1. House prices and deleveraging: evidence

- Mian, Sufi, Rao (2013)
- Narrative: contraction in home values, reduction in household wealth, reduction in household capacity to borrow against houses, reduction in spending
- Exploit cross-sectional variation to find convincing evidence in support of this narrative and quantify its significance
- Hypothesis: geographic areas in which contraction in house values was larger experienced greater contractions in consumption and greater unemployment
- Problem 1: how to measure consumption at disaggregated geographic level
  - Credit card data, auto sales
  - These give subsamples of spending in area, so we need to use some procedure to scale them up
- Problem 2: how to measure household balance sheets
  - Some measures of financial wealth (stocks and bonds) from IRS
  - But central focus on housing wealth and debt
  - Housing wealth combining census to get stock in 2000 and Core Logic for house appreciation
  - Debt from Equifax
  - Two type of specifications
    - The first needs less assumptions on the data, as we regress log changes on log changes (so scaling assumptions less important)
To deal with potential endogeneity they also use an instrument, Saiz measure of elasticity of housing supply.

IV gives slightly bigger slope.

Second type of specification, tries harder to get to theory, by measuring MPCs out of changes in housing wealth, that is, dollar per dollar, rather than % per %.

It requires more assumptions (scaling).

We can then do 2 things:
  - look at average MPC
  - look at heterogeneity in MPCs

Average results.
• Also here IV can be done and gives higher number (.072 instead of .054)
• Heterogeneity
• Simple intuition, concavity of the consumption function
• Given $ loss in housing wealth hits more consumers with low net worth
• Sharpest results are at the ZIP level, using leverage ratios (loan to house value ratio)
2. Deleveraging, theory

- Simple interpretation, change in house values change households’ borrowing capacity
- Do not model housing explicitly (as if housing completely illiquid)
- Effects of a shock to $\phi$ in a HANK model
- Approximation result (Auclert): a permanent reduction in $\phi$ equivalent to a reduction in cash-on-hand
- Decision problem

$$E \sum_{t=0}^{\infty} \beta^t u(c_t)$$

$$q b_{t+1} = b_t + y_t - c_t - \tau$$

$$b_{t+1} \geq -\phi$$

where $y_t$ is a Markov process
- Consumption policy

$$C(b, y; \tau, \phi)$$

- Result:

$$C(b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) = C(b, y; \tau, \phi)$$
• Why?
• Take an optimal plan under initial condition and parameters with no $\Delta$
  \[ \{c_t, b_t\} \]
• Change initial condition and parameter
• Then this plan
  \[ \{c_t, b_t + \Delta\} \]
  is feasible because
  \[ q(b_{t+1} + \Delta) = b_t + \Delta + y_t - c_t - \tau - (1 - q) \Delta \]
  \[ b_{t+1} + \Delta \geq -\phi + \Delta \]
• So
  \[ V(b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) \geq V(b, y; \tau, \phi) \]
• Same logic starting at the optimal plan for \( (b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) \) and showing same consumption feasible at \( (b, y; \tau, \phi) \) implies
  \[ V(b, y; \tau, \phi) \geq V(b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) \]
• So
  \[ V(b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) = V(b, y; \tau, \phi) \]
  and since optimal $c$ is unique
  \[ C(b + \Delta, y; \tau + (1 - q) \Delta, \phi - \Delta) = C(b, y; \tau, \phi) \]
• Then differentiate both sides wrt $\Delta$ at $\Delta = 0$
  \[ \frac{\partial C}{\partial b}(b, y; \tau, \phi) + (1 - q) \frac{\partial C}{\partial \tau}(b, y; \tau, \phi) - \frac{\partial C}{\partial \phi}(b, y; \tau, \phi) = 0 \]
• Result
  \[ \frac{\partial C}{\partial \phi} = \frac{\partial C}{\partial b} + (1 - q) \frac{\partial C}{\partial \tau} \]
  if $q \approx 1$ then
  \[ \frac{\partial C}{\partial \phi} \approx \frac{\partial C}{\partial b} \]
• MPC informative on effect of a credit crunch