Ajello, Laubach, López-Salido, and Nakata, “Financial Stability and Optimal Interest-Rate Policy”

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“The New Normal for Monetary Policy”
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The views expressed in this presentation are those of the author and do not necessarily represent those of the IMF or IMF policy.

Issue

- Monetary policy and financial stability
- Assume that a higher policy rate (leaning against the wind) somehow reduces the probability of a future financial crisis
- What are the tradeoffs between current costs and future benefits of leaning?
- What is the optimal monetary policy?

Results of the paper

- Optimal policy implies very small policy-rate increase in standard case
- Somewhat larger policy-rate increase if uncertainty about parameters taken into account
- Robust policy (worst-case policy) implies larger policy-rate increase

Comments

- Little theoretical and empirical support for an economically significant policy-rate effect on the probability of a financial crisis
- Mechanism? Very indirect and very weak.
  - “Good” and “bad” credit growth should have different effects
  - Monetary policy is the deviation from the neutral rate, not the general level of interest rates.
  - Direction of effect? Tighter policy may affect price level and disposable income faster than the stock of debt, thereby increasing real debt and debt-to-income, or at least have very small effects (Svensson 2014, Gelain, Lansing, Natvik 2014)
Comments

- The probability and consequences of a crisis depends on the resilience of the financial system and the magnitude and nature of disturbances
- The resilience of the financial system depends directly on supervision and regulation (macroprudential policy)
- Macroprudential policy therefore has a much bigger and direct effect on the probability and consequences of a crisis than the policy rate
- Thus, use macroprudential policy rather than monetary policy for achieving and maintaining financial stability

Other comments

- Inherent problem with robust optimal control
  - Optimal policy often on boundary of assumed feasible set of models/parameters
  - Optimal policy hence very sensitive to assumptions (not robust at all)
  - Any probability assigned to boundary of feasible set very small
  - Very unlikely outcomes determine policy
  - Not practical
  - Instead, Bayesian optimal control

Comments

- Nevertheless, one may want to have an idea of the tradeoffs from using monetary policy
- Estimate tradeoff between current and expected future macroeconomic outcomes for policy-rate changes
- Cost and benefit in terms of unemployment (linear calculation, marginal rate of transformation)
- Cost and benefit in terms of quadratic loss function
- First-order conditions for optimal policy: Benefit ≥ Cost

The Riksbank’s case for leaning against the wind

- A higher policy rate (leaning) implies lower household debt
- Lower debt implies (1) a lower probability of a future crisis and/or (2) a less deep future crisis if it occurs
- Benefit of leaning: Better expected macroeconomic outcome in the future
- Cost of leaning: Worse macroeconomic outcome in the next few years
- Riksbank assumption (gut feeling): The benefit exceeds the cost
- Is that assumption true?
- The answer can be found in the Riksbank’s own boxes in MPRs July 2013 and February 2014, plus Schularick and Taylor (2012) and Flodén (2014)
- This involves putting numbers on the cost and benefit of leaning (Svensson 2015, Inflation targeting and leaning against the wind)
Intertemporal tradeoff faced by central bank (figure 1 in paper): Simple linear calculation in terms of output

Intertemporal tradeoff faced by Riksbank (Svensson): Simple linear calculation in terms of unemployment

Higher policy rate: $\Delta i_1 = 1$ pp
Cost: Higher current employment: $\Delta u_1 = 0.5$ pp
Benefit 1: Lower probability of crisis: $\Delta \gamma_1 = -0.02$ pp/yr
Unemployment increase in crisis: $u_{2c} - u_{2nc} = 5$ pp
Lower expected future unemployment:
$\Delta E(u_2) = \Delta \gamma_1(u_{2c} - u_{2nc}) = -0.0002 \times 5 = -0.001$ pp
Benefit 2: Lower unemployment in crisis: $\Delta u_{2c} = 0.009$ pp
Probability of crisis: $\gamma_t = 4\%$/yr (previously used 10%/yr)
Lower expected future unemployment: $\Delta E(u_2) = \gamma_1 \Delta u_{2c} = -0.00036$ pp
Total benefit: $\Delta E(u_2) = -0.001 - 0.00036 = -0.00136$ pp
Benefit / Cost $= 0.3\%$  Should have been $\geq 100\%
Cost / Benefit $= 350$

Intertemporal tradeoff faced by Riksbank (Svensson): Simple quadratic calculation in terms of unemployment

$L_1 = (u_i - u^*)^2$
$E_1 L_2 = \gamma_1(u_{2c} - u^*)^2 + (1 - \gamma_1)(u_{2nc} - u^*)^2 = \gamma_1(u_{2c} - u^*)^2$
Cost: $\Delta L_1 = 2(u_i - u^*)\Delta u_1 = 2 \times (8 - 6) \times 0.5 = 2$
$\Delta E_1 L_2 = \Delta \gamma_1(u_{2c} - u^*)^2 + 2 \gamma_1(u_{2c} - u^*) \Delta u_{2c}$
$= -0.0002 \times 5^2 - 2 \times 0.04 \times 5 \times 0.009 = -0.0086$
Benefit / Cost $= \Delta E_1 L_2 / \Delta L_1 \approx 0.4\%$
Cost / Benefit $\approx 230$

FOC: Cost/Benefit $= 1$ (adjusted for lengths of periods 1 and 2 and discounting)

Intertemporal tradeoff faced by central bank (figure 1 in paper): Simple linear calculation in terms of output

Higher policy rate: $\Delta i_1 = 1$ pp (scaled up from figure 1)
Cost: Lower current output: $\Delta y_i = -0.25$ pp
Benefit: Lower probability of crisis: $\Delta \gamma_i = -0.0008$ pp/qtr $\approx -0.0032$ pp/yr
Output in crisis: $y_{2c} - y_{2nc} = -10$ pp
Higher expected future output:
$\Delta E_i y_2 = \gamma_1 (y_{2c} - y_{2nc}) = 0.000032 \times 10 = 0.00032$ pp
Benefit / Cost $= 0.00128\%$
Cost / Benefit $\approx 750$
Intertemporal tradeoff faced by central bank (paper):

Simple quadratic calculation in terms of output

\[ \Delta L_1 = 1 \text{ pp} \]
\[ L_1 = y_1^2 \]
\[ E_i L_2 = \gamma_1 y_2^2 \]

Assume \( y_1 = -2 < 0 \! \)
\[ \Delta L_2 = 2y_1 \Delta y_1 = 2 \cdot (-2) \cdot (-0.25) = 1 \]
\[ \Delta E_i L_2 = \Delta \gamma_1 y_2^2 = -0.000032 \cdot 10^2 = -0.0032 \]

**Benefit / Cost** = \( \Delta E_i L_2 / \Delta L_1 = 0.3\% \)

**Cost / Benefit** = 300

Depends on assumption about initial \( y_1 \! \)

FOC: Cost/Benefit = 1 (adjusted for lengths of periods 1 and 2 and discounting)

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**Conclusion**

- Do not let monetary policy lean against the wind for financial-stability purposes
- There is no choice but to use macroprudential policy to achieve and maintain financial stability

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**Intertemporal tradeoff faced by central bank (paper)**

- Quadratic loss function does not make much difference (benefits are mainly linear)
- Uncertainty and Bayesian optimal policy does not make much difference
- Robust (worst-case) optimal policy simply assumes worst feasible outcome. But very sensitive to assumed feasible set. If probability to outcomes assigned, very unlikely outcomes determine policy

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**Additional slides**
A detail: The financial-stability mechanism

\[ y_t = E_t^p y_t - \sigma [E_t^p \nu_t] \]  
\[ \pi_t = \pi_0 + E_t^p \pi_t \]  
\[ L_t = E_t^p L_t + \phi_1 \pi_t + \phi_2 \pi_t + \phi_3 \]  
\[ \gamma_0 = \frac{\exp(\phi_0 + \lambda_0 \xi_t)}{1 + \exp(\phi_0 + \lambda_0 \xi_t)} \]

**Benefit (1) of 1 pp higher policy rate:** Lower probability of a crisis

- Schularick & Taylor (2012): 5% lower real debt in 5 yrs implies 0.4 pp lower probability of crisis (average probability of crises about 4%)
- Riksbank, MPR Feb 2014, box:

\[ \Delta \log B_t = \epsilon + \phi_1 \pi_t + \phi_2 \pi_t + \phi_3 \]  
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\[ \Delta \log B_t = \epsilon + \phi_2 \pi_t + \phi_3 \]  

**Benefit (2) of 1 pp higher policy rate:** Smaller increase in unemployment if crisis

- Flodén (2014): 1 pp lower debt ratio may imply 0.02 pp smaller increase in unemployment rate in crisis
- Riksbank MPR Feb 2014, box:

**Cost of 1 pp higher policy rate:**
0.5 pp higher unemployment rate

- Schularick & Taylor (2012): 5% lower real debt in 5 yrs implies 0.4 pp lower probability of crisis (average probability of crises about 4%)
- Riksbank, MPR Feb 2014, box:

\[ \Delta \log B_t = \epsilon + \phi_1 \pi_t + \phi_2 \pi_t + \phi_3 \]  
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**Benefit (1):** Expected lower future unemployment: 0.0002*5 = 0.001 pp

**Cost:** Higher unemployment rate now: 0.5 pp

**Benefit (2):**

- 1 pp higher policy rate leads to 0.25% lower real debt in 5 years
- Lowered probability of crises by 0.25*0.4/5 = 0.02 pp
- Assume 5 pp higher unemployment in crisis (Riksbank crisis scenario, MPR July 2013, box):
- **Benefit (1):** Expected lower future unemployment: 0.0002*5 = 0.001 pp
- **Cost:** Higher unemployment rate now: 0.5 pp

Summarize cost and benefit of 1 pp higher policy rate

Table 1. Cost and benefit in unemployment of 1 percentage point higher policy rate during 4 quarters

| Cost: Higher unemployment during the next few years, percentage points | 0.5 |
| Benefit: Lower expected future unemployment, percentage points | 0.001 |
| 1. Because of lower probability of a crisis | 0.0009 |
| 2. Because of a smaller increase in unemployment in a crisis | |
| Total benefit, percentage points | 0.0019 |
| Total benefit as a share of the cost | 0.0038 |

- Riksbank’s case does not stand up to scrutiny

The leaning: Policy rates in Sweden, UK, and US; Eonia rate in euro area

The leaning: Real policy rate in Sweden, UK, and US, real Eonia rate in euro area
Ex post evaluation: Riksbank policy-rate increases from summer of 2010 have led to inflation below target and higher unemployment (and probably a higher debt ratio)