Discussion (revised) of Filardo and Rungcharoenkitkul, "Quantitative Case for Leaning Against the Wind"

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Strong statements

- "Our dynamic monetary policy model provides a strong foundation for the case of leaning against the financial cycle"
- "Recent models which argue against leaning fail to to capture the full set of monetary policy trade-offs"
- "A full financial cycle approach" is obviously considered different from and better than "a random crisis approach"
- "The findings of this paper support a shift away from narrow price stability orientation to a more inclusive joint price- and financial-stability orientation"
- "The extent of optimal leaning is not negligible"
- "Our model stand in stark contrast to earlier modeling efforts. The paper suggests that a policy of always leaning against the wind to some extent is welfare enhancing"

Comments 1

- Strong statements. Do they stand up to scrutiny? Do FR have anything different from Svensson 2016 and Ajello et al. 2015?
- FR introduce a "financial cycle" in the discussion of costs and benefits of leaning against the wind
- But arguably no essential difference between "financial cycle", f_t, and real debt growth, g_t, in Schularick-Taylor 2012, in similar analysis on Laeven and Valencia 2012 dataset, in Ajello et al. 2015, and in Svensson 2016
- What variables predict financial crises and can be affected by the policy rate is an empirical issue
- More complex and restricted dynamics of "financial cycle" (Markov process, financial crisis only from highest state) can hardly be essential, but in any case it is an empirical issue

Comments 2

- FR section 4 assumes a fixed crisis loss increase (somewhat similar to fixed crisis loss level in Ajello et al. and FR section 3(!), but different from Svensson 2016)
- But realistically the crisis loss increase is larger for an initially weaker economy (this is a major new point in Svensson 2016)
- At a closer look, with the crisis loss increase being larger for a weaker economy, FR would be similar to Svensson 2016
- With a fixed crisis loss level, FR would be even more similar to Ajello et al.
- The crucial issue remains the effect of the policy rate on the probability or severity of a crisis
- And existing empirical estimates says that, with the loss in a crisis being larger for a weaker economy, the policy-rate effect is much too small to make benefits exceed costs of LAW

Comments 3: Some strange statements about Svensson 2016

- FR (section 2) strangely state that S2016 implies that:
  1. "The cost of crisis is unaffected by the state of the economy and policy actions."
  2. "Once a crisis materializes, the cost of future crises ... is zero."
  3. The possibility that "the cumulative effect of past monetary policy actions can change the amplitude and duration of the financial cycle and the likelihood of crises" is disregarded.
- But:
  1. A major new point in S2016 is that the crisis loss increase (the cost of a crisis) is not exogenous but is larger for a weaker economy and is therefore affected by monetary policy; a larger crisis loss increase is the main component of the cost of LAW.
  2. In S2016, crises can happen any time and several crises can happen in the future; the cost of this is taken into account.
  3. Empirically estimated lagged policy-rate effects on both the probability and magnitude (appendix D!) of crises are indeed taken into account over at least a 40-quarter period.
- Thus, the statements do seem misleading

To clarify: 3 different loss functions, cf. simple examples below

1. (Analogous to Svensson 2016) Fixed crisis output-gap reduction ($y^{\mathrm{c}}_{t+1} = y^{\mathrm{n}}_{t+1} - \Delta y$):

$$\begin{aligned} \mathrm{E}_t L_{t+1} &= \mathrm{E}_t (y_{t+1})^2 = E_t[y^{\mathrm{n}}_{t+1} - \Delta y\, I(\text{Crisis in quarter } t+1)]^2 \\ &= (1-p_{t+1})(y^{\mathrm{n}}_{t+1})^2 + p_{t+1}(y^{\mathrm{n}}_{t+1} - \Delta y)^2 = (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}[(y^{\mathrm{n}}_{t+1} - \Delta y)^2 - (y^{\mathrm{n}}_{t+1})^2] \\ &= (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}[(\Delta y)^2 - 2\,\Delta y\, y^{\mathrm{n}}_{t+1}] = (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}[c - 2\sqrt{c}\, y^{\mathrm{n}}_{t+1}], \end{aligned} \tag{1}$$

where $c \equiv (\Delta y)^2$. Then the crisis loss increase (the cost of a crisis), $(y^{\mathrm{n}}_{t+1} - \Delta y)^2 - (y^{\mathrm{n}}_{t+1})^2 = (\Delta y)^2 - 2\,\Delta y\, y^{\mathrm{n}}_{t+1}$, is decreasing in the non-crisis output gap.

2. (FR section 4) Fixed crisis loss increase ($y^{\mathrm{c}}_{t+1} = y^{\mathrm{n}}_{t+1}$, fixed crisis loss increase c):

$$\mathrm{E}_t L_{t+1} = E_t[(y_{t+1})^2 + c\, I(\text{Crises in quarter } t+1)] = (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}\, c \tag{2}$$

3. (FR section 3, Ajello et al., previous literature) Fixed crisis loss level

$$\mathrm{E}_t L_{t+1} = (1-p_{t+1})(y^{\mathrm{n}}_{t+1})^2 + p_t(\Delta y)^2 = (y^{\mathrm{n}}_{t+1})^2 + p_t[(\Delta y)^2 - (y^{\mathrm{n}}_{t+1})^2] \tag{3}$$

Then the crisis loss increase in a crisis, $(\Delta y)^2 - (y^{\mathrm{n}}_{t+1})^2$, is decreasing in the non-crisis loss.

Example 1 (S 2016): Crisis loss increase larger for weaker economy 1

$$\pi_t = y_t \ \text{(Phillips curve with divine coincidence, for simplicity)}$$
$$L_t = \frac{1}{2}(\pi_t^2 + y_t^2) = y_t^2 \ \text{(loss function)}$$

$$y_{t+1} = y_{t+1}^{\rm n} \ \text{with probability } 1 - p_{t+1} \ \text{(output gap in non-crisis state)}$$
$$y_{t+1} = y_{t+1}^{\rm c} \equiv y_{t+1}^{\rm n} - \Delta y \ \text{with probability } p_{t+1} \ \text{(output gap in crisis state)}$$

$$y_{t+1}^{\rm n} = -\alpha i_t$$
$$p_{t+1} = \gamma f_{t+1} \ \text{(“financial cycle”)} \equiv \gamma g_{t+1} \ \text{(real debt growth; no essential difference)}$$
$$g_{t+1} = \bar{g}_t - \theta i_t \ (\bar{g}_t \text{ exogenous and observed in period } t\text{, for simplicity)}$$

$$dy_{t+1}^{\rm n}/di_t = -\alpha \ \text{(effect of policy rate on output gap)}$$
$$dp_{t+1}/di_t = -\gamma\theta \ \text{(effect of policy rate on probability of crisis)}$$

Example 1 (S 2016): Crisis loss increase larger for weaker economy 2

Expected loss:

$$\begin{aligned} {\rm E}_t L_{t+1} &= (1 - p_{t+1})(y_{t+1}^{\rm n})^2 + p_{t+1}(y_{t+1}^{\rm n} - \Delta y)^2 \\ &= (y_{t+1}^{\rm n})^2 + p_{t+1}[(y_{t+1}^{\rm n} - \Delta y)^2 - (y_{t+1}^{\rm n})^2] \end{aligned}$$

Optimal policy:

$$\begin{aligned} \frac{d{\rm E}_t L_{t+1}}{di_t} &\equiv {\rm NMC}_{t+1} \equiv {\rm MC}_{t+1} - {\rm MB}_{t+1} \\ &\equiv 2(y_{t+1}^{\rm n} - p_{t+1}\Delta y)\frac{dy_{t+1}^{\rm n}}{di_t} - [(\Delta y)^2 - 2y_{t+1}^{\rm n}\Delta y](-\frac{dp_{t+1}}{di_t}) = 0 \end{aligned}$$

Example 1 (S 2016): Crisis loss increase larger for weaker economy 3

First-order condition w.r.t. i_t:

$$\mathrm{NMC}_{t+1} \equiv \mathrm{MC}_{t+1} - \mathrm{MB}_{t+1} \equiv 2(y^{\mathrm{n}}_{t+1} - p_{t+1}\Delta y)\frac{dy^{\mathrm{n}}_{t+1}}{di_t} - [(\Delta y)^2 - 2y^{\mathrm{n}}_{t+1}\Delta y](-\frac{dp_{t+1}}{di_t}) = 0$$

If exogenous probability of a crisis, $dp_{t+1}/di_t = 0$, $\mathrm{MB}_{t+1} = 0$: Lean with the wind!

$$dp_{t+1}/di_t = 0 \Rightarrow y^{\mathrm{n}}_{t+1} = p_{t+1}\Delta y > 0$$

If endogenous probability, examine net marginal cost for $y^{\mathrm{n}}_{t+1} = 0$ (no leaning):

$$\mathrm{NMC}_{t+1} \equiv \mathrm{MC}_{t+1} - \mathrm{MB}_{t+1} \equiv p_{t+1}\Delta y\,\alpha - (\Delta y)^2\gamma\theta \quad > 0 \text{ (for existing empirical estimates)}$$

Optimal policy involves small leaning with the wind: $y^{\mathrm{n}}_t > 0$

In general, FR with loss increase larger in weaker economy not different from Svensson 2016

Example 2 (FR, section 4): Fixed crisis loss increase

Expected loss:

$$\mathrm{E}_t L_{t+1} = (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}c = (y^{\mathrm{n}}_{t+1})^2 + p_{t+1}(\Delta y)^2$$

First-order condition w.r.t. i_t:

$$\mathrm{NMC}_{t+1} \equiv \mathrm{MC}_{t+1} - \mathrm{MB}_{t+1} \equiv 2y^{\mathrm{n}}_{t+1}\frac{dy^{\mathrm{n}}_{t+1}}{di_t} - (\Delta y)^2(-\frac{dp_{t+1}}{di_t}) = 0$$

If exogenous probability of a crisis, $dp_{t+1}/di_t = 0$, $\mathrm{MB}_{t+1} \equiv 0$: No leaning!

$$dp_{t+1}/di_t = 0 \Rightarrow y^{\mathrm{n}}_{t+1} = 0$$

If endogenous probability, examine net marginal cost for $y^{\mathrm{n}}_{t+1} = 0$ (no leaning):

$$\mathrm{NMC}_t = -(\Delta y)^2(-dp_{t+1}/di_t) = -(\Delta y)^2\gamma\theta < 0 \ \ (\text{if } \gamma\theta > 0)$$

Small LAW is optimal, $y^{\mathrm{n}}_t < 0$

Somewhat imilar to Ajello et al. In general, FR not very different from Ajello et al.

Example 3 (FR section 3, Ajello et al.): Fixed crisis loss level

Expected loss (fixed crisis loss level: $y^{c}_{t+1} \neq y^{n}_{t+1} - \Delta y$, instead $y^{c}_{t+1} = -\Delta y$):

$$\mathrm{E}_t L_{t+1} = (1 - p_{t+1})(y^{n}_{t+1})^2 + p_{t+1}(y^{c}_{t+1})^2 = (1 - p_{t+1})(y^{n}_{t+1})^2 + p_{t+1}(-\Delta y)^2$$

First-order condition w.r.t. i_t:

$$\mathrm{NMC}_{t+1} \equiv \mathrm{MC}_{t+1} - \mathrm{MB}_{t+1} \equiv 2(1 - p_{t+1}) y^{n}_{t+1} \frac{dy^{n}_{t+1}}{di_t} - (\Delta y)^2 \left(-\frac{dp_{t+1}}{di_t}\right) = 0$$

If exogenous probability of a crisis, $dp_{t+1}/di_t = 0$, $\mathrm{MB}_{t+1} \equiv 0$: No leaning!

$$dp_{t+1}/di_t = 0 \Rightarrow y^{n}_{t+1} = 0$$

If endogenous probability, examine net marginal cost for $y^{n}_{t+1} = 0$ (no leaning):

$$\mathrm{NMC}_t = -(\Delta y)^2(-dp_{t+1}/di_t) = -(\Delta y)^2 \gamma\theta < 0 \;\; (\text{if } \gamma\theta > 0) \Rightarrow y^{n}_{t+1} < 0$$

Small LAW is optimal

Conclusions

- No essential difference between "financial cycle", f_t, and real debt growth, g_t, in Schularick-Taylor 2012, Ajello et al. 2015, and Svensson 2016
- More complex and restricted dynamics can hardly be essential, and is in any case an empirical issue
- FR with a fixed crisis loss increase or with fixed crisis level: No essential difference from Ajello et al.
- FR with a crisis loss increase larger for a weaker economy: No essential difference from Svensson 2016
- The crucial issue remains the effect of the policy rate on the probability or severity of a crisis
- Existing empirical estimates says that, with the loss in a crisis being larger in a week economy, the policy-rate effect is much too small to make benefits exceed costs of LAW
- The strong statements of FR do not stand up to scrutiny