Should Central Banks publish interest rate forecasts? - A Survey

Tuan Phan

Australian National University

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Abstract

As a particular form of transparency, nowadays some central banks publish their interest rate forecasts while many others refuse to do that. Whether the publication is good or bad for economic performance and social welfares is now a hotly debatable subject. This paper provides a review of the literature in both theoretical and empirical aspects. We also establish a criteria table which could be used as a preliminary guideline for central banks in answering the question whether they should reveal the forecasts, and how to publish the policy rate inclinations. The suggested conclusion is that interest rate projections should be considered as one of the last items that central banks should reveal and they should be very careful in publishing its policy rate forecasts.

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*Crawford School of Public Policy, The Australian National University. Email: tuan.phan@anu.edu.au

'If I seem unduly clear to you, you must have misunderstood what I said.'
- Alan Greenspan

1 Introduction

Prior to 1990s, central banks were masked in secrecy. A common acknowledgement in central banking circles held that monetary policymakers should say as little as possible, and say it mysteriously[1]. When central banks became more independent, the accountability arguments led central banks to be transparent. In the last ten years, many central banks have become more transparent and this is likely to be the main stream both in theoretical and actual operation of central banks.

Many central banks publish their macroeconomic projections for the economy and the future values of key variables such as inflation, GDP growth or unemployment as forms of transparency. However, there are currently only a few central banks around the world which have practical experience in publishing macroeconomic projections based on endogenous interest rate projections (EIRPs) and publishing the interest rate forecasts themselves. The Reserve Bank of New Zealand (RBNZ, since June 1997), Norges Bank (since November 2005) and Sveriges Riksbank (since February 2007) currently publish endogenous interest rate forecasts. Banco de la Republica Colombia used to publish such a forecast (from December 2003 to June 2004). EIRP has recently started to be published in the Central Bank of Iceland (March 2007) and the Bank of Israel (July 2007).

As now standardized, the modern monetary policy is all about guiding and influencing the public's expectations. Private agents make decisions about consumption, investment, labor supply, and price settings etc. not basing on the current interest rate but on their expectations of future rates, together with their adjustments for risks. That is, the current policy rate is most relevant to the extent it conveys information about future policy settings and influences longer-maturity interest rates. Accordingly, at its

[1]See Blinder et al. (2008)

core, monetary policy can be considered a process of shaping the entire yield curve of interest rates in order to achieve various macroeconomic objectives[2]. Since the (nominal, fundamental) interest rate is the most direct tool that central bank has nearly full control on, it seems natural that central banks should consider publishing their policy rate projections as the most direct form of transparency[3]. Therefore, the small number of central banks doing that must raise a question whether revealing interest rate forecasts is good or bad for central banks and for economic performance.

Among the huge literature on effects of central bank transparency (in general form), there are surprisingly few papers about publishing interest rate forecasts as a specific form of transparency. Nevertheless, this issue is rapidly increasing in the centre of monetary policy debates. Theoretically, Rudebusch and Williams (2006) and Gosselin et al. (2008) are the pioneers. Using a New-Keynesian log-linear form model including a Phillips curve, a forward-looking IS curve and a central bank loss function, Rudebusch and Williams (2006) examine the macroeconomic effects of direct revelation of a central bank's expectations about the future path of the policy rate. They show that, in an economy where private agents have imperfect information about the determination of monetary policy, central bank communication of interest rate projections can help shape financial market expectations and may improve macroeconomic performance. Employing a similar setup, Gosselin et al. (2008) show that the publishing of central bank's interest rate forecasts will align central bank and private sector expectations about the future inflation rate, however there exist some conditions where opacity may be creative and raise welfare. Recently, Brzezina and Kot (2008) use a cost-benefit analysis approach with calibrations to explain that the gains from publishing interest rate paths are small relative to those from publishing other macroeconomic projections to provide a reason for the hesitation of central banks.

Given the fact that only few countries have experiences in publishing

[2]See Rudebusch and Williams (2006)

[3]Recently the debate on the need of QE when central banks cannot reach their target via interest rate channel has been raised, especially in the UK and US

interest rate projections, the number of empirical papers in this stream is expectedly small. Ferrero and Secchi (2007) use a panel data of New Zealand, Norway, the US and the euro area to provide a conclusion that the announcement of future policy intentions, in either quantitative or qualitative form, will improve the ability of market operators to predict monetary decisions. Archer (2005), Filacek et al. (2007), Rudebusch (2008) are among some other economists that analyses the effects of revealing the policy inclinations without employing econometric models. Their general conclusion is that this specific form of central bank transparency is desirable, although there are still possibilities of decreasing welfare caused by the publications of future interest rate forecasts. Some of them study the capacity of particular central banks in implementing the revelations[4]. However, neither of them provides a complete set of criteria for central banks to assess their own readiness for attending the group of pioneer banks.

This paper is to provide a review of the literature on publishing central bank's interest rate projections in both theoretical and empirical aspects. Examining the main arguments on pros and cons of the revealing policy inclinations, we will establish a criteria table for central banks to consider in answering the questions: Should they publish the interest rate forecasts? And if yes, how should they do? The bottom line suggestion is that publishing future policy inclinations is a double-edged knife which central banks should consider as one of the last forms of transparency and must be very careful in use.

The remainder of the paper is structured as follows: Section 2 provides main arguments on the pros and cons of the revealing. A table of criteria for publishing interest rate forecasts is recommended in Section 3. Conclusions on the complexity of the problem with some suggestions for future research will be in Section 4.

[4]See Filacek et al. (2007)

2 The arguments on the pros and cons of publishing interest rate forecasts

2.1 Theoretical frameworks and empirical results

We first examine the available theoretical frameworks for analyzing the effects of publishing policy inclinations. From Woodford (2003), a set of log-linearized New Keynesian model is now-standard used for the analysis. Rudebusch and Williams (2006) use a model including 3 key equations:

- a New Keynesian Phillips curve

$$\pi_t = \beta E_t \pi_{t+1} + \kappa(y_t + u_t)$$

- a forward-looking IS curve

$$y_t = -(i_t - E_t \pi_{t+1} - r_t^*) + E_t y_{t+1}$$

- and a policy maker (central bank)'s loss function which is standard for inflation and output variability

$$L = VAR(\pi_t - \pi_t^*) + \lambda VAR(y_t)$$

where y_t is the output gap, i_t is the nominal interest rate, π_t is the inflation rate, r_t^* is the natural rate of interest and E_t denotes expectations conditional on the information set available at time t; u_t is a distortionarily stationary shock to marginal cost, β is the rate of time preference, and κ measures the sensitivity of inflation to the output gap; and λ is the relative weight on output gap variability.

Their results show that revealing policy inclinations (interest rate projections) can help align the public's and the central bank's expectations of future policy actions, and thus reduce the magnitude of fluctuations in output and inflation, which is equal to reducing the policymaker's loss. The benefits of central bank communication of interest rate projections are greatest when the public has relatively little data. However, they also indicate that the

benefits of central bank communication are muted if the public systematically underestimates the accuracy of the projections. In worse case, if the public severely overestimates the accuracy of the central bank signals, then the publication can be counterproductive until private agents realize their misperception of the accuracy. This second part of the conclusion is somehow similar to the one raised by Morris and Shin (2002 and 2005) except for the factor playing important role here is transmission noise, not the precision of information itself.

Nevertheless, Rudebusch and Williams (2006) use two key assumptions that might be too strong: *(i)* they assume that the central bank can commit to future policy actions and therefore does not face a Barro-Gordon time inconsistency problem; and *(ii)* they also ignore the strategic complementarity which causes the problem of misleading information raised by Morris and Shin (2002 and 2005). This seems to make the model be less than complete.

Similarly, Gosselin et al. (2008) use a set of three equations to examine the conditions under which a central bank raises welfare by revealing its expected future interest rate in a simple two-period model with heterogeneous information between central bank and private sector:

- a New Keynesian Phillips curve

$$\pi_t = \beta E_t^P \pi_{t+1} + \kappa_1 y_t + \varepsilon_t$$

- a forward-looking IS curve

$$y_t = E_t^P y_{t+1} - \kappa_2 (r_t - E_t^P \pi_{t+1} - r_t^*)$$

- and a policy maker (central bank)'s loss function which is standard for inflation and output variability

$$L = E(\pi_1^2 + \pi_2^2)$$

where y_t is the output gap, r_t is the nominal interest rate, and E_t^P denotes private sector's expectations conditional on the information set available at time t.

They calculate the loss function value in two themes where central bank publishes or does not publish its interest projections. Comparing the two results with possible relations between parameters, they show that a central bank that follows an optimal linear interest rule will raise welfare by revealing the future interest rate in two cases: *(i)* when central bank signal precision is high enough relative to the private signal precision; and *(ii)* when the elasticity of current to expected inflation is large and the relative signal and early signal precision are not too low. The publishing will help align central bank's and private sector's expectations about the future inflation rate. The private sector fully trusts the central bank to eliminate future inflation and sets the long-term interest rate accordingly, leaving only the unavoidable central bank forecast error as a source of inflation volatility. Contrary, they also show that opacity may welfare-dominate transparency (*'creative opacity'*) if the private sector's own forecasts systematically offset the impact on inflation volatility of the central bank forecast errors. This can be the case when the early signals are precise relative to contemporaneous signals and when the relative precision of the central bank information is not too large. In other words, current period inflation differs from its target not just because of the unavoidable central bank expectation error but also because central bank and private sector expectations about future inflation and interest rates are no longer aligned.

Recently, Brzezina and Kot (2008) employ a similar New-Keynesian model with asymmetric information with some calibrations to show that publication of macroeconomic projections and of the future interest rate path by the central bank can improve macroeconomic outcomes. However, their results indicate that the gains from publishing interest rate paths are small relative to those from publishing macroeconomic projections. Given that most inflation targeting central banks are already publishing macroeconomic projections this means that most gains from increasing transparency in this area may already have been reaped. This means they use cost-benefit analysis to provide a possible explanation of the relative reluctance of central banks to publish interest rate paths.

However, similar to the debate on the desirability of the transparency, as pointed out in surveys by Geraats (2002) and Woodford (2005), many conclusions about the value of transparency appear to hinge on the exact specification of the theoretical models. The parameters calibrations are somewhat ad-hoc and can be criticized as being lack of generalization.

Applying the problem of value of information raised by Morris and Shin (2005) into the specific form of transparency, we can think of a 'self-fulfilling mechanism' of central bank's and private's information, keeping in mind the dual role of central bank as shaper and observer of the market. That is, when private information is very accurate, and if the precision of central bank signal (in the form of central bank's interest rate forecasts) increases, at a level that crowds out private information, agents take actions basing on the over-weighted central bank information. Then the agents' actions bear less information value, or loosely reflect the true conditions of the economy. Now, at the next period, forecasts becomes less accurate, since it is formed basing on the signals of prices which are now less informative, until it returns to a level that does not crowd out private information any more. From that period, private information is not under-weighted and investors' actions become more informative. At the next period central bank forecasts gaining more informativeness from market signals becomes more precise back, and so on until its precision reaches the level that crowds out private information again, and so on. We call this a 'self-fulfilling mechanism' of central bank's and private information which will maintain the relationship between these types of information within a corridor in form like a sin-shape graph. However, because learning is possible for both central bank and financial market participants, this shape might have decreasing amplitudes overtime and there will be no longer difference between central bank's and private sector's forecasts in the infinity horizon (someday, all available information become common knowledge).

As mentioned above, there has been no comprehensively empirical study for the effects of publishing central bank's interest rate forecasts except for Ferrero and Secchi (2007). They find evidence that the communication of future policy intentions, either quantitative or qualitative, improves the abil-

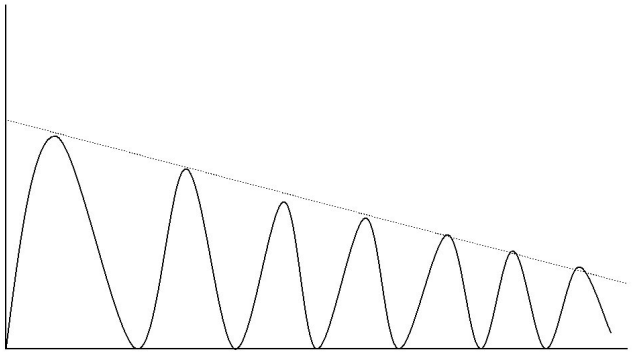

Figure 1: 'Self-fulfilling mechanism' of central bank's and private sector's interest rate forecasts

ity of market operators to predict monetary policy decisions. Analyzing the case of Reserve Bank of New Zealand, which releases a quantitative assessment of its future policy intentions since 1997, they show that even for a very transparent central bank, the publication of the expected interest rate path has a significant impact on market expectations. This result contradicts to the one by Brzezina and Kot (2008) mentioned before. They also find evidence that the change in market interest rates in the period included between two publications of the interest rate path is similar to the revision of the published path, thus suggesting that market operators have well understood the conditionality of the central bank's projections. However, in presence of changes in the direction of official interest rates, the reaction of financial markets to the monetary news included in the publication of the path is somehow anomalous: the change in market expected interest rate goes in the opposite direction of that implied by the monetary news.

Beside some of the arguments supported by theoretical and empirical studies mentioned in this parts, many other arguments raised by increasing papers concentrating on the revealing of interest rate projections. Nothing prevents us from borrowing the arguments on the pros and cons of central bank transparency in general form or some other forms like inflation forecasts

(which is conditionally based on a constant path of interest rate). However, in the scope of this paper, we will only focus on the claims of the good and bad of publishing policy rate inclinations in the next parts.

2.2 Why should central bank publish interest rate forecasts?

We now turn to reviewing the arguments that are in favor of 'revealing the secrets of the temple'. Many claims have not been empirically tested in reality, however each of them includes a reasonable nuclear that is worthy to study.

First, for the current wide-applied level of transparency, central bank publishes macroeconomic projections basing on the assumption that the policy interest rate will not change in the future from its current setting. Private agents must then compare this constant-interest-rate projection to the announced economic objectives in order to back out the actual expected policy rate path. For example, if, at some future date, the published constant-interest-rate inflation projection is higher (lower) than the inflation target, then, in general, private agents should infer that the policy rate is likely to increase (decrease). However, this implicit signaling procedure has been criticized for supplying a circuitous, vague, and potentially confusing expression of the central bank's actual views of the likely path of policy[5].

This leads to the second point which argues that publishing dynamic interest rate may directly provide signals about future interest rate, then affects market expectations about the future evolution of monetary policy and, in turn, it allows the market to price financial assets more efficiently (Archer, 2005; Kahn, 2007). This helps reduce uncertainty for other decision-makers increasing the allocative efficiency of the economy[6]. As a result, through the transmission process from expectations to the real actions, the publication will help decrease the fluctuation of inflation and output, equally

[5]See Rudebusch and Williams (2006); and for the wider scope, see Rudebusch and Svensson (1999), Goodhart (2001), Svensson (2005), Faust and Leeper (2005), and Woodford (2005)

[6]See Tarkka and Mayes (1999)

improve macroeconomic performance.

That is for the financial market. How about the central banks or policymakers, will they benefit themselves from their publications? It turns out that the publication firstly can help to enforce the optimal policy under commitment (Woodford, 2005; Archer, 2005; Kahn, 2007; Mishkin, 2004). Being fear of the credibility and reputation problems, central banks must be more careful if they want to deviate interest rates from the published levels. This also increases the incentives of central banks for producing good forecasts (Mishkin, 2004; Archer, 2005). In a deeper level, those fears will also foster the discussion within the monetary policy committee on policy objectives and on the appropriate models to be used in assessing the evolution of the economy (Archer, 2005). In other words, it improves the co-ordination of macroeconomic policies, and it provides a sort of democratic accountability of a central bank via ongoing to a full transparency. All of the effects, in turn, would help central bank implement its functions smoothly.

The experience of the RBNZ, which has given specific numerical policy guidance (point projections) for over a decade, is generally positive. As discussed by Archer (2005), financial markets in New Zealand have reacted favorably to the central bank's interest rate forecasts, and understood their conditionality. Although the Norges Bank has only a very brief track record of interest rate projections, the explicit confidence bands (probabilistic projections) provided should reinforce forecast conditionality, and so far, its experience has been favorable.

Moreover, supporting for a really full transparency, Svensson (2005) argues that the central bank should even publish its objective function and model and thereby provide the public with all the information it needs to form expectations of future policy actions. All the central bank information will become common knowledge then. And because central banks are assumed to have the best place with large number of qualified experts to provide the best forecasts, the last problem remained would only be how to react to sudden shocks.

2.3 Why should not publish?

Among many papers, two main arguments have been raised against such a publication of interest rate projections. The first is that it's very difficult to provide an accurate forward-looking policy inclination[7], even for central banks. Therefore, it may be very difficult to reach an agreement on the future evolution of the interest rates within the monetary policy committee (Goodhart, 2005; Mishkin, 2004). In many countries, there are usually draft documents including policy rate forecasts prepared by central bank's staff for members of monetary policy committee before each committee's meeting. But each member may have own forecasts which may be very different to the staff's forecasts, as long as there is no common-accepted model. However, as pointed out by Ferrero and Secchi (2007), although RBNZ's and Norges Bank's forecasts are not significantly more precise than other central banks' forecasts, they seem not to face any big problems caused by their forecast publications.

The second main argument is that financial market participants may inevitably misinterpret the central bank's signals. They are likely to misunderstand that the projections are central bank's promises. It would be harmful if the public does not understand the conditional nature of the forecasts, given that it could undermine the credibility of the central bank when the realized interest rates are different from the published ones. At least, publishing central bank forecasts would make its communication to economic agents become more complex (for further discussion, see Woodford, 2005; Mishkin, 2004; Rudebusch, 2008).

The third claim would follow immediately from the second one. Central bank's fearness of credibility and reputation problem arises. That, in turn, affects the flexibility of central bank in forming future policy, especially in dealing with unanticipated shocks. In other words, central bank is sticky to what they told before about the future policy inclinations such that they cannot flexibly and effectively react to unanticipated shocks in time.

The forth is that a publication of interest rate will be useless if the central

[7] See Rudebusch and Williams (2006)

bank is already very transparent in many other dimensions, since in this case the impact on private expectations could be minimal (Kahn, 2007). Or in other words, gains from revealing interest rate forecasts are relatively small compared to gains from publishing other macroeconomic projections (inflation, output growth, unemployment, etc.) - the form that many inflation targeting central bank have already reached in reality[8].

Last, but not least, publishing interest rate projections means central bank will give up their possibility of *'creative opacity'*[9]. Greenspan era has shown that opacity sometimes is effective in forming expectations and pursuing stability in macroeconomic performance. This argument remains since many central banks still consider the policy intentions as the last taboo of the monetary policy[10], *'the last secret of the temple'* and therefore are reluctant to reveal them despite the fact that they are publishing many other macroeconomic forecasts.

3 Criteria for central bank to publish future interest rate paths

Through the above arguments on the pros and cons of publishing the policy rate projections, the double-edge nature of the problem suggests that a central bank should take careful steps in its deciding process for that kind of publishing. We now are ready to turn to establishing a criteria table for central banks in considering whether they should reveal the interest rate forecasts or not. This table however is only a preliminary assessment suggestion for central banks and is far less than a complete guideline. Many criteria included need to be strengthened and deepened through empirical studies.

[8]See Brzezina and Kot (2008)
[9]See Gosselin et al. (2008)
[10]See Rudebusch (2008)

3.1 To answer the question: Publish or not?

Criteria	Explanation
1. Central bank	
1.1. Pre-conditions	
Clear target regime	A flexible inflation targeting might be the best regime.
Relative independence	Without independence, central banks cannot forecast well and also cannot follow their policy intentions smoothly
Good credibility level	All publications will be useless if people do not believe central bank's communication
Good reputation level	Central bank must have a believable experience of keeping commitment in the past
Good accountability level	Central bank itself must be aware of responsibility for what it talks and what it does
1.2. Forecast accuracy	
A good model for forecasting interest rate	Model must account for key variables which affect interest rate and must be potential to provide good forecasts regardless it bears strong base of economic relationships or not
Good models for forecasting other macroeconomic variables	Models for forecasting inflation, output growth, unemployment, etc., taking interest rate as endogenous
Adaptiveness (learning)	The models must be adjustable to increase the accuracy of forecasts overtime. Always open for competing forecasting models: compare and adapt, even replace old, less efficient models.
Good data for putting into the models	A good system and procedure of collecting and checking data. Statistical requirements: not only central bank internal statistical department but also national statistical bureau for all necessary macroeconomic variables

Criteria	**Explanation**
Qualified staff	The department which prepares the forecast reports must have highly qualified staff who can use properly and efficiently the model and the data to provide good results of forecasting
Quality control	Control and checking procedures for assuring the quality of each forecast
Qualified members of monetary committee	The members of the monetary committee must well understand the forecast process and results; and must have ability to assess the forecasts prepared by staff
Agreement within the committee	Clear and efficient procedure for reaching agreement on current and future setting of interest rate in the monetary committee
Ability to keep informed of shocks	Ability to keep central bank itself and financial market informed of any shock that affects interest rate, inflation, output or any other key macroeconomic variables
Ability to adjust to shocks	Ability to adjust interest rate to bring inflation rate toward the target of inflation, lower output variability and stabilize other macroeconomic variables
1.3. Criteria for appropriate interest rate path	See Qvigstad (2006)
Anchoring inflation expectations	The interest rate must be set so that inflation expectations are around the target, then the realized inflation moves towards the target
Getting the balance between inflation gap and output gap	The two gaps should be kept in reasonable proportion to each other

Criteria	Explanation
Robustness	Interest rate should be robust to other assumptions concerning economic developments and the functioning of the economy (at least for few months when new shocks do not come into effects)
Interest rate smoothing	Interest rate should not be changed suddenly unless the credibility of the nominal anchor is threatened
Financial imbalances	Interest rate setting must be linked to asset price and credit market and help keep stability in those markets
Cross checks	It is suggested to cross check the interest rate forecasts by some simple policy rules other than the model in use
1.4. Feedback obtaining systems	
Regular surveys	Regular expectations observation system, etc.; observe level of using central bank's forecasts
Observe other factors	Observe asset prices, credit market, other financial factors to check the process of reflecting expectations into reality factors
Assess efficiency level of using central bank's forecasts	Evaluate the market participants' use of central bank forecasts in pricing and making decisions on investment, consumption of economic agents
2. Financial market participants	
2.1. Understand the forecasts	An average-level agents should be able to fully understand the forecasts and know the meaning of the forecasting results
2.2. Understand the conditional nature of the forecasts	Agents will not underestimate or overestimate the precision of central bank's interest rate forecasts Central bank's communication should become 'common understanding' for being effective

Criteria	Explanation
2.3. Their own forecasting systems	Agents might have their own private channel of information which can be used together with common knowledge in forecasting
2.4. Ability to efficiently use the forecast information	Agents might be able to use the revealed future interest rate efficiently in pricing assets, investment, consumption, borrowing, lending, etc.

3.2 To answer the question: How to publish?

Criteria	Explanation
1. Language of the publication	Each word of the publication must be monitored very carefully to avoid sending highly noisy signals of future policy intentions that confuse markets
Keep agents aware	Always repeat the conditional nature of the forecasts
Clear explanation on adjustments	Give clear reasons each time central bank has to adjust interest rate in response to a significant shock
2. Levels of revealing	
Only qualitative statements	Qualitative statements (about future interest rate) sometimes make communication more complicated and can lead to confusion
Some parts of numerical but not full projection	Usually ad-hoc and in some special situations
Full forecast results	As RBNZ, Norges Bank, Sveriges Bank and some others are implementing. Might think of the frequency: quarterly (in most cases), monthly, or even weekly or daily; and also the form of the forecasts: point projections (as performed by RBNZ) or probabilistic projections (Norges Bank)
Full forecast results and also the models in use for forecasting	As suggested by Svensson (2005), however until now no central bank has pursued this extremely full transparency strategy

Both the tables then can be improved simultaneously via 3 different directions:
(i) expanding: put more criteria
(ii) detailing: give more detailed conditions into each of the criterion
(iii) quantifying: establish an index system to quantify the level of readiness for each central bank to publish interest rate forecasts.

4 Conclusion

Whether central banks should publish their interest rate forecasts or not is now a debatable topic that lies in the centre of the central bank transparency. This paper is to provide a review of literature for the topic in both theoretical and empirical aspects. Employing wide-accepted pros and cons arguments, we try to establish a criteria table as a preliminary guideline for central banks to assess their capacity to publish the policy rate intentions and also how to do it if they choose to reveal. The bottom line is that, because of the complication of the double-edged nature, publishing interest rate projections should be one of the last forms of transparency that central banks might use and they must be very careful when doing it.

Some directions are suggested for future research. Theoretically, a commonly accepted model which also control for time inconsistency (Barro - Gordon problem) and value of public and private information (Morris and Shin problem) is needed to develop in shedding light on the debate. Even more necessary is empirical studies which collect available data from the group of the most transparent central banks to analyze the full effects of the forms of transparency (including all levels of revealing interest rate forecasts) on the macroeconomic performance and social welfare. From those studies, the criteria table in this paper will gain more fundamental bases and can be expanded and deepened, providing a complete guidance for any monetary policy maker in deciding whether to pursuit a full transparency and how to do it smoothly.

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