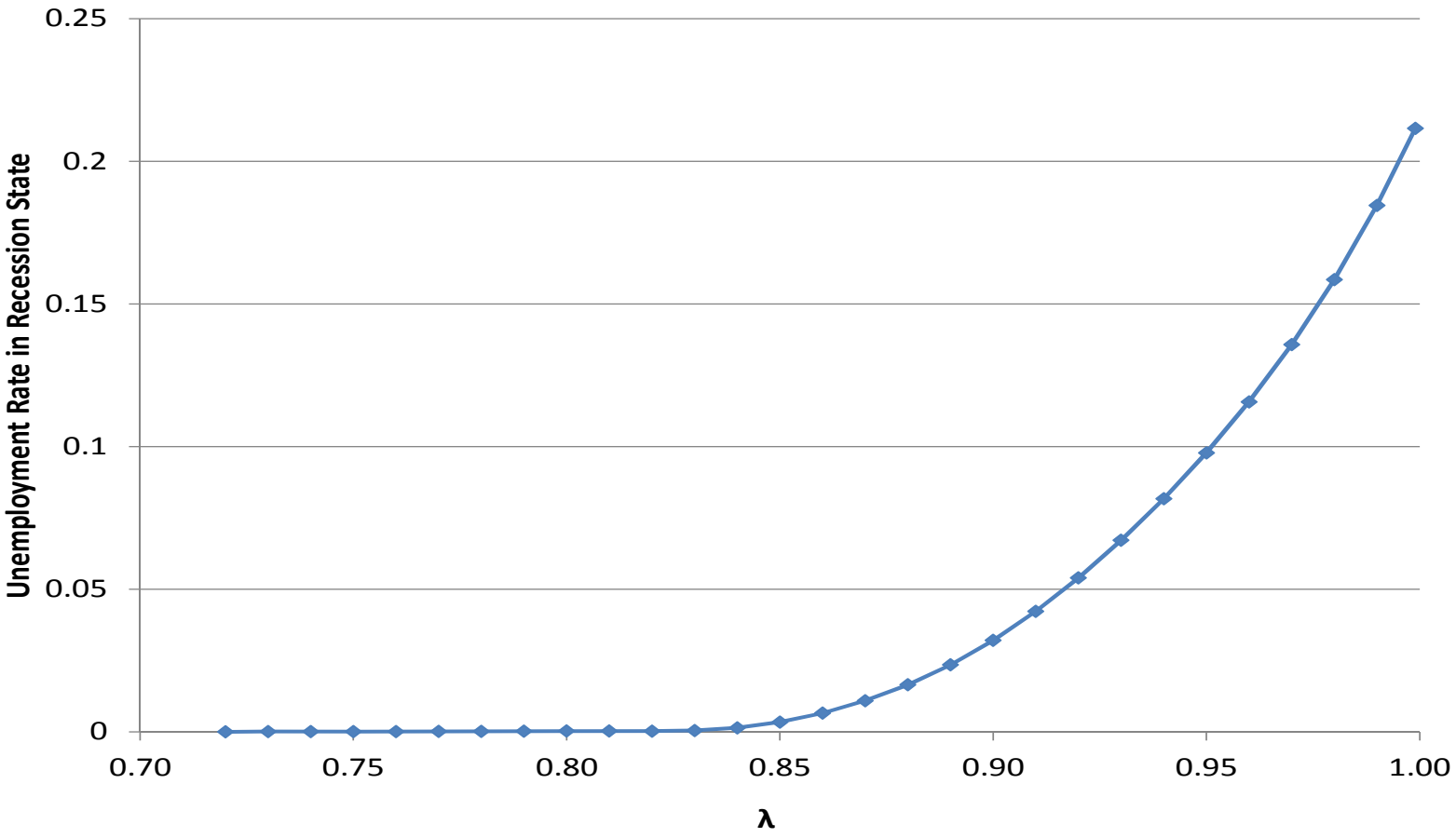


Data

Sunspots

- Characterize Markov equilibria switching from high to low unemployment, with a fixed probability $1 - \lambda$ and a fixed price.
- Results:
  - For these equilibria to exist λ has to be large enough
  - Equilibria with higher prices are characterized by low volatility

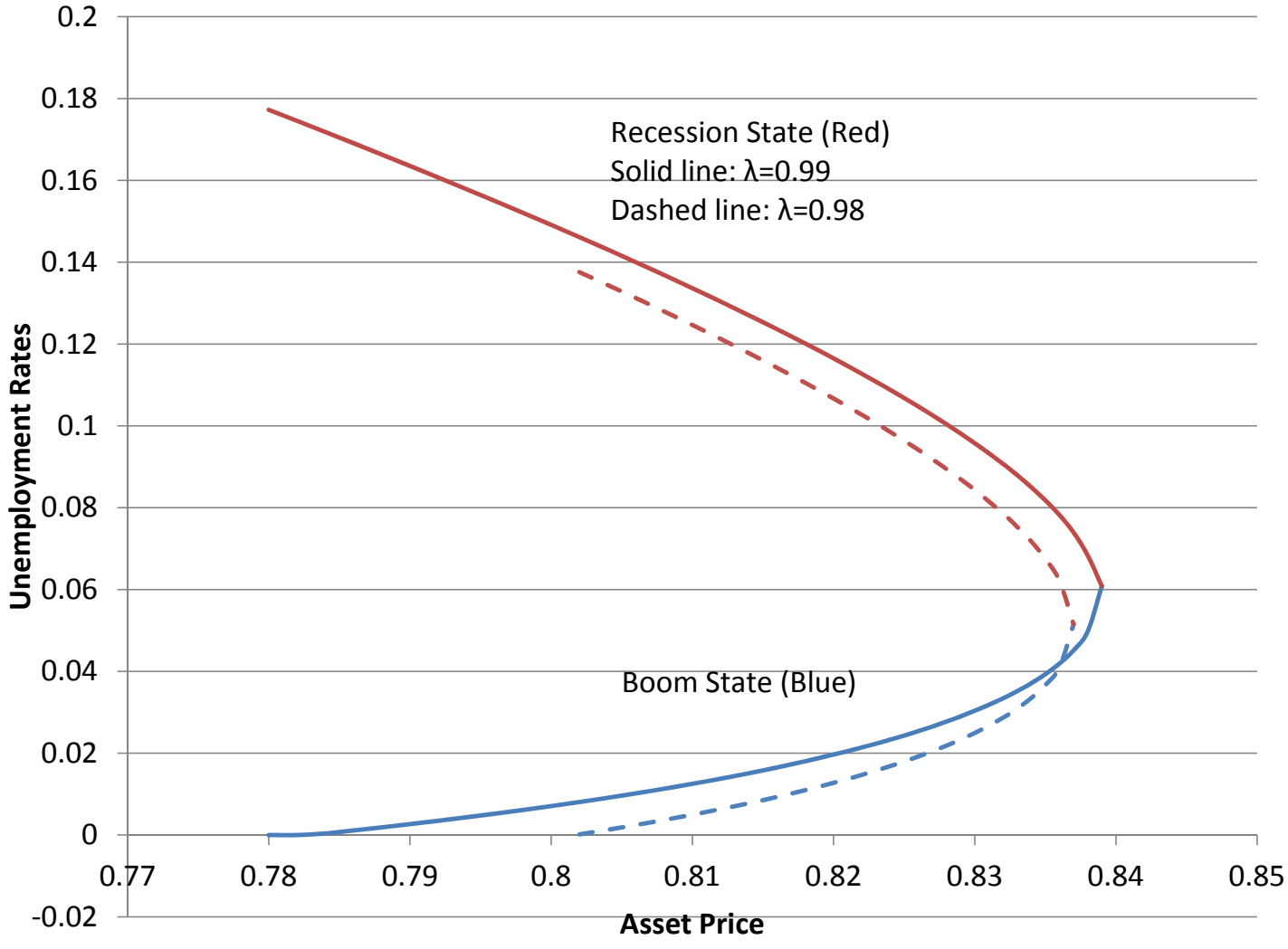
Sunspot recessions and persistence



Understanding Persistence

- It is only because agents expect high u_{t+1} that they cut c_t
- Logic extends forwards: only expect high u_{t+1} (low c_{t+1}) if also high expected u_{t+2}
- Permanent income intuition: Only persistently high expected unemployment consistent with low optimal current consumption
- The longer things are expected to stay bad, the sharper is the fall in demand and the larger the recession on impact
- Consistent with data from Michigan Survey of Consumers

More Wealth ⇒ Less Volatility



Review: Asset Prices and Macro Volatility

- High asset prices $\Rightarrow$ weak precautionary motive $\Rightarrow$ unique full employment equilibrium
- Lower asset prices $\Rightarrow$ strong precautionary motive $\Rightarrow$ range of equilibrium unemployment rates larger the lower is the asset price
- Volatility of unemployment is larger for low asset prices because low asset prices make consumption demand more sensitive to expectation

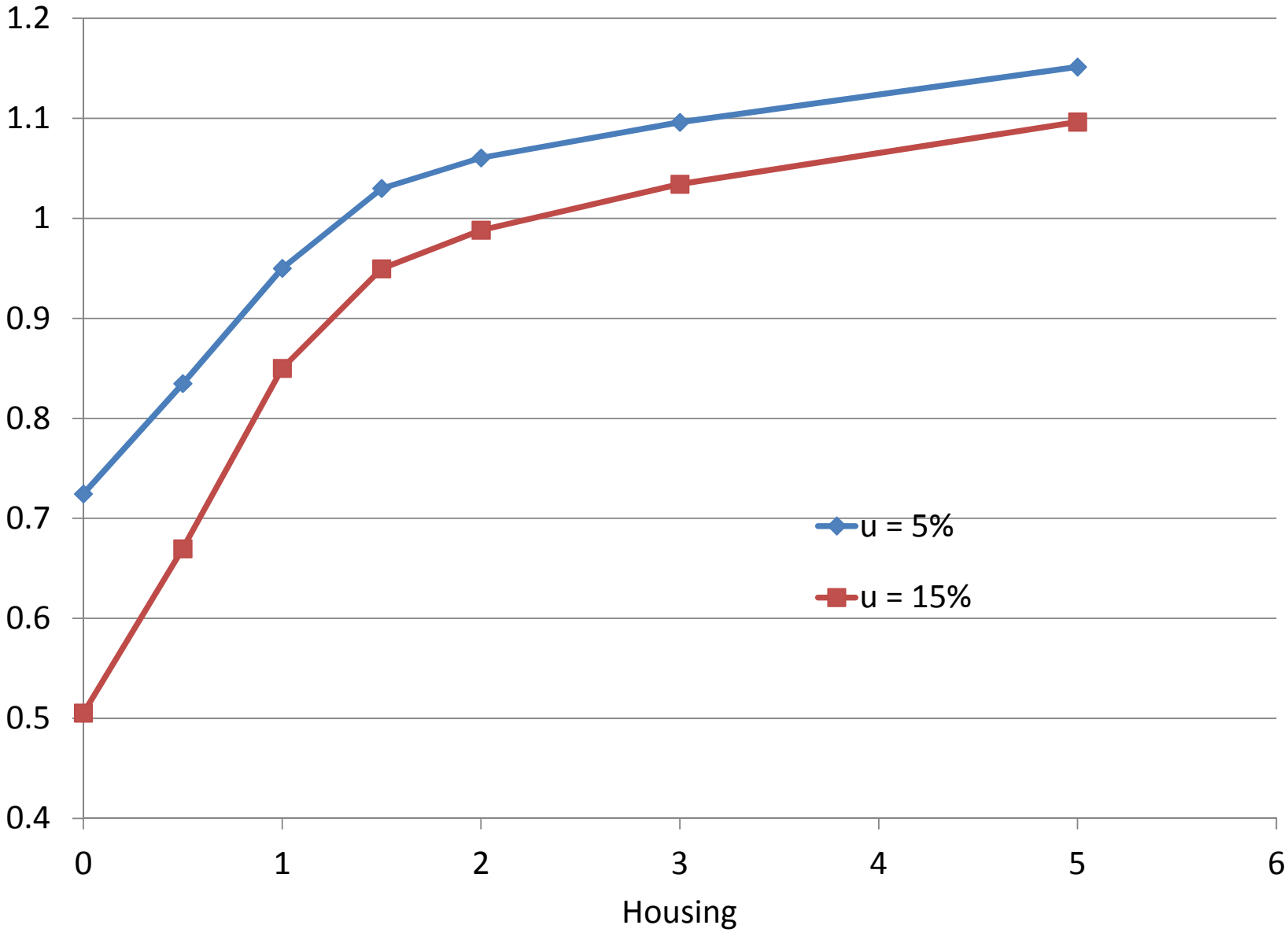
Why is the recovery slow?

- Large demand driven recession is driven by a large fall in consumption demand
- Large fall in consumption demand only happens if persistent fall in income is expected (PIH logic)
- Large fall <-> Slow recovery
- Consistent with data from Michigan Consumers Expectation, showing slow expected recovery in 2008

Micro Evidence for the Mechanism

- Key mechanism: Elasticity of demand wrt unemployment risk is larger when wealth is low
- Natural test: Did wealth-poor households reduce consumption more than rich households as unemployment rose during the Great Recession?

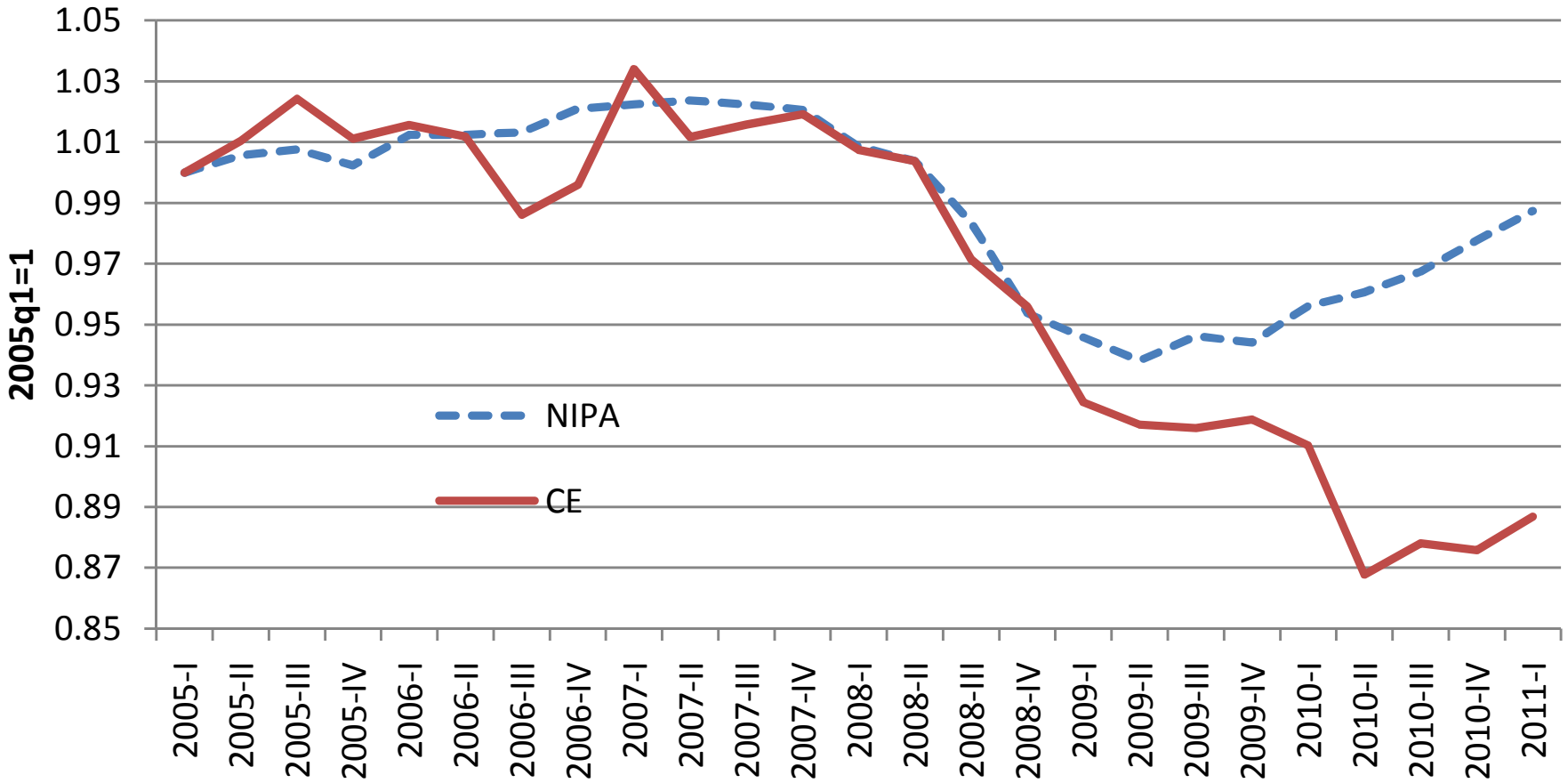
Differential Sensitivity in the Model



Consumer Expenditure Survey

- Households aged 25-60 with 4 quarters of consumption data
- Sort households by wealth (net financial wealth plus home equity) relative to consumption
- Compare consumption growth of top and bottom halves of wealth distribution

CE Survey versus NIPA



Characteristics of Rich versus Poor

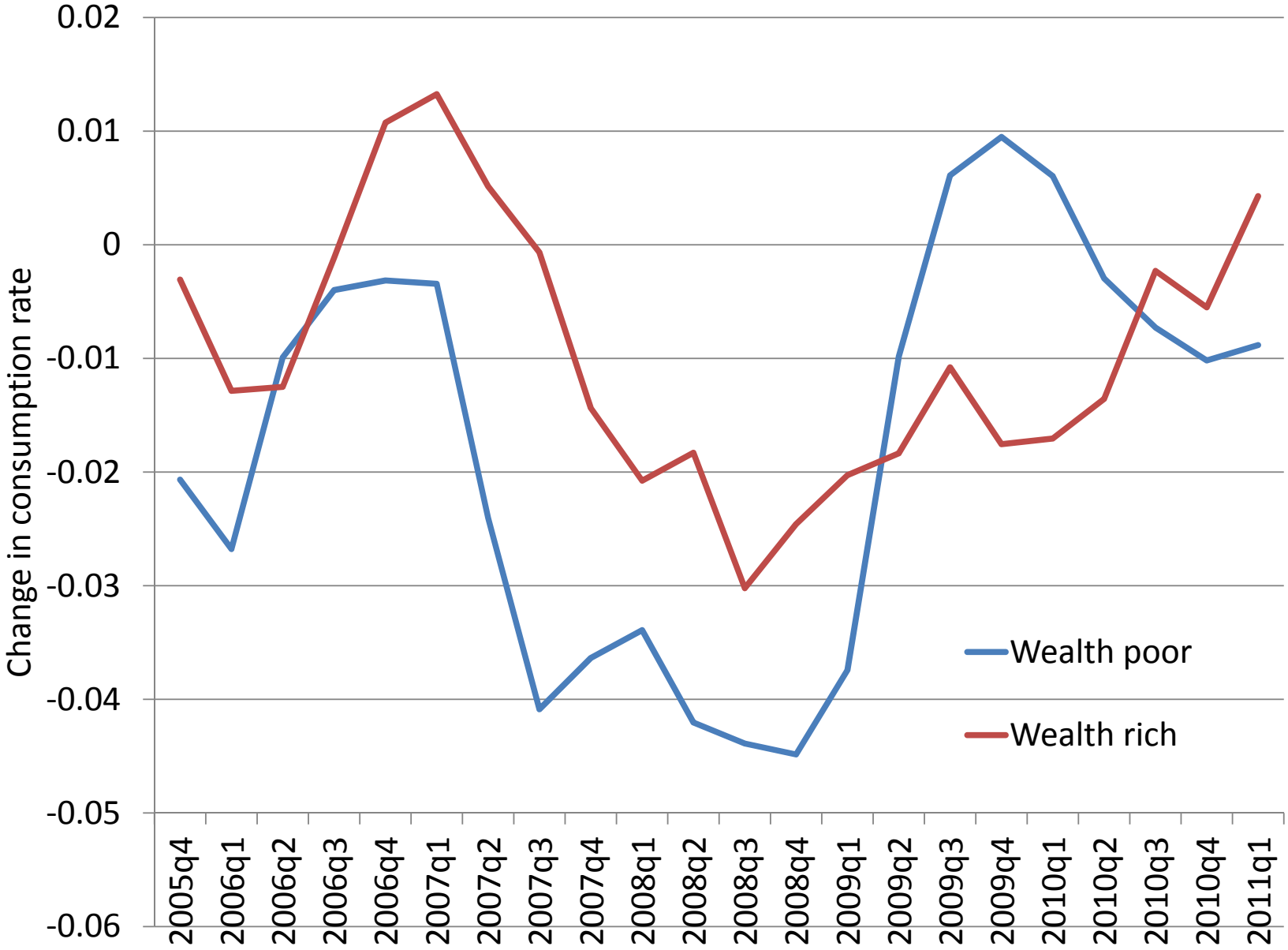
	Wealth Group	
	0-50	50-100
Sample size	8,864	8,873
Average age of head	41.4	46.9
Heads with college	25.7%	40.5%
Average household size	2.9	2.8
Net wealth p.c. (2005$)		
Mean	1,498	119,796
Median	238	63,162
Mean after-tax income p.c. (2005$)	22,117	32,811
Mean consumption p.c. (2005$)	9,353	11,252

Consumption Growth: Rich versus Poor

Consumption vs. Income Growth

	Wealth Group	
	0-50	50-100
Mean growth income p.c.	-0.3%	-1.0%
Mean growth cons. p.c.	-5.6%	-3.1%

Consumption Rates: Rich versus Poor



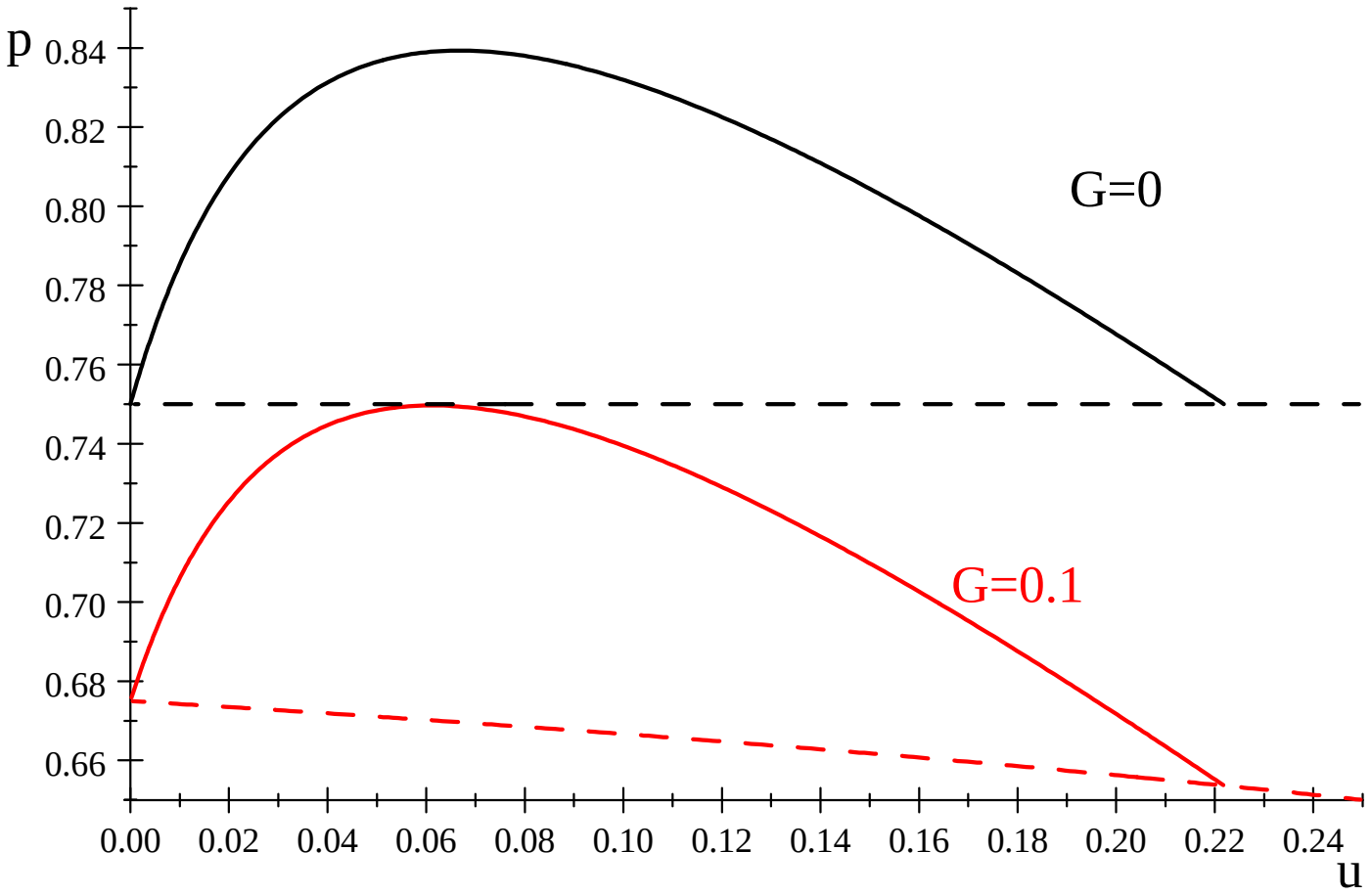
Evidence from PSID

	Low Wealth		High Wealth	
	2006	2006-2008	2006	2006-2008
Disposable Income	36600	+15%	73600	+6%
Consumption	24800	-13%	33600	-2%
Consumption Ratio	68%	-16%	46%	-3%
	2008	2008-2010	2008	2008-2010
Disposable Income	41200	+2%	77800	-2%
Consumption	22600	+3%	31600	+10%
Consumption Ratio	55%	+1%	41%	+5%

Micro Evidence: summary

- Low wealth households reduce consumption more during recession, despite facing similar increase in unemployment/income risk

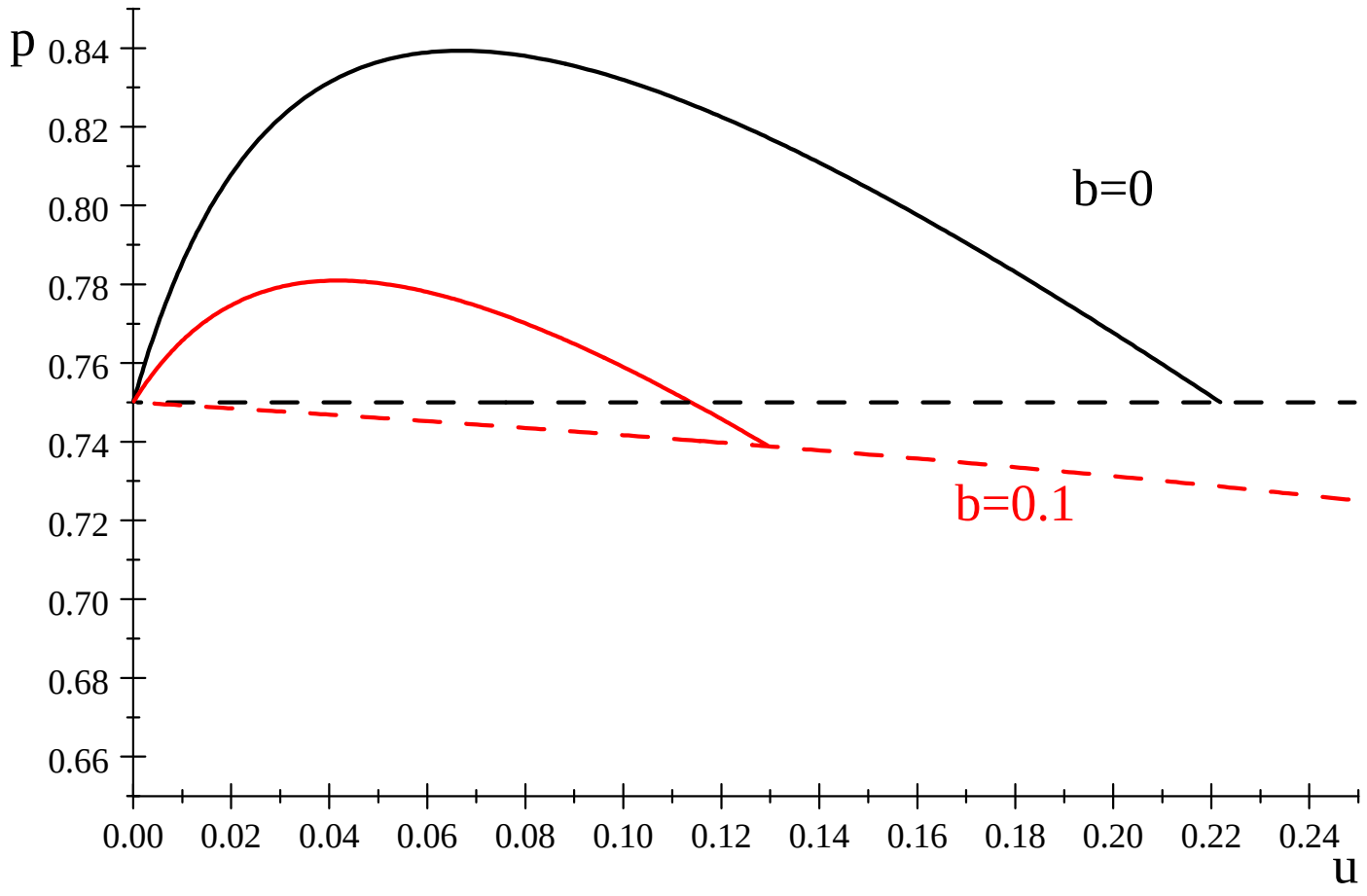
Policy 1: Tax and Spend



Policy 1: Review

- Reduces elasticity of aggregate demand to expectations
- Also reduces asset values (induces more precautionary saving)
- Can narrow/expand range of equilibrium unemployment
- Welfare implications depend on utility from G
- Not necessarily effective!

Policy 2: Unemployment benefit b financed by proportional tax τ on earnings



Policy 2: Review

- Policy reduces precautionary motive $\Rightarrow$ shrinks range of possible unemployment rates

- Policy reduces asset prices but..
- Unique full employment equilibrium if b sufficiently large

Conclusions

- Model in which macroeconomic stability threatened by (exogenously) low asset values
- Great Recession: Decline in home values left economy vulnerable to wave of pessimism
- Macro evidence of a link between level of wealth and aggregate volatility
- Micro evidence that low wealth households reduced consumption most sharply
- Can evaluate effectiveness of policies geared toward stabilization of these fluctuations

Household net worth in the long run