Discussion of "Cost-Benefit Analysis of Leaning Against the Wind: Are Costs Larger Also with Less Effective Macroprudential Policy?" by Lars E.O. Svensson

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Main Issue

- How should monetary policymakers consider financial stability?
- Severity of financial crisis and ensuing recession renewed this discussion.
    - Financial imbalances can build up even in a low-inflation environment. Price stability is not a sufficient condition for financial stability.
    - Financial instability can arise from nonbanks and from institutions that are solvent and not highly leveraged (Feroli, Kashyap, Schoenholtz, and Shin, 2014).
    - Financial instability can disrupt the transmission of monetary policy to the economy.
    - Monetary policy can pose potential risks to financial stability by affecting market functioning and spurring risk-taking in a search for yield.
    - Even if monetary policymakers care only about the dual mandate of price stability and maximum employment, they need to consider the nexus between monetary policy and financial stability.

Main Issue, continued

- "Clean" or "Lean" (White, 2009)
  "Fire Extinguisher" or "Smoke Detector" (Kroszner, 2014)
  - Clean: Use monetary policy to respond to asset price movements (or other financial stability issues) only to extent they affect inflation and output growth. Monetary policy not used to limit size of imbalances as they develop but to mop up consequences.
  - Lean: More activist approach of using monetary policy to try to stem developing imbalances before they cause harm.
- Divisions between these two views may be overstated. They agree on:
  - Central banks have a responsibility to promote financial stability by acting as the lender of last resort to solvent financial institutions with good collateral.
  - Monetary policy should take financial conditions into account as part of the economic environment and respond to the extent that imbalances in credit and financial markets pose risks to price stability over the medium and longer run.
  - Asset prices play an important role in the monetary policy transmission mechanism, potentially affecting both aggregate demand and inflation, but monetary policy should not target asset prices.

Main Issue, continued

- Broader question than "bubbles": Financial imbalances need not come from bubbles.
  - High optimism => rapid expansion of credit => higher asset prices and lower cost of capital => more credit and economic expansion.
  - If high optimism turns out to be ill-founded => investments don't pay off, confidence collapses, credit supply falls, asset prices fall.
  - Not necessarily a bubble because original optimism may have been rationally based on available information.
  - But can generate behavior that leads to instability: lowering of credit standards that relies on further appreciation of asset prices to cover potential losses rather than relying on borrowers' ability to repay.
  - Asset-price dynamics can yield undesirable outcomes for the economy.
- Take an action against a growing imbalance?
  - Balance expected improvement in future economic conditions against the potential cost imposed on current economic conditions (e.g., unduly limiting credit extension).

Lar's Paper

- Brings some metrics to the question of how monetary policy should optimally respond to the possibility of financial instability.
  - Non-crisis state and crisis state. Multiperiod model => Cross-state and intertemporal trade-offs.
  - Non-crisis state is the norm, but in each period there is a probability of a crisis. Once crisis hits, it lasts 8 quarters (this is fixed).
  - Cost-benefit analysis: Optimal policy will balance the expected costs and benefits.
  - Cost: Running a policy that is non-optimal in (multiple-period) non-crisis state.
  - Benefit: Lower the severity of the crisis and/or lower probability of entering the crisis state.
  - If monetary policy is neutral in the long-run, then policy can reduce the probability of a crisis tomorrow but only by raising the probability of a crisis at some point in the future.

Main Conclusion

- Don't lean against the wind in non-crisis state. In fact, lean with the wind.
  - Benefit: Leaning with the wind implies that the economy will enter the crisis in a better state, which lowers the economic cost of the crisis.

outweighs...

  - Costs: Increase in probability of crisis in future period and worse economic performance in the non-crisis state due to running non-optimal policy in the non-crisis state.

Quadratic loss function:

$$E_1 \sum_{t=1}^{\infty} \delta^{t-1} L_t(\tilde{u}_t) = \sum_{t=1}^{\infty} \delta^{t-1} E_1 L_t(\tilde{u}_t), \text{ where } L_t(\tilde{u}_t) = (u_t - u_t^*)^2 = (\tilde{u}_t)^2$$

Rewrite this using $E\{y^2\} = \{E(y)\}^2 + Var(y)$:

$$E_1 \sum_{t=1}^{\infty} \delta^{t-1} L_t(\tilde{u}_t) = \sum_{t=1}^{\infty} \delta^{t-1} \left\{ \left\{ E_1(\tilde{u}_t) \right\}^2 + Var_1\left(\tilde{u}_t\right) \right\}$$

Choose policy to minimize this loss function.

Trade-off between minimizing the expected gap squared and the variance of the gap.

Let i_1^* be the policy that minimizes $\left\{E_1(\tilde{u}_t)\right\}^2 + Var_1\left(\tilde{u}_t\right)$.
Let i_1^{**} be the policy that minimizes $\left\{E_1(\tilde{u}_t)\right\}^2$, i.e., $E_1(\tilde{u}_t)\big|_{i_1^{**}} = 0$.
Then $\dfrac{dVar_1(\tilde{x}_t)}{di_1} < 0 \Rightarrow i_1^* > i_1^{**}$.

=> Tighter policy than if policymakers were only concerned with expected gap. Tolerate a larger gap in order to reduce volatility.

Let's add some structure on $\left\{E_1(\tilde{u}_t)\right\}^2$ using Lar's notation and assumption:

- p_t = probability of being in crisis in period t
- u_t^n = unemployment rate in non-crisis period t
- u_t^c = unemployment rate in crisis period t

- Assume: $\tilde{u}_t^c = \tilde{u}_t^n + \Delta u$

$$\left\{E_1(\tilde{u}_t)\right\}^2 = \left\{(1-p)\underbrace{E_1(\tilde{u}_t^n)}_{\text{Expected loss in non-crisis period } t} + p\underbrace{E_1(\tilde{u}_t^c)}_{\text{Expected loss in crisis period } t}\right\}^2 = \left\{(1-p)E_1(\tilde{u}_t^n) + pE_1(\tilde{u}_t^n + \Delta u)\right\}^2 = \left\{E_1(\tilde{u}_t^n) + p\Delta u\right\}^2$$

Loss Function:

$$E_1 \sum_{t=1}^{\infty} \delta^{t-1} L_t(\tilde{u}_t) = \sum_{t=1}^{\infty} \delta^{t-1} \left[\left\{ E_1(\tilde{u}_t) \right\}^2 + Var_1\left(\tilde{u}_t\right) \right]$$

$$= \sum_{t=1}^{\infty} \delta^{t-1} \left[\left\{ (1-p_t) E_1(\tilde{u}_t^n) + p_t E_1(\tilde{u}_t^n + \Delta u) \right\}^2 + Var_1(\tilde{u}_t^n) \right]$$

For now, assume p_t and Δu are constant.

So policy only affects squared expected gap through its effect on the size of the expected gap in the non-crisis period, which indirectly affects the size of the expected gap in the crisis period.

Define $\hat{i}_t$ as the interest rate that minimizes the gap in the non-crisis state, i.e., $E_1(\tilde{u}_t^n)\big|_{\hat{i}_t} = 0$.

Recall that i_1^{**} is the interest rate that minimizes $\left\{ E_1(\tilde{u}_t) \right\}^2$, i.e., $E_1(\tilde{u}_t)\big|_{i_1^{**}} = 0$.

Lean against wind $\equiv i_t > \hat{i}_t$ =>

Cost in non-crisis period and cost in crisis period because $\tilde{u}_t^n + \Delta u$ higher.

Lean with wind $\equiv i_t < \hat{i}_t$ =>

Cost in non-crisis period but gain in crisis period when i_t near $\hat{i}_t$ because $\tilde{u}_t^n + \Delta u$ lower.

$\therefore$ Lean with wind lowers the squared expected gap because it reduces the gap in the crisis period => $i_t^{**} < \hat{i}_t$

Recall, $i_t^{**} < i_t^{*}$

But this gain has to be compared to effects of i on p_t, Δu, and $Var_1(\tilde{u}_t^n)$ [probability of crisis, the severity of crisis, volatility of unemployment rate].

$\exists$ Additional benefits of leaning <u>against</u> the wind.

$$\frac{dE_1 L_t}{di_1} = \frac{dE_1(\tilde{u}_t^n)}{di_1}\left[2\left(E_1(\tilde{u}_t^n) + p_t \Delta u\right)\right]$$

$$+ \underbrace{\frac{dp_t}{di_1}}_{-} \underbrace{\left[2\Delta u\left(E_1(\tilde{u}_t^n) + p_t \Delta u\right)\right]}_{+} + \underbrace{\frac{d\Delta u}{di_1}}_{-} \underbrace{\left[2p_t\left(E_1(\tilde{u}_t^n) + p_t \Delta u\right)\right]}_{+} + \underbrace{\frac{dVar(\tilde{u}_t^n)}{di_1}}_{-}$$

- The last three terms are negative.
    - Thus, it's an <u>**empirical exercise**</u> to determine if "leaning against" or "leaning with" the wind is optimal.

- Numerical results are sensitive to the model assumptions and parameterization.
  - Fixed length of crisis, probability of start of crisis, fixed increase in *u* in crisis period.
  - Lars does many robustness tests.
  - Main marginal benefit of leaning with the wind is through the reduction in the unemployment rate gap in the crisis periods.
  - Main marginal benefit of leaning against the wind is through reduction in the probability of a crisis.
    - Calculations are based on real debt growth being the driver of the probability of a crisis.
    - Assume that monetary policy is neutral in the long run. That is, monetary policy cannot have a long-run impact on debt growth and therefore on the average probability of a crisis over time.
    - Lars's calculations indicate the benefit of a higher *i* in reducing the probability of a crisis is small – even if it is assumed that monetary policy is not neutral in the long run.

Comments

- By assumption: $\tilde{u}_t^c = \tilde{u}_t^n + \Delta u$ => Rise in the unemployment rate in the crisis state is an exogenous, fixed increase over the unemployment rate as it enters the crisis.
  (Appendix D analyzes case where $\frac{d\Delta u}{di_t} \neq 0$. Appendix G analyses case where Δu is random.)
  - If the rise in the unemployment rate during crisis was non-linearly dependent on the gap in the non-crisis state, then running a policy that was non-optimal in the non-crisis state could mean a more severe crisis (2003?).
  - $u_t^n < u_t^*$ entails costs, e.g., inefficient matching, which could leave economy in worse shape as it enters crisis period, thereby decreasing welfare.

- Analysis assumes a log-linear world and quadratic loss function. But financial crises involve extreme states and non-linearities.
  - Feroli, Kashyap, Schoenholtz, and Shin (2014): Model agency problems in delegated asset management.
    - Asset managers concerned with relative performance rankings.
    - Low short-term policy rate can encourage "reach for yield" => lower risk premia.
    - There can be a sudden and sharp correction in risk premia in response to a small tightening of monetary policy.

Comments, continued

- Can a central bank credibly run a policy that is persistently non-optimal in non-crisis periods?
  - Benchmark case => a crisis about every 31 years.
- If not, then it would seem to be better to develop tools other than monetary policy to reduce the expected cost of a crisis: concentrate on reducing the probability of a crisis (macroprudential and microprudential tools), and reducing the severity of the crisis (fiscal policy).
  - Lars argues that ineffective macroprudential policy would strengthen the case of leaning with the wind – but that assumes that the ineffective policy worsens the severity or probability of a crisis.
- Reduced form model – mechanism through which monetary policy can affect probability and severity of crisis is via debt growth, but this isn't explicitly modeled.
  - Parameterization relies on Schularick and Taylor (AER, 2012) estimate that the effect of debt growth on the probability of crisis is small and Riksbank analysis that effect of monetary policy on debt growth is small. (Hence, little to be gained by leaning against the wind.)
- Is "reach-for-yield" a separate channel of financial instability that should be considered?
- Does the paper assume there is a long-run Phillips curve?
  - Loss function can be written in terms of the unemployment rate because there is a Phillips curve.

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