Discussion of “Stability and Identification with Optimal Macroprudential Policy Rules”

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Summary of paper

Motivation

- Literature pursues a specific approach to analyze the role that variables of interest to macro-prudential policy (MAP) should take in macroeconomic policy.
- In a DSGE model, does welfare improve by augmenting otherwise standard monetary policy (MOP) rules with MAP variables?
- Variables of interest to MAP are often financial variables, e.g., asset prices.
- Financial variables are often forward-looking variables, i.e., driven by what people expect will happen rather than by what has happened.

Summary of paper

Authors ask if approach pursued in the literature is informative:

- Suppose we maximize welfare by selecting coefficients of a Taylor rule augmented with a financial variable.
- Suppose further, we find a large coefficient for the financial variable.
- Can we conclude that it is indeed worth responding to the financial variable?

Authors argue that this approach is generally NOT informative!

Summary of paper

Argument:

- Coefficients of optimal simple rules (OSRs) are potentially not identified.
- Non-identification plagues *only* policy coefficients for “non-state” variables.
- But non-state variables comprise the financial variables of interest to MAP.
- Thus, MAP literature is particularly prone to non-identification pitfalls.

Authors conclude that results in relevant MAP literature are spurious.

Comments

- Paper asks important question: Under what conditions are OSRs identified?
- Paper is technically sophisticated and hence a tough, but rewarding, read.
- Paper derive its results in general setup, i.e., optimal linear regulator problem.
- Therefore, results apply to all OSRs derived in this setup, not only to those related to MAP. This makes the paper particularly interesting.
- My comments focus on OSRs (“quasi-optimal rules”), where I see paper’s main contribution.

Comment I – What is the source of the identification problem in OSR? (1/4)

Consider a simple rule that depends on both non-state (q) and state (k) variables:

$$r_t = -F \begin{pmatrix} k_t \\ q_t \end{pmatrix}$$

Substitute rule into generic DSGE model:

$$\begin{pmatrix} k_{t+1} \\ E_t q_{t+1} \end{pmatrix} = A \begin{pmatrix} k_t \\ q_t \end{pmatrix} + Br_t + \gamma z_t$$

$$= (A - BF) \begin{pmatrix} k_t \\ q_t \end{pmatrix} + \gamma z_t \ .$$

Solve DSGE model with k_0 known and imposing regularity (e.g., Blanchard Kahn) conditions:

$$q_t = N(F) k_t \ .$$

Substitute solution into simple rule to express it as function of states only:

$$r_t = -[F_k, F_q] \begin{pmatrix} k_t \\ q_t \end{pmatrix} = -[F_k k_t + F_q q_t]$$

or

$$r_t = -[F_k + F_q N(F_k, F_q)] \ k_t \ .$$

Comment I – What is the source of the identification problem in OSR? (2/4)

Denote $r_t = -[F_k + F_q N(F_k, F_q)]\ k_t$ as

$$r_t = -\widetilde{F}\ k_t\ .$$

Levine Currie 1987 show that $\widetilde{F}$ is identified as solution to the optimal policy problem:

$$\begin{aligned} \max_{\widetilde{F}} \quad & \text{E(discounted loss)} \\ s.t. \quad & \text{solution of DSGE model using} \quad r_t = -\widetilde{F}\ k_t\ . \end{aligned}$$

Since $\widetilde{F}$ is identified, identification problem arises when mapping $\widetilde{F}$ into F_k and F_q:

$$\widetilde{F} = F_k + F_q N(F_k, F_q)\ .$$

Levine Currie achieve identification by imposing $F_q = 0$ (most convenient for them):

$$\widetilde{F} = F_k\ .$$

Comment I – What is the source of the identification problem in OSR? (3/4)

Imposing $F_q = 0$ is equivalent to starting from a simple rule with only state variables:

$$r_t = -[F_k k_t + F_q q_t]$$

Adding *non-state variables* to rule implies non-identification, since $F_q = 0$ violated.

Paper's core result: Policy coefficients of *non-state variables* are not identified.

But:

I guess $F_q = 0$ is not the only identifying assumption! E.g., $F_k = 0$ may also work.

In general, identification obtains with enough restrictions on F_k and F_q, so that

$$\widetilde{F} = F_k + F_q N(F_k, F_q)$$

is a unique mapping.

Given my guess, I suspect that non-identification of policy coefficients has nothing to do with whether state, or non-state, variables are added to the simple rule.

Comment I – What is the source of the identification problem in OSR? (4/4)

If guess is true, then deriving the conditions under which OSRs are identified, i.e.,

$$\widetilde{F} = F_k + F_q N(F_k, F_q)$$

is unique mapping, may be a non-trivial problem.

Problem non-trivial mostly because $N(F_k, F_q)$ is highly nonlinear in policy coefficients.

If guess is wrong, it would be essential to see a proof that $F_q = 0$ is the only identifying assumption.

Can you make progress here?

People (including me) will love you for deriving general conditions under which coefficients in OSRs are identified!

Comment II – Decoupled policy rules

- Suppose policy maker has two instruments, e.g., interest rate and loan-to-value ratio, instead of one.
- Policy maker wants to use each instrument to achieve separate mandates.
- Then, policy maker may be interested in “decoupled OSRs” (Levine Currie 1987).
- I.e., each instrument feeds back on distinct combination of (state) variables.
- Decoupling may help to find restrictions on F_q and F_k, which are required to identify OSR coefficients.
- Can decoupled OSRs provide an alternative set of identifying assumption?

Comment III – Certainty equivalence and OSRs for MAP

- It is well known, that OSRs do not obey certainty equivalence.
- Thus, OSRs depend on properties of economic shocks (and initial conditions).
- This is commonly thought of as undesirable feature, because MOP faces considerable uncertainty about shock properties.
- But uncertainty about shock properties may be even larger in MAP domain.
- MAP deals (mostly?) with *sectoral* shocks (e.g., housing or MBS market).
- My suspicion is that we know less about *sectoral* shocks than aggregate shocks.
- This issue is not discussed in the paper, but may be worth a remark.

Comment IV – A deeper identification problem

There is also a deeper "identification problem" of using MAP variables in adhoc MOP rules.

Adhoc MOP rules may not address all inefficiencies in the economy that MOP should address.

This may create an artificial role for MAP variables.

But this role is likely to vanish, when optimal MOP is considered.

Thus, it may be more informative to analyze MAP in models with optimal MOP.

One simple way to do this may be to work in real models; see, e.g., recent Bundesbank work by Stephane Moyen et al.

Other comments

- Is it necessarily the case that MAP is only interested in non-state variables? E.g., how about net worth of commercial banks?
- You mention that it is difficult to numerically detect non-identified policy coefficients. While there are some fairly straightforward checks (e.g., plot welfare surface as function of policy coefficients, start optimizer at different initial values), they may not be sufficient.

  Can you propose a numerical check that is waterproof?
- Likely, your results are related to Cochrane's work on identification of coefficients in the basic New Keynesian model. Can you spell out this relationship?
- Can you make your paper more "user friendly"? E.g., use simple examples from MAP (or MOP) literature to illustrate identification problem.

Conclusion

Given the widespread use of OSR for MAP or MOP purposes, clarifying the conditions required to identify the coefficients in OSRs is important!

The paper takes an important step into this direction!