Comments on "Optimal conventional and unconventional monetary policies in the presence of collateral constraints and the zero bound" by Brendon, Paustian and Yates.

Carl E. Walsh

University of California, Santa Cruz

FRBSF Conference: Feb. 25, 2010

Objectives of the paper

- Studies monetary policy design when
  - shocks may produce "a sudden reduction in the quantity of lending advanced to firms and a tightening on the terms on which such lending was made."
  - the environment is one in which the financial sector amplifies and propagates shocks;
  - the central bank policy rate is driven to zero;
  - the central bank adopts conventional policy measures, including promises to keep interest rates low in the future, and unconventional policies associated with credit easing policies.
- Paper focuses on
  - commitment versus discretion;
  - the role of the zero lower bound;
  - the effects of asset purchases.

Contributions of paper

1. Explicit treatment of credit easing policies and their fiscal implications.
2. Derivation of optimal use of *both* conventional and unconventional policies.
3. New algorithm for solving for optimal policy under discretion with multiple instruments, endogenous state variables, and the zero lower bound.

Basic modeling approach

- Model based on Kiyotaki and Moore (1997) via Iacoviello (2005) and Andrés, Arce, and Thomas (2010).
- Fixed stock of real estate held by either households or entrepreneurs.
  - Entrepreneurs use commercial real estate as factor of production.
  - Borrowing (collateral) constraints on entrepreneurs limit their ability to purchase real estate.
- Key shock is to the fraction of commercial real estate entrepreneurs can pledge as collateral.
  - "serve to capture the idea that a proximate cause of the crisis was a sudden change in the preparedness of those with money to invest it in risky or illiquid forms, unconnected with fundamentals."

Basic structure – Kiyotaki and Moore (1997)

- Fixed stock of land – divided between farmers and gatherers.
- Farmers have more efficient technology for using land;
  - Socially efficient outcome would equalize marginal product of land in both uses.
- Farmers face borrowing constraints:
  - Farmer's labor is critical and they cannot commit not to walk away;
  - This limits the amount they can borrow to the collateralized value of their land:
  - Leads to socially inefficient allocation of land - farmers have too little land;
  - Anticipated rise in price of land relaxes the borrowing constraint and allows farmers to borrow more.

Brendon, Paustian and Yates (2010)

- Similarities:
  - Land equals housing;
  - Gatherers equal households;
  - Farmers equal entrepreneurs;
- Differences:
  - Lending is in nominal terms;
  - Banks introduce a spread between the deposit rate and the lending rate.
  - Costly to transfer land between gatherers to farmers.

Components of the BPY model

- Collateral constraint on entrepreneurs:

$$b_t \leq \left(\frac{m_t}{\Gamma}\right) \mathrm{E}_t \left(\frac{\pi_{t+1}}{R_t}\right) p_{t+1}^{h^e} h_t^e,$$

  where Γ is an exogenous wedge between the (gross) interest rate banks charge entrepreneurs and the central bank interest rate.

  - a negative realization of m_t is the driving shock.

- Adjustment costs in converting housing between residential and commercial uses, implying

$$p_t^{h^e} = p_t^h + \psi^e \left(h_t^e - h_{t-1}^e\right).$$

  - Conversion costs are external to construction firms – source of an externality.

Policy instruments

- Two types of policies:
  - Conventional control over a nominal interest rate;
  - Unconventional purchases of loans from banks which act to subsidize borrowing by entrepreneurs;
    - Loan purchases (credit easing) financed with tax on labor.
  - How is unconventional policy defined? Borrowing rate faced by entrepreneurs is a mark up Γ over bank's funding costs:

    $$Q_t = \Gamma R_t$$

    At the ZLB (i.e., when $R = 1$), the central bank is assumed to control Q_t.
- So unconventional policies are assumed to be able to affect the cost of borrowing – focus is not on whether unconventional policies work but rather on how to optimally implement control of Q as a second instrument.

Policy objectives

- Objective of policy is to maximize weighted utility of households and entrepreneurs.
- Tax/subsidy policy to ensure and efficient steady state.
  - Eliminates the inefficiency in the distribution of housing between households and entrepreneurs.
- Approximation around efficient steady state – misses the inefficiency key to Kiyotaki-Moore where too little land is in hands of farmers in steady state.
  - In a model with labor frictions, Ravenna and Walsh (2011) find gains from deviating from price stability are small, even with a fixed wage if the wage fixed at the efficient steady-state level, but gains are much larger it wage is fixed at a level associated with an inefficient steady state.

Policy objectives

- Authors derive a second-order approximation to welfare;
  - Policy makers uses same discount rate for households and entrepreneurs. Period loss function is

$$\mathrm{E}_t \left\{ \begin{array}{c} \hat{\pi}_t^2 + 0.087 \left(\hat{y}_t - \hat{y}_t^{fl} \right)^2 + 0.001 \left(\hat{c}_t - \hat{c}_t^e \right)^2 + 0.027 \hat{c}_t^2 \\ +0.001 \left(\hat{c}_t^e \right)^2 + 0.083 \left(\hat{h}_t^e - \hat{h}_{t-1}^e \right)^2 + 0.002 \left(\hat{h}_t^e \right)^2 \end{array} \right\}$$

- Welfare is expressed in terms of the volatility of variables rather than the volatility of "gaps".
  - Does not provide insights into distortions policy should be addressing.
- To understand the distortions policy should be addressing, the motivation for the model's specification matters.
  - For example, the assumption that adjustment costs depend on aggregates introduces an externality.
  - Motivation is that there exist scarce, unmodelled resources and increased demand pushes up their cost. But that isn't an externality and so cannot provide a justification for monetary policy to respond.

Policy responses to a negative borrowing shock (no ZLB)

- Policy responses with one instrument ($Q_t = \Gamma R_t$):

  Borrowing constraint: $\hat{b}_t = \hat{m}_t - \left(\hat{R}_t - \mathrm{E}_t \hat{\pi}_{t+1}\right) + \mathrm{E}_t p^{h^e}_{t+1} + \hat{h}^e_t$

  Euler condition for HH: $\hat{c}_t = \mathrm{E}_t \hat{c}_{t+1} - \left(\frac{1}{\sigma}\right)\left(\hat{R}_t - \mathrm{E}_t \hat{\pi}_{t+1}\right)$

- Combining the two yields

$$\hat{b}_t = \hat{m}_t + \sigma\left(\hat{c}_t - \mathrm{E}_t \hat{c}_{t+1}\right) + \mathrm{E}_t p^{h^e}_{t+1} + \hat{h}^e_t$$

  - Create a consumption boom that raises price of entrepreneurs' output (and inflation).

Policy responses to a negative borrowing shock (no ZLB)

- Policy response with two instruments:

$$\hat{b}_t = \hat{m}_t - \left(\hat{Q}_t - \mathrm{E}_t \hat{\pi}_{t+1}\right) + \mathrm{E}_t p^{h^e}_{t+1} + \hat{h}^e_t$$

$$\hat{b}_t = \hat{m}_t - \left(\hat{R}_t - \mathrm{E}_t \hat{\pi}_{t+1}\right) - \left(\hat{Q}_t - \hat{R}_t\right) + \mathrm{E}_t p^{h^e}_{t+1} + \hat{h}^e_t$$

$$\hat{b}_t = \hat{m}_t + \sigma\left(\hat{c}_t - \mathrm{E}_t \hat{c}_{t+1}\right) - \left(\hat{Q}_t - \hat{R}_t\right) + \mathrm{E}_t p^{h^e}_{t+1} + \hat{h}^e_t$$

- Lower Q_t relative to R_t.
  - But if $\hat{Q}$ offsets $\hat{m}$, fall in $\hat{Q}$ leads entrepreneurs to buy more housing. This increases future productive capacity and is deflationary. But to finance lending to entrepreneurs, labor tax rises and this reduces labor supply.

Policy response at the ZLB

- Policy with one instrument:
  - Under commitment, welfare loss is small;
  - Under discretion, welfare loss is huge – 31.98% of quarterly consumption.
- Policy with two instruments:
  - Under commitment, welfare loss is further reduced by about 25%;.
  - Under discretion, welfare loss is reduced by over 90%. Even so, it is still 200 times the level under commitment;
  - Cutting $\hat{Q}$ increases $\hat{h}_t^e$ and increases future productive capacity. This is deflationary but at the ZLB $\hat{R}$ cannot be cut to offset expectations of deflation. But rise in labor tax works the other way.
- Non-indexed debt matters.

Comments

- Nice focus on optimal policy with multiple instruments.
- Does it explain the housing boom and collapse? No, just treats m_t as an exogenous shock.
  - Is the focus on commercial real estate the right one?
- Does the shock to the borrowing constraint capture the crisis?
  - "serve to capture the idea that a proximate cause of the crisis was a sudden change in the preparedness of those with money to invest it in risky or illiquid forms, unconnected with fundamentals." But it was the boom that seemed unconnected to fundamentals, not the crisis.
  - In the model, m_t is a bad shock – policy should offset it. If a fall in m_t reflects a more accurate assessment of risks, then the issue is whether monetary policy can improve the adjustment to a new lower m_t (in model, shocks to m are transitory).
- Assessing unconventional policies – paper assumes they work and focuses on how to use them.
  - How big would the purchases need to be?

Questions to address

- How good is the model? Would be nice to compare to U.S. data (or other statistics). Does it capture normal (i.e., non ZLB) business cycles?
- How big is the role played by nominal rigidities?
  - Eggertsson and Krugman (2010): wage and price flexibility makes things worse.
  - Del Negro et al (2010): shock causes virtually no decline in output when prices/wages are flexible.
- What role are banks playing? What matters is m_t/Γ – should Γ be linked to m_t? Spreads rose in crisis.
- Would it be more efficient to use fiscal policy directly? i.e., is monetary policy the best instrument?