Economics Bulletin

Referee1's report -Round 0

Submission Number:EB-22-00560

Implications for Determinacy with Average Inflation Targeting

Yamin Ahmad
University of Wisconsin - Whitewater

James Murray
University of Wisconsin - La Crosse

Submitted: August 22, 2022.

Report on "Implications for Determinacy with Average Inflation Targeting" (Submission Number: EB-22-00560) by Yamin Ahmad and James Murray

August 22, 2022

This paper examines the determinacy of the equilibrium when there is heterogeneity in inflation expectations (naive expectations versus average expectations) and the central bank practices the average inflation targeting with the target window that includes both backward and forward-looking windows, and an average inflation which is an average of past average inflation target and future average inflation.

Comments

- Lack of economic interpretations/intuitions. The text for Economics bulletin can reach 7 pages without tables and figures. Excluding tables and figures, your paper has approximately 5 pages. You have enough space to give more explications, interpretations and intuitions.

- Lack of some references: Nessén and Vestin (2005), one of the oldest references on this topis, should be cited. Other references: e.g., Piergallini (2022) also studies the stability. What is your contribution compared to this one?

- The paper should precise the sens of the term "window: is it a period, the value of the target or something else? term appears for the first time on page 1 in the sentence "...is the window for how the 'average' level of inflation is determined. It may be based purely on past values of inflation, expectations of future values for inflation, or some combination". This explanation creates confusion et is not a very clear expression. example, "Monetary policy targets an average value of inflation over a target window that may include backward- and forward-looking terms for inflation" on page 3. Here, what is sense of "window"? When you write "window ..include... terms", it is not in the sense of time horizon. contrast, Mota and Fernandes (2022) also speak of "window" but it is the

period over which the average is calculated. Eo and Lie (2020) have also used "target window" in the sence of time horizon. You should clearly define the term "window" and check all the text to verify if this term is used coherently.

- Pages 1 and 2, in Eqs. (1)-(3), for the same variable, the notations are differents, $\pi^e_{t+1|t}$ in Eqs (1) and (3) but $\pi^e_{t+1|}$ in Eq. (2).

- Page 3: "Smaller values for δ_B can be viewed as longer backward-looking windows". $(1-\delta_B)$ to discount the past, the effective time window is infinite although the distant past is weakly taken into account. alternative way is to compute the average only in the limited time windows (e.g., 5 years in the past and data in more distant past is ignored). As you solve numerically the model, you can test differents time windows over which the average past inflation is computed and see if they are compatible with the dynamic stability of the economy. should explain why not use the approach of limited time window. If you continue to use the approach of "infinite time" window, then explain why the values of δ_B is a good proxy of the limited time window" as in any way, you cannot solve model analytically. Is there any facility in simulation that justify the use of $1/\delta_B$ as the target window?

- Page 2, Eq. (2): Give the references where this type of rule is first used. There are multiple possible forms of the Taylor rule with backwrd looking, why choose this one? Can you briefly discuss the implications of some alternative rules?

- Page 3, "the nature with which the weights decline geometrically with time" lets the reader perplex about the word "nature". The sentence may become clearer if it is rewritten as something like "that the current average inflation is a function of past inflation rates with their weights declining geometrically with time".

- It seems that your paper considers for the first time "backward- and forward-looking windows". If this is the case, you affirm this in the paper. If not, you cite the original contributions.

  You need to explain why the central bank uses different coefficients to compute past and expected future average inflation. There is some time inconsistency that needs to justify.

  The past average inflation is given by (page 3, Eq. (6)):

$$\pi^B_t = \delta_B \pi_t + (1-\delta_B)\,\pi^B_{t-1}.$$

  If the CB has a coherent behavior, it should compute the past inflation in the future in the same way as in the past:

$$\pi^B_{t+1} = \delta_B \pi_{t+1} + (1-\delta_B)\,\pi^B_t.$$

By changing notations and considering that future average expected inflation follows the same rule, we get

$$\mathbb{E}_t \pi^F_{t+1} = \delta_B \mathbb{E}_t \pi_{t+1} + (1 - \delta_B)\, \pi^F_t$$

Arranging the terms and then changing the notation of coefficients, we get

$$\frac{1}{(1-\delta_B)} \mathbb{E}_t \pi^F_{t+1} = \frac{\delta_B}{(1-\delta_B)} \mathbb{E}_t \pi_{t+1} + \pi^F_t \Longrightarrow$$

$$\pi^F_t = -\frac{\delta_B}{(1-\delta_B)} \mathbb{E}_t \pi_{t+1} + \frac{1}{(1-\delta_B)} \mathbb{E}_t \pi^F_{t+1} \Longrightarrow$$

$$\pi^F_t = \delta_F \mathbb{E}_t \pi_{t+1} + (1 - \delta_F)\, \mathbb{E}_t \pi^F_{t+1}.$$

where $\delta_F = -\frac{\delta_B}{(1-\delta_B)} < 0$ and $(1 - \delta_F) = \frac{1}{(1-\delta_B)} > 1$. This is inconsistent with the rule used to compute average future inflation in Eq. (8). Your paper should justify why the central bank use time-inconsistent rules to compute average past inflation and average future inflation.

- It seems that the model cannot be solved analytically, at least for the short-run equilibrium. But it is possible to solve for the steady state and check for the consistency of different equations: is there a unique solution of equilibrium? What are the steady-state values of inflation, the output gap and the interest rate?

- "Figure 1 shows the regions of determinacy for different values of the forward-looking weight, δ_F, depending on four other parameters in the model." But in the figure, there are 6 parameters.

- In Panel (C), "When more than 40% of agents form naïve expectations, no purely forwardlooking window for AIT leads to determinacy". Does $\delta_F \geq 0.5$ signifies "purely forward looking window"?

- "When $\gamma \geq 0.63$, all possible forward-looking windows yield determinate solutions. This implies the target window has at least a 63% weight on the current inflation rate, and therefore at most a 37% weight on future inflation"

  First, the parameter γ appears only in Eq. (5) defining "The average inflation target". In this equation, γ is related to past average inflation and $(1 - \gamma)$ related to future average inflation. It is not clear why you talk about current inflation and future inflation and associate these variables with "63% weight" and "37% weight".

  Second, "the target window" used here seems is in the sense of a target. If not, why it is weighted value of current and future inflation as shown in the cited sentence.

- Page 6, "Larger response to inflation lead to more restrictive forward windows." In Panel (D), the relation between δ_F et ψ_π is not monotonic and at least for small values of ψ_π, there is a decreasing relation. What does it mean "restrictive"? Does it mean "smaller window"?

- Page 6, "Larger responses to the output gap are necessary are also important for determinacy" There are two "are" in the sentence whose sense is not clear. Maybe you should rather said that it "increases the forward looking target window" instead of " important for determinacy", which is vague. The following sentence is more precise and is sufficient on its own.

- Page 6, "Monetary policy persistence can play an important role".

  Here, "play an important role" is an imprecise expression. More precision is necessary. Otherwise, this sentence can be cut.

- Page 6, "We find large ranges of indeterminacy, especially when a large portion of aggregate expectations are naïve, when little weight is put on the output gap, and when the forward window is greater than two years."

  First, the statement is incoherent because in Figure 1, forward weight (hence forward window) depends on other parameters. In this sentence, all parameters are put on the same ground. Second, this affirmation is contradictory with the comment "When $\gamma \geq 0.63$, all possible forward-looking windows yield determine solutions" (not just greater than two years) in the graphical analysis on page 5.

- Page 6, at the end of conclusion, "with a target window that puts significant weight on current and past inflation"

  What is the weight? Do you talk about δ_b since in equation (6) (we observe the presence of present inflation but only average past inflations) ? The term "window" is the period over which the average is calculated, and has no direct relation with weight.

References

[1] Mota, Paulo R. & Fernandes, Abel L.C. (2022), "Is the ECB already following albeit implicitly an average inflation targeting strategy?" *Research in Economics*. Available online 20 July 2022.

[2] Nessén, M. & Vestin, D. (2005), "Average inflation targeting", *Journal of Money, credit and Banking*, Vol. 37, No. 5 (Oct., 2005), pp. 837-863.

[3] Piergallini, Alessandro (2022), "Average inflation targeting and macroeconomic stability", *Economics Letters*. Available online 9 August 2022, 110790.