Houses as ATM:

Mortgage Refinancing and Macroeconomic Uncertainty

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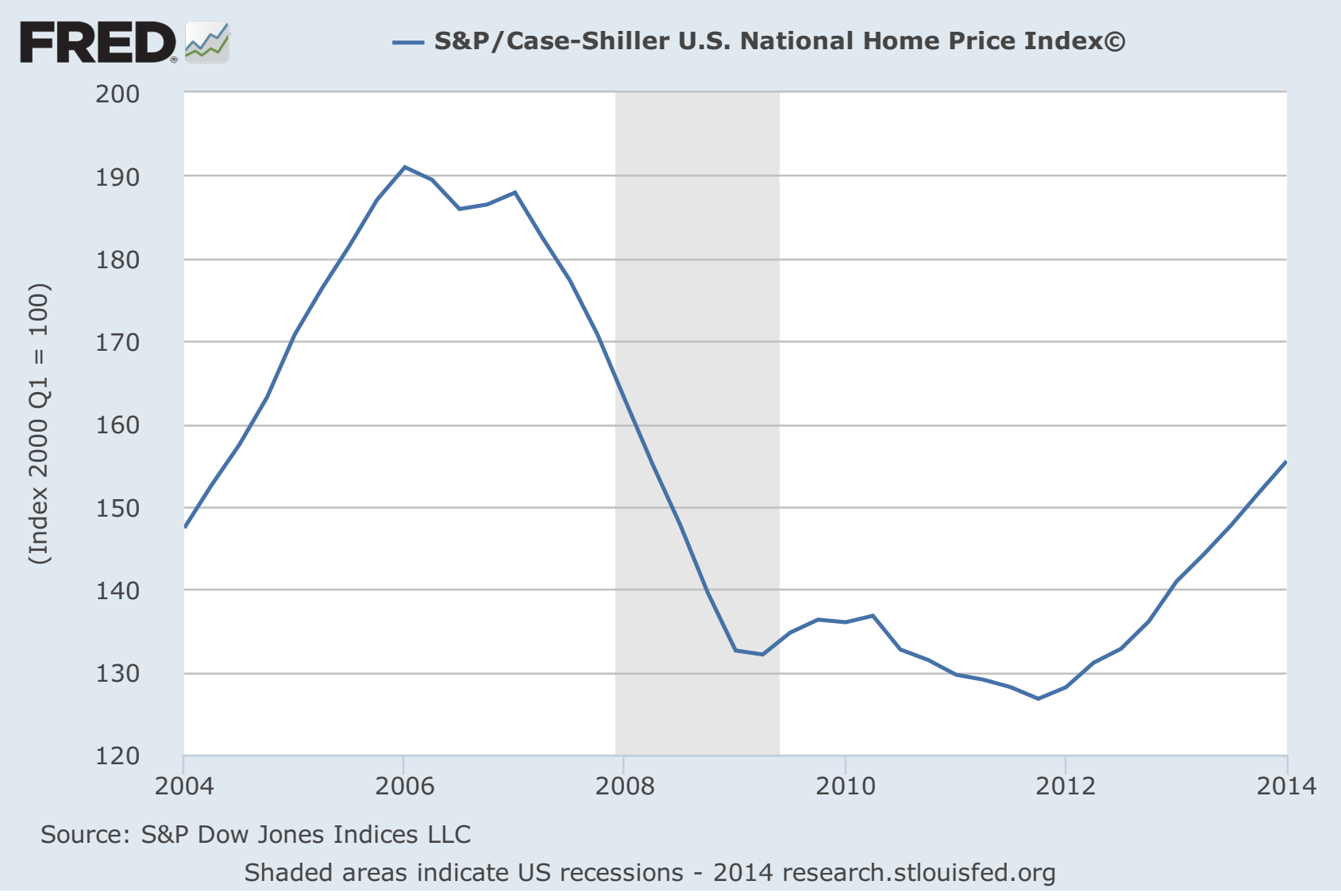
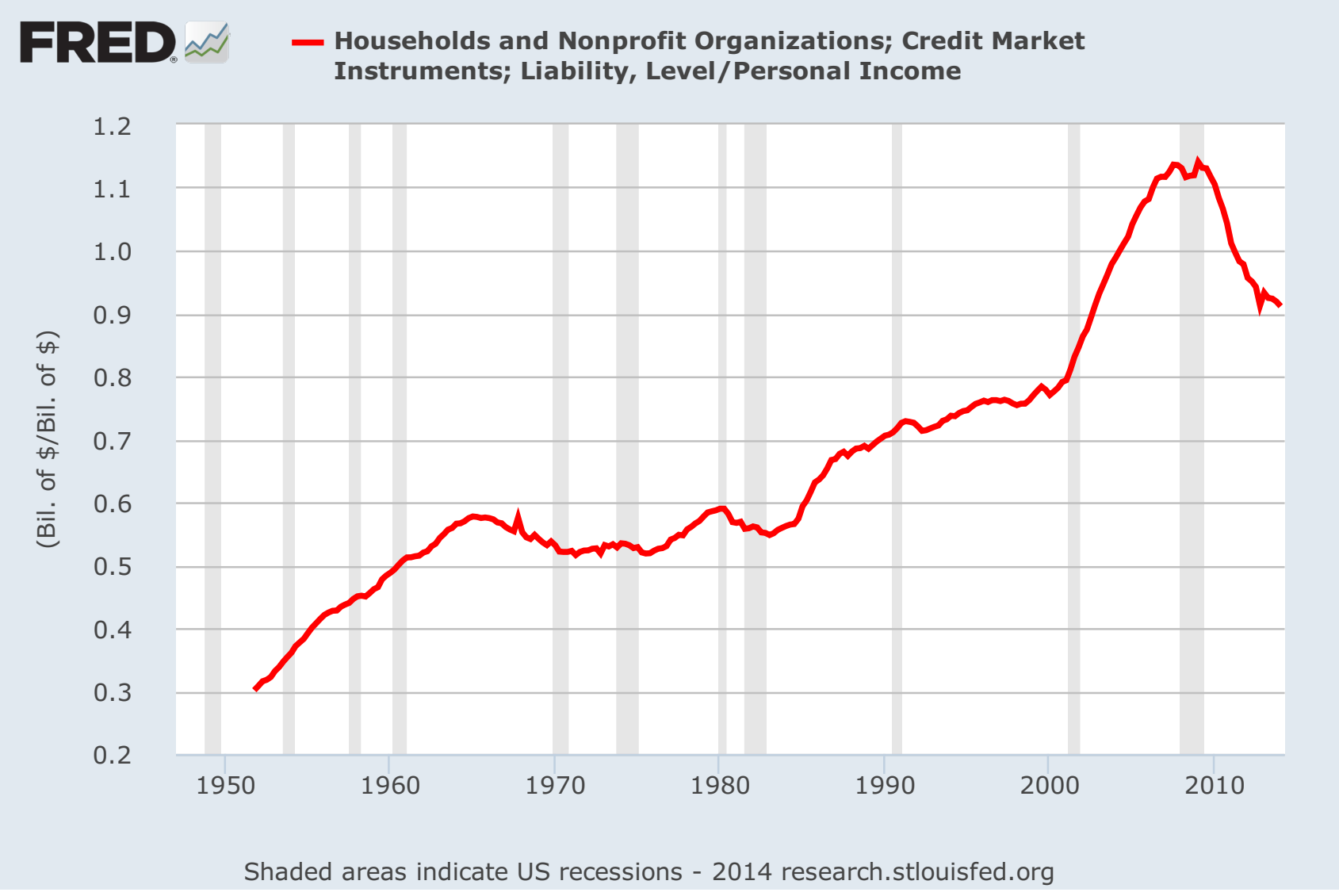
House Prices

- can the boom/bust in U.S. residential house prices ?



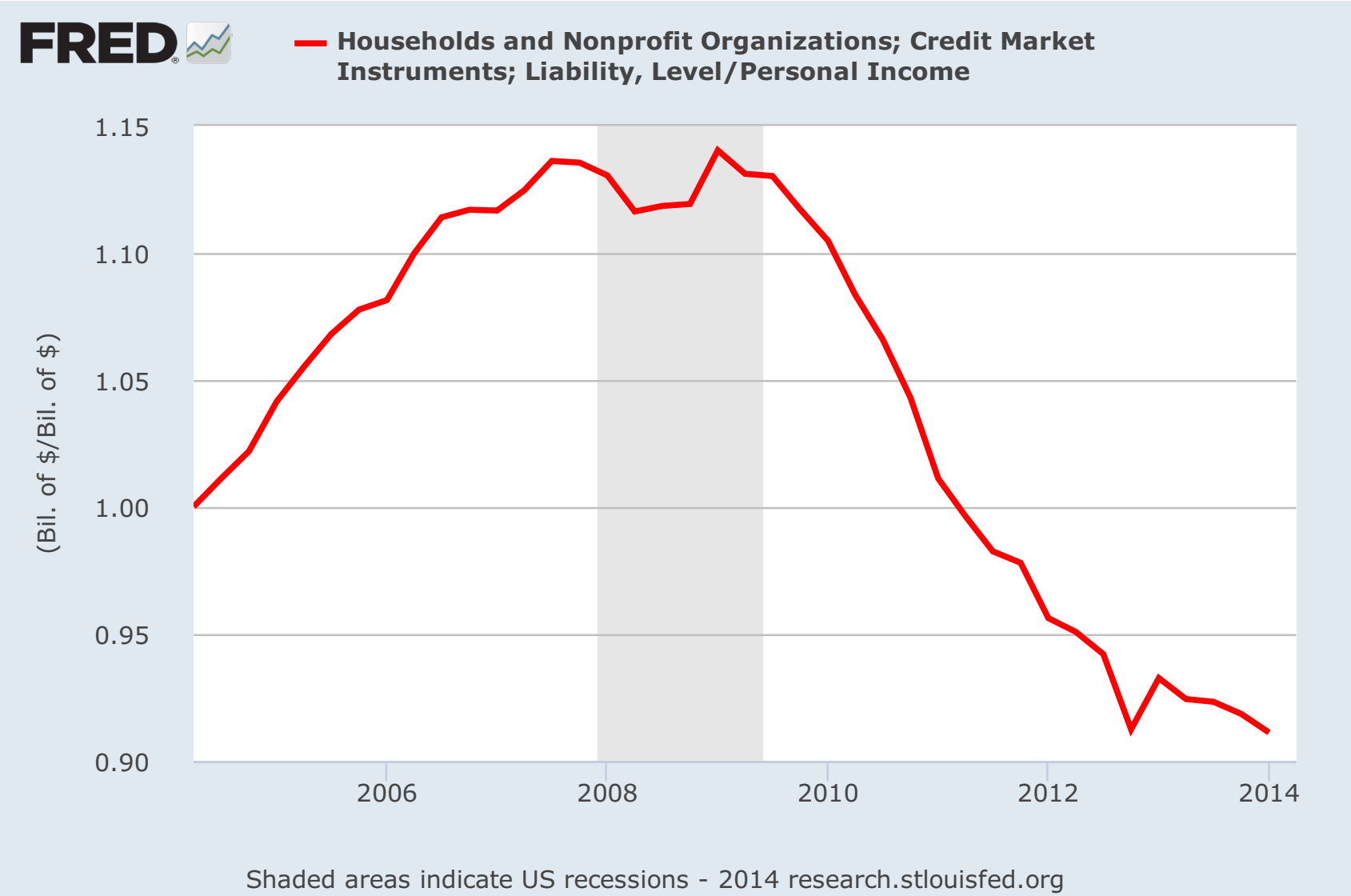
(1) Run-up in U.S. Household Debt

- account for (i) the run-up in household debt...



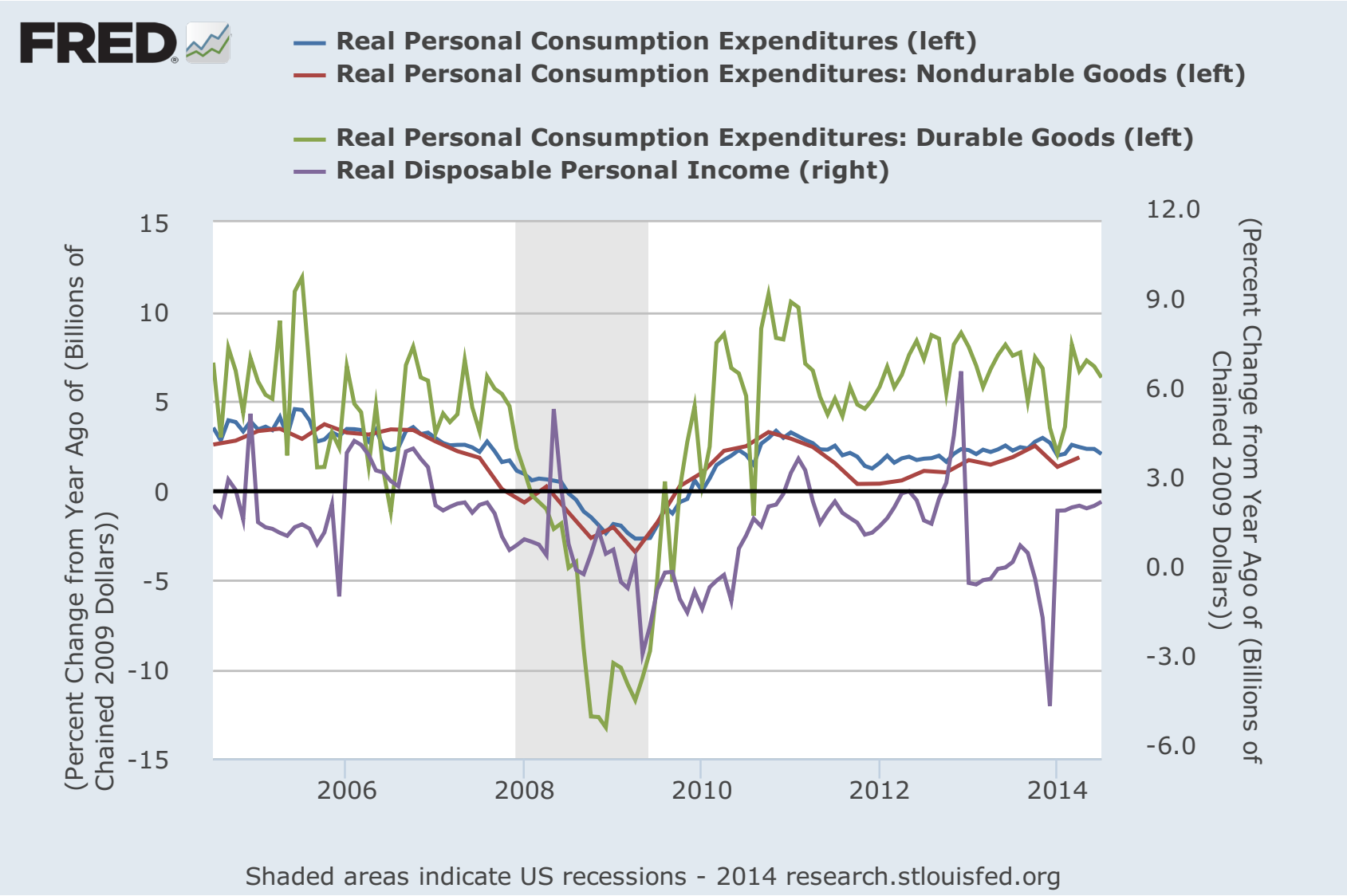
(2) Slow Deleveraging of U.S. Households

- account for (i) the run-up in household debt and (ii) subsequent slow deleveraging

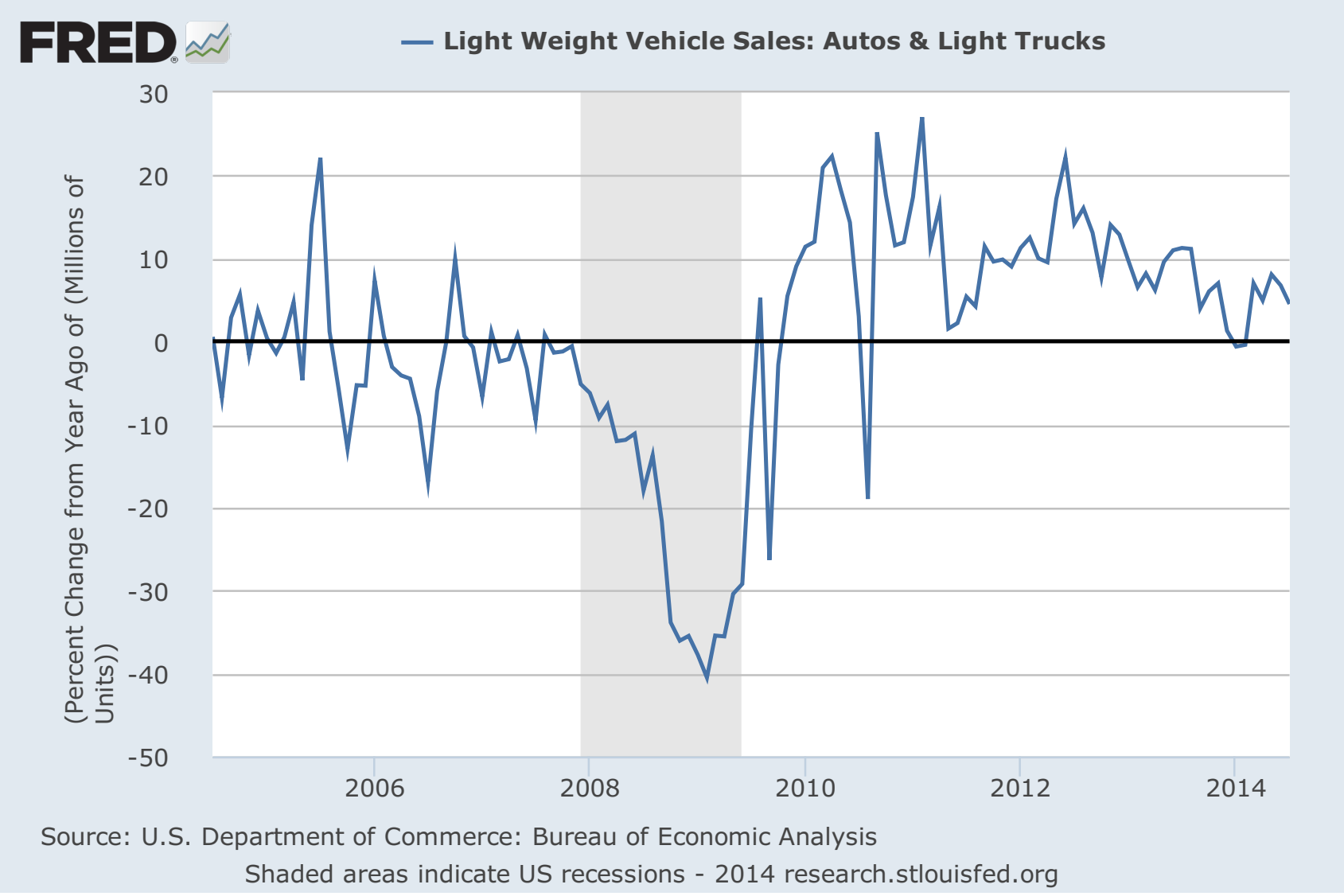


(3) U.S. Household Consumption Boom and Bust

- account for (i) the run-up in household debt , (ii) subsequent slow deleveraging and (iii) the household consumption boom and bust



U.S. Car Sales


FRED
Light Weight Vehicle Sales: Autos & Light Trucks
(Percent Change from Year Ago of (Millions of Units))
30
20
10
0
-10
-20
-30
-40
-50
2006
2008
2010
2012
2014
Source: U.S. Department of Commerce: Bureau of Economic Analysis
Shaded areas indicate US recessions - 2014 research.stlouisfed.org

Possible Approaches

1. clever **econometrics**: identify the effect of exogenous house price variation on consumption in the cross-section of households etc

2. **equilibrium model**: prices clear all (financial/goods) markets

3. **structural model of portfolio choice and consumption** ✓

   - feed in the observed [exogenous] path for house prices and the (long/short) interest rates
   - check whether the households' choices in aggregate match those in the data [without clearing any markets]

CMR Structural Model of Household Finance

1. **housing market**
   - rent [pay a fixed fraction of income]/buy [purchase a unit of house] decision
   - exogenous process for house/price income ratio h_t [agents fully understand this stoch. process]

2. **incomplete asset markets**
   - long-term fixed-rate loans (mortgages)
   - short-term loans (HELOCs)
   - default technology [default leads to renting]
   - collateral constraints
   - exogenous process for short-term rates r_t [agents fully understand this stoch. process]

3. **idiosyncratic/aggregate income risk**
   - Counter-Cyclical Variation in Idiosyncratic Risk
   - idiosyncratic income shock y_{it}
   - aggregate income growth z_t

State space includes aggregate state variables (r_t, h_t, z_t)

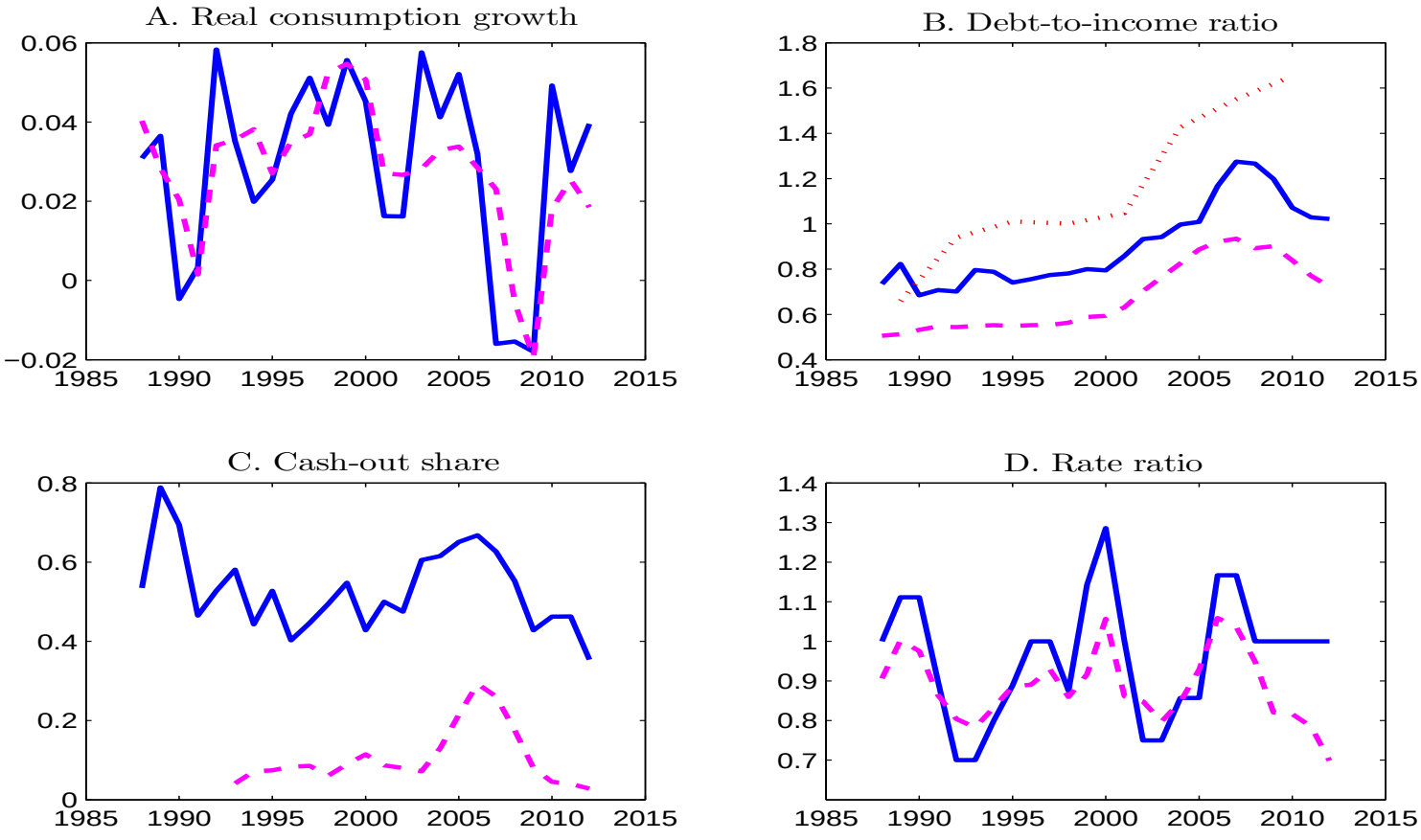
Aggregate Dynamics in Model Match Data

- aggregate choices by risk-averse (and slightly paranoid) rational agents who completely understand the asset price dynamics look like the 'data'

1. **consumption dynamics**: **relaxing** of collateral constraints $\rightarrow$ run-up in debt and consumption boom
2. **debt dynamics**: **tightening** of collateral constraints $\rightarrow$ sharp consumption drop and slow deleveraging
   - you purchase a unit of an asset ('house')
   - asset keeps appreciating (though rents are not going up);
   - you cannot sell a little bit of the house / selling the house is costly
   - instead, you borrow to de-cumulate wealth (short the other asset)
   - you consume more (because you really feel wealthier)

   - owners in this model are subject to large wealth shocks
   - harder to smooth their consumption

Aggregate Dynamics in Model/Data



Model solid line. Data dashed line

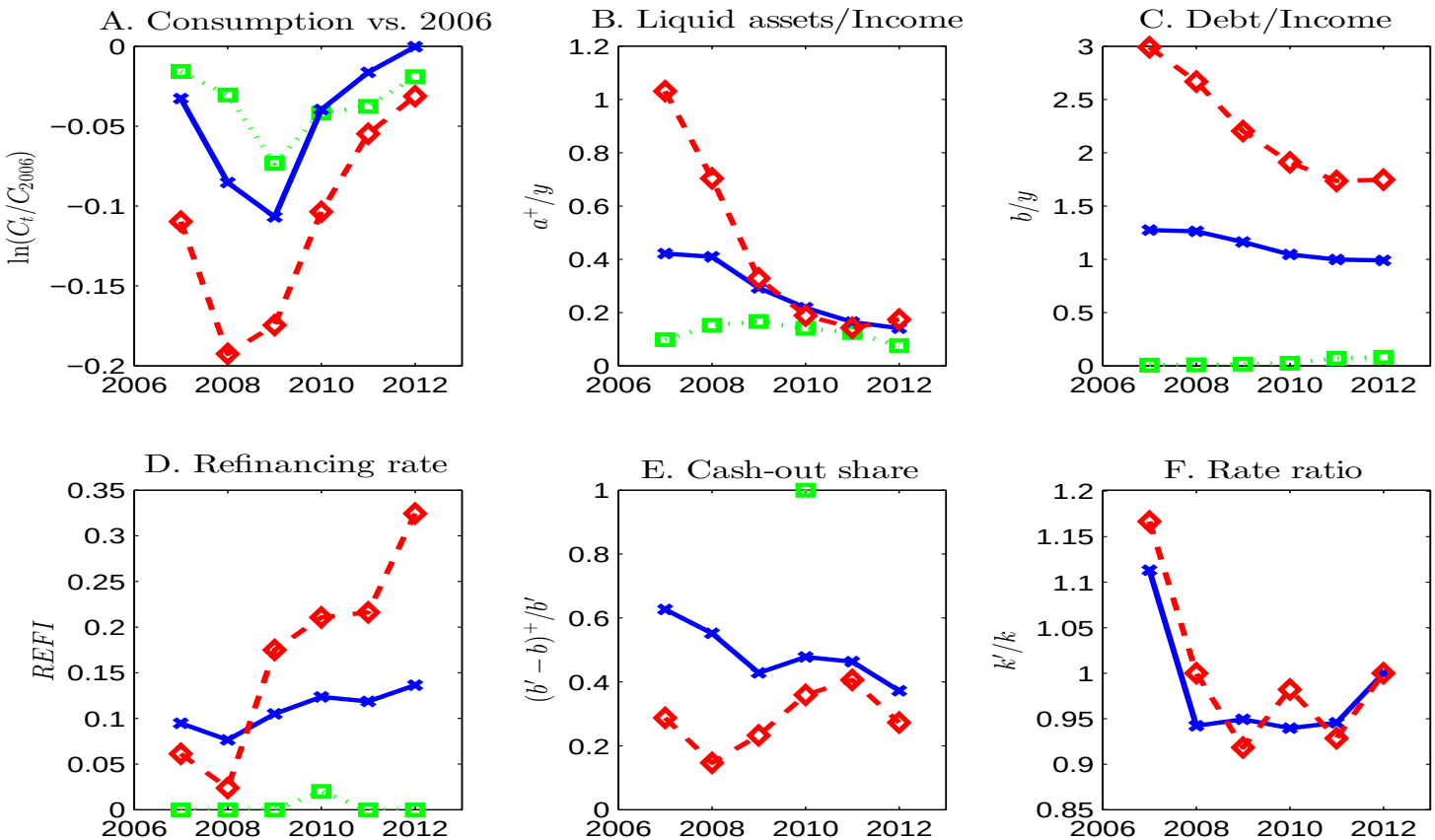
Aggregate Dynamics in GE Model

- in *CMR* model, prices do not adjust
  - exogenous dynamics for real risk-free rate
  - **no connection** between real risk-free rate and collateral asset value
- in equilibrium model, asset prices adjust during crisis:

$$r \swarrow, h \nearrow$$

  - scarcity of collateral (binding collateral constraints) pushes down the real risk-free rate below the rate of time preference and increases the value of the collateral asset
  - deterioration in risk-sharing/increased motive for precautionary savings also pushes down the real risk-free rate below the rate of time preference and increases the value of the collateral asset
  - large decrease in real risk-free rate and increase in the value of the collateral stock
  - these price adjustments will mitigate aggregate consumption decline

Aggregate Dynamics and X-section in Model



Top/bottom quintile of debt/income distribution in 2006. Average household solid line.

Other Questions

- risk sharing: why is there so little risk sharing in this model?
  - the unconditional volatility of household consumption growth equals the unconditional volatility of household income growth
  - lots of opportunities for self-insurance by accumulating assets plus access to default
  - possibly related to the way we accumulate housing wealth in this model

- very few home-owners in model relative to data, but model matches aggregate dynamics...

- what if default risk is priced properly? [are banks in your model making money/losing money on average]
- what happens to defaults in the model during the crisis?

Conclusion

1. CMR produce state-of-the-art household finance model to study macro dynamics

2. **collateral constraints/idiosyncratic risk** play a key quantitative role in macro dynamics before and during crisis

   - model produces large consumption drop and slow de-leveraging
   - key ingredients: you cannot fine-tune your holdings of the housing asset/ house prices and rents evolve independently

3. our models work better if we fix prices

   - housing collateral scarcity during crisis: why does the price of the collateral not increase? (maybe haircuts increase)
   - risk-free asset scarcity during crisis: why does the real risk-free rate not drop precipitously? (ZLB?)