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How Elastic and Predictable Money Should Be: Flexible Monetary Policy Rules from the Great Moderation to the New Normal Times (1993-2023)

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How Elastic and Predictable Money Should Be: Flexible Monetary Policy Rules from the Great Moderation to the New Normal Times (1993-2023)

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The never ending debate on the optimal money elasticity and predictability, coupled with the recent wishes of the major central banks to normalize monetary policy, as well as to revise their best practices, motivate this paper. Its aim is to offer a review of the evolution of the modern concept of flexible monetary policy rules, from the seminal contribute of Taylor (1993) to nowadays. Four subsequent steps are implemented: after an excursus on the traditional rules versus discretion debate, the origin of the flexible rules is described, and then its evolution; finally, the opportunity to consider as a promising research perspective the role of the central bankers' heterogeneity - in terms of personal preferences, including the behavioural biases – is highlighted. The more it is likely that psychology matters, the more a new motivation arises for a central bank to adopt a flexible rule.

Keywords: monetary policy, flexible rules, central bank governance, central banker conservatism, behavioural economics, Sweden, New Zealand

JEL Codes: E50, E52, E58.

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1. Introduction

The Federal Reserve System mandate claims that the aim of the US central bank is "to furnish an elastic currency", given the dual mandate to pursue both "maximum employment" and "stable prices". In parallel, both the traditional (Buchanan 1962) and the current (Blattner et al. 2008, Svensson 2015) best practices in monetary policy view high degree of predictability as desirable. As we will see, the intertwined concepts of elasticity and predictability can be effective metaphors to summarize a key principle deeply characterizes the monetary policy analysis in the last four decades: the flexible monetary policy rule (Taylor 1993 and 1999). In fact, such vague phrases that appear in the Federal Reserve Act can be considered the starting point for all the macroeconomic models that aim to describe how the central banks in advanced economies, starting from the FED (Blinder 2023), may balance real and monetary goals.

Flexible monetary rule is sometimes defined as "constrained discretion" (Bernanke and Mishkin 1997), or "instrument rule" (Svensson 2003), stressing the fact that, given the central bank commitment to achieve in the medium run an inflation target, the central bankers in charge maintain discretion in changing its main instrument – usually a short nominal interest rate – to addressing and fix macroeconomic unbalances.

Moreover, in the last months the structural change in macroeconomic context – from stag-deflation scenarios to high inflation risk - led major central banks to pursue monetary policy normalization (Lagarde 2022, Panetta 2022, Waller 2022). At the same time, the Federal Reserve (Federal Open Market Committee 2020) and the European Central Bank (European Central Bank 2021) revised their monetary policy frameworks. In such a scenario, it is natural that the central bankers' need to provide more clarity on, and be guided by, their own reaction functions (Panetta 2023), represents a further, contingent motivation to take stock of the state of the art regarding the monetary rules, other things being equal, including the increasing importance of central bank communication (Gorodnichenko et al. 2023, Masciandaro et al. 2023).

As monetary policy economics evolved in such as period, two intertwined tales played crucial roles. On the one hand was the tale of how the institutional design of central bank rules – the procedures that govern central bankers' decisions – can shape policymakers' incentives (Sargent and Wallace, 1981). On the other hand was the tale of how central bankers' preferences matter (Barro and Gordon 1983, Rogoff 1985).Central bankers' choices and central bank design have progressively emerged as two crucial features of central bank governance that can shape monetary policy.

Therefore monetary policy became the final outcome of complex interactions among four main components (Masciandaro 2022): monetary institutions, central bankers' preferences, policy rules and macroeconomics (Persson and Tabellini, 1993; Svensson, 1995). In this regard, both central bankers' preferences and the central bank's design can influence the definition and implementation of the monetary policy rules given the assumptions about how the macroeconomic system works. In a sense a four- pillar framework was born. Here the role of the flexible monetary policy rules came in.

The paper is organized as follows. Section Two summarizes the traditional rules versus discretion debate. Section Three describes the origin of the flexible rules, while Sections Four, Five and Six analyse their evolution, In Section Seven the relationships between flexible rules and concrete central banking experiences are discussed, focusing on the cases of Sweden and New Zealand. Section Eight highlights the need to consider in the

future research agenda the role of the central bankers' heterogeneity in terms of personal preferences, including their behavioural biases. Section Nine concludes.

2. Before the Taylor Rule: The Traditional "Rules vs Discretion" Debate

Before the 1980s, macroeconomics did not pay explicit and systematic attention to either central bankers' preferences or the central bank's institutional setting when developing positive and normative arguments (Masciandaro 2022). Both features were hidden. This reflected the "rules versus discretion" dilemma regarding the optimal conduct of monetary policy (Bibow 2002, Rivot 2013, Tavlas 2015 and 2021, Dellas and Tavlas 2016 and 2021, Nakamura and Steinsson 2019), which originated at the University of Chicago in the early 1930s, identifying uncertainty as the main drawback of discretionary policies (Dellas and Tavlas 2021). That dilemma still offers key insights (Nelson 2007, Bibow 2010, Taylor 2011, Dellas and Tavlas 2021) that highlight two relevant evolutions in monetary policy analysis.

First the concepts of "rule" and "discretion" are viewed differently today (Rivot 2013, Dellas and Tavlas 2021) . A "rule" is a systematic policy reaction function (Taylor 1993). The dilemma is how much discretion the central banker has in applying a policy. In other words, the crucial question is the following: "What is the optimal degree of activism in a rule?" (Dellas and Tavlas 2021). Second, in the 1980s, the discretionary policy rule became intertwined with another feature: the central bank's design, that influences the de jure and/or de facto central bank independence, and, through such as channel, the macroeconomic performances (Grilli et al. 1991, Cukierman et al. 1992, Romelli 2022, Ioannidou et al. 2023). The central bank's governance deeply influences the discretionary policy rule and, eventually, monetary policy.

In the traditional debate, the design of the central bank's governance did not matter for several reasons. On the one hand, Friedman (1962) generally distrusted collective bodies and consistently advocated for constitutional rule in the monetary policy field in order to completely tie central bankers' hands (Rivot 2013). On the other hand, Keynes (1971, <1930>; 1982,<1932>) viewed the government as the monetary policymaker that sets the goals for monetary policy (Bibow 2002, Rivot 2013).

As such, the central banker's preferences do not matter. At the same time, the central bank's design does not have special status with respect to other public agencies. In fact, both features – central bankers' preferences and central bank design – are proxies for the importance of monetary stability in policy makers' goal functions. However, if the monetary policymaker is the government, then the central bank's governance is irrelevant (Masciandaro 1995 and 2022).

Moreover, in the Keynesian view, the central bank is a technical body that retains discretion in implementing the day-to-day policy, and the need for cooperation between the central bank and the treasury is stressed (Bibow 2002, Rivot 2013). However, in this perspective, the need for cooperation is defined in a set of rules that govern the hierarchical relationship between the monetary policymaker (i.e. the government) and an expert bureaucracy (i.e. the central bank). In other words, the central bank's design is likely to be no more than an application of the general rules that govern the interactions between the political principal and its administrative bureaucratic agents (Pond 2021).

Our narrative begins when the roles of both central bankers' preferences and the central bank's design emerged through the application of a game theoretical approach following the discovery of the general time-inconsistency problems that characterize economic policy (Kydland and Prescott 1977, Calvo 1978). The key feature was the identification of the relationship between the political cost-benefit analysis of any incumbent government and the likelihood of a sub-optimal macroeconomic equilibrium. In this context, either an independent central bank (Sargent and Wallace 1981, Barro and Gordon 1983) or a conservative central banker (Rogoff 1985) were identified as the solution to the problem of monetary policy effectiveness. At the same time, both concepts highlighted the importance of monetary stability in policy makers' goal functions.

Central bank governance became the institutional architecture for implementing day-to-day monetary policies aimed at smoothing business cycles (Bernanke and Gertler, 1995; Clarida, Gali and Gertler, 1999; Woodford, 2003b; Gali and Monacelli 2005) using monetary policy rules (Taylor, 1993; Henderson and McKibbin 1993; Walsh, 1995, Orphanides A., 2003), where the operating lever can be either a nominal interest rate (Taylor 1993), a quantitative target (Mc Callum 1987), o both (Curdia and Woodford 2011).

All in all, monetary policy became the final outcome of complex interactions among four main components: monetary institutions, central bankers' preferences, flexible policy rules and macroeconomics (Persson and Tabellini, 1993; Svensson, 1995). In this regard, both central bankers' preferences and the central bank's design can influence the definition and implementation of the monetary policy rules given the assumptions about how the macroeconomic system works. In a sense a four- pillar framework was born. In this respect, institutional arrangements and policy rules are not necessarily alternative options, as Friedman claimed in 1962 and Taylor suggested in 2013. Here the role of the flexible monetary policy rules, came in. Moreover, it is worth noting that the flexible monetary rule approach, beyond to be this funding pillar in the New-Keynesian DSGE models (Woodford 2001 and 2003b, Clerc and Boianovsky 2023), can be also interpreted along Classical-Keynesian lines (Levrero 2023).

Three decades ago John Taylor (Taylor 1993), analysing the period 1987-1992, found that the FED interest rate policy seems to systematically follow a simple rule of reacting to gaps respectively between actual inflation and inflation target, on the one side, and between actual output and potential output on the other side, assuming that the central bank knows the value of the long run real rate of interest[1].

Since then, a plethora of econometric studies estimated the Taylor rule for many countries and in different business cycle situations (among others Clarida et al. 1998, Peersman and Smets 1999, Orphanides 2001 and 2003, Sauer and Sturm 2007, Galimberti and Moura 2013), testing its key assumption: a central bank reacts if actual macroeconomic performances are different from their targets: for example, when inflation goes above its target, and/or actual output is above potential, a central bank must raise its policy rates. Moreover the Taylor rule became an ubiquitous method in teaching the actual conduct of monetary policy (Waters 2021).

In parallel, the interest rate rule has been theoretically well grounded (Rudebush and Svensson 1999, Woodford 2001 and 2003a, Walsh 2015), and the Taylor rule became the consensus specification of monetary policy in macroeconomic theory; although the concrete

[1] It is worth noting that the original Taylor Rule specification is still used; see Vinci and Licandro 2021.

specifications of the rule can vary, most of the existing macro models included an equation similar to the original one.

3. The Taylor Rule: Its Origin

To describe the original 1993 Taylor rule, we can use the following specification:

$$i_t = r^* + \pi^* + a(\pi_{t-1} - \pi^*) + b(y_{t-1} - y^*) \quad (1)$$

Where *i* is the reference rate, *r** is the natural (long run real) rate , π and *y* are the inflation rate and the output growth, while π^* and y^* are the inflation target and the potential output; finally, the parameters *a* and *b* represent the central bank sensibility respect to the fundamental macroeconomic gaps. It is worth noting that both gaps can be considered as determinants of present and future inflation (Svensson 1997 and Rudebush and Svensson 1999).

We are assuming that the central bank knows in every moment which are its targets, as well as the value of the natural rate and the past values of both inflation and output growth. In turn the dynamics of such as variables depend on two equations for inflation and output growth, that are motivated by a correspondent macroeconomic model.

Economically, given a medium term horizon, and the information set which is available at time *t*, we are assuming that monetary policy can be either neutral (passive) or active. Monetary policy is neutral when neither accommodative nor restrictive actions are implemented, i.e. when the economy is in its bliss point: growth and inflation are respectively equal to the potential output and to the inflation target. The corresponding reference rate will be equal to the sum between the neutral rate and the inflation target, consistently with the Fisher definition of nominal interest rate.

Otherwise, monetary policy is active, becoming a stabilization device: the reference rate is associated with both the inflation gap and the output gap, given the central bank goal to minimize the discrepancies between actual values and targets. For the sake of simplicity, we assume that the natural rate and the targets are constant in the medium term. Therefore, the central bank reaction function becomes as follow:

$$\begin{aligned} i_t &= r^* + \pi^* + a(\pi_{t-1} - \pi^*) + \beta(y_{t-1} - y^*) \\ i_t &= (r^* + (1-a)\pi^* - by^*) + a\pi_{t-1} + by_{t-1} \end{aligned} \quad (2)$$

Econometrically, specification (2) becomes:

$$i_t = C + \alpha\pi_{t-1} + \beta y_{t-1} + \varepsilon_t \quad (3)$$

Where:

$$C = r^* + (1-a)\pi^* - by^*$$

Parameters α and β represent respectively the central bank response factors to inflation and growth, while ε is an independent and normally distributed random variable with a mean of zero and finite variance.

From a macroeconomic point of view, the reference rate policy is a stabilization tool if: a) the inflation response factor α is greater than one; in this case, if the Fisher Effect holds, any nominal rate change modifies the real rate; b) the growth response factor β is greater than zero, which implies that the central bank wishes to stabilize the output growth. Moreover, intercept C can be considered a spurious proxy of the natural rate, acknowledging that by construction it just embeds the long run real rate. Finally, regressors in lagged values allow us to avoid endogeneity problems[2].

4. Going Ahead: Forward-Looking Specification, Monetary Inertia and Non Linearities

It is worth noting that specification (3) is a backward- looking rule, since it uses past values of both inflation and output growth. Alternatively, the central bank can base its choices on its own forecasts of inflation and output growth; if this assumption holds, the specification becomes a forward-looking rule (Clarida et al. 1998 and 1999, Orphanides 2001 and 2003, Svensson 2003, Fourcans and Vranceanu 2004, Castelnuovo 2007, Sauer and Sturm 2007):

$$i_t = C + \alpha\pi_t^e + \beta y_t^e + \varepsilon_t \qquad (4)$$

It is worth noting that assuming a forward looking central bank does not imply that disagreement between the monetary authority and the markets cannot occur; it is a matter of fact that different data, as well as different perspectives towards the Taylor rule help to explain why the central bankers and the markets can disagree on future policy rates (Jia et al. 2023).

Finally, specification (3) implies that the central bank immediately changes its interest rate, which means that past monetary policy decisions do not matter, i.e. monetary inertia (persistence) is not a relevant phenomenon.

Alternatively, we can argue that past choices are relevant. In this case we will have an interest rate smoothing, or a so called monetary policy inertia (persistency): past interest rate choices influence the present ones (Goodfriend 1991, Clarida et al. 1998, Favero and Rovelli 2003, Ozlale 2003, Smets and Wouters 2003, Dennis 2006, Castelnuovo 2007, Beck and Wieland 2008, Orphanides and Wieland 2013, Canzoneri et al. 2015).

The general explanation of such as behaviour is that the central banker prudently smooths changes toward the reference rate target. Moreover, the more common assumption is that the smoothing mechanism links just two subsequent central bank decisions; in this case we have an autoregressive process with one lag only. We can write:

[2] However, endogeneity problems can be just minimized. In fact, central banks react to variables that are in turn endogenous to previous monetary policy shocks, both intended and unintended ones. In this case, using Ordinary Least Squares (OLS) estimations, endogeneity implies a correlation between regressors and the error term – i.e. an asymptotic bias – that however can be addressed (Carvalho et al. 2021). Alternatively, estimations by Instrumental Variables (IV) or Generalized Method of Moments (GMM) can solve such as endogeneity problem (Clarida et al. 2000).

$$i^* = C + \alpha\pi_{t-1} + \beta y_{t-1}$$
$$i_t = \rho i_{t-1} + (1-\rho)i^* + u_t$$
$$i_t = \rho i_{t-1} + (1-\rho)(C + \alpha\pi_{t-1} + \beta y_{t-1}) + u_t$$
$$i_t = \rho i_{t-1} + C' + \alpha'\pi_{t-1} + \beta' y_{t-1} + u_t \quad (7)$$

Where the implicit reference rate *i** follows the standard Taylor rule (2), *0<ρ<1* is the inertia factor and *u* is an independent and normally distributed random variable with a mean of zero and finite variance. Specification (7) represents an inertial Taylor rule, where the reference rate is associated with observable regressors, including its lagged value, and *ρ* is the corresponding smoothing factor.

Moreover, if the central banks can have asymmetric preferences – i.e. they assign different weights to positive and negative inflation and output gaps – it better to test non-linear Taylor rules (Martin and Milas 2004, Taylor and Davradakis 2006, Petersen 2007, Castro 2011, Neuenkirch and Tillmann 2014, Beckmann et al. 2017, Caporale et al. 2018, Wang et al. 2019).

5. More Than Inflation and Output Gap: the Augmented Taylor Rule

A further step has been done when other macroeconomic variables rather than inflation and output gaps has been considered relevant in influencing the monetary policy conduct. In particular, the inclusion of financial variables in interest rate rules has been motivated by the need to assess if central banks take in account financial stability issues in taking their decisions (Borio and Lowe 2002, Svensson 2017, Filardo et al. 2022). In such as augmented Taylor rules, the relevance of financial stability is typically proxied using financial variables or building up specific financial indexes (Zhu et al. 2021, Verona et al. 2017):

$$i_t = \rho i_{t-1} + C' + \alpha'\pi_{t-1} + \beta' y_{t-1} + \gamma(fin\_variable/s)_{t-1} + u_t \quad (8)$$

Moreover, the augmented Taylor rule can be used to test if monetary policy decisions are influenced by exchange rate movements (Svensson 2000, Chadha et al. 2004, Lubik and Schorfheide 2007, Heimonen et al. 2017, Caporale et al. 2018, Rodriguez et al. 2021), stock market information (Heimonen et al. 2017), money supply shifts (Fendel and Frenkel 2006, Surico 2007), forecast uncertainty (Bauer and Neuenkirch 2017), media coverage (Bennani 2018), credibility losses (Neuenkirch and Tillmann 2014). More generally, an augmented Taylor rule specification can be used when other sources of heterogeneity could affect central bank decisions (Malmendier et al. 2021), as in the case of Eurozone (Papadamou et al. 2018). Finally, the Taylor rule specification can be used to model and forecast exchange rate movements (Wang et al. 2019).

6. After the Great Crisis: Taylor Rule Fine Tuning

After the 2008 Global Financial Crisis and the implementation of new unconventional monetary policies (UMP) in advanced economies - zero and/or negative interest rate

policies (ZIRP and NIRP), systematic purchases of financial assets through open market operations and/or bilateral lending (QE), forward guidance, i.e. monetary policy announcements (FG) - the identification the Taylor rule became a challenging task. The fact that different central banks used such as UMP innovative procedures produces relevant macroeconomic effects (Rossi 2021) and therefore imposed an overall fine tuning in the Taylor rule empirical analyses.

The more common strategies has been i) to introduce structural break techniques in the estimates (Canova 2009, Coibion Gorodnichenko 2015, Bunzel and Enders 2010, Mavroeidis 2010, Ilbas 2012) and/or ii) to use "shadow" rates, i.e. new proxies for the policy rates (Ichiue and Ueno 2013, Krippner 2013, Lombardi and Zhu 2014, Wu and Xia 2016, Anderson et al. 2017, Wu and Zhang 2019, Avdjiev et al. 2020, De Rezende and Ristiniemi 2023, Ouerk et al. 2020, Jones et al. 2021, Rossi 2021, Choi et al. 2022).

In the latter case the intuition is straightforward: even if the usual short-term (reference) rate is constrained, given the lower bound floor, the central bank can still stimulate the economy by influencing a long term interest rate. In general, the shadow rates are empirically obtained using the term structure of the actual interest rates.

Moreover, recent events motivated a reconsideration of money growth rules (Belongia and Ireland 2022), consistently with the view that the effects of monetary policy actions can be transmitted either through changes of the nominal interest rate or variations in the quantity of money (McCallum 1987, 1993 and 1999, Ireland 2004, Nelson 2005, Favara and Giordani 2009, Caraiani 2016, Belongia and Ireland 2021).

7. Taylor Rule and Central Banking

Regarding the relationships between the flexible monetary rule literature and the concrete central banking practices, it is worth noting that in general central bankers avoided to adopt explicitly an instrument rule – or use it as a guideline (Taylor 1993 and 2000) - preferring to be committed to goal rules (Svensson 2003). Some central banks – the Sveriges Riksbank and the New Zealand central bank, but also the Norges Bank, the Bank of Israel and the Czech National Bank (Svensson 2015) – provide interest rate projections as conditions to reach the target variables at an appropriate horizon: a policy-rate path is published, as well as the corresponding forecasts of inflation and real variables, explaining and motivating it.

Looking more carefully at the two more analysed experiences, and starting from the Swedish case, the Executive Board of the Riksbank, normally five times a year, and from 2007, communicates the interest rate path that is needed for monetary policy to be well balanced, in order to make monetary policy easier to understand, to predict and to evaluate (Sverige Riksbank 2022). The interest rate path is a forecast, not a promise, given that the rate path can be revised on the basis on new information (Sverige Riksbank 2022). A new Riksbank Act entered into force on January, 1, 2023. Under the new act, low and stable inflation remains the overriding goal, and its independence is specifically highlighted with regard to monetary policy. This places demand for transparency, and the Riksbank therefore endeavours to ensure that its communication is open and clear, including the forecast tables (Sverige Riskbank 2023).

Moving to the New Zealand case, its Reserve Bank of New Zealand follows a structure forecast process, publishing a policy-rate path from 1997. The Reserve Bank's

forecast show the path that monetary policy should take in order to meet its dual inflation and employment goals (Bohm and Sing 2022). This strategy is in contrast to other central banks, like the European Central Bank and the Bank of England, that communicate an exogenous policy forecast, assuming that interest rates will evolve in line with current market expectations (Bohm and Sing 2022).

Under the same vein, the Reserve Bank forecasting strategy cannot be compared with the Federal Reserve Bank procedures. The US experience of a published policy-rate path started in January 2012. From that time the Federal Open Market Committee (FOMC) publishes its Summary of Economic Projections (SEP), which include economic projections of its participants under their individual assessments of projected appropriate monetary policy. But the SEP is a snapshot of the different views of the FOMC members and do not represent a joint decision by the FOMC (Svensson 2020), and using the SEP, and in particular the median policy-rate path as an approximation to a joint FOMC decision is an assumption to handle with a lot a care (Svensson 2015).

All in all, the procedures of both the Sverige Riksbank and the New Zealand Reserve Bank show that a flexible monetary policy rule can be actually designed and implemented. The policy- rate path publication can be an effective device in managing expectations, the more it is predictable and credible, i.e. how much alignment can be found among central bank projections, private expectations and actual macro performances (Svensson 2015). In any case, it is interesting to uncover what circumstances can explain actual discrepancies, in order to improve the effectiveness of the policy-rate path (Woodford 2013,Svensson 2015).

If these types of monetary practices can be considered (Levin et al. 2003), or not (Svensson 2003 and 2020), an instrument rule is evidently a matter of discussion. In fact, let us consider a setting where a central bank convey information on its reaction function such that any new piece of relevant information changes both the central bank forecasts and its policy- rate path, and the economic players – markets, households, firms – credibly understand such as relationship, including it in their expectations and choices. Is this a case of flexible target rule, as it has been claimed (Svensson 2020), or is it likely how a flexible instrument rule can concretely work?

Moreover, from a theoretical perspective, let us compare an interest rate path consistent with a standard Taylor rule (Taylor 1993) with an interest rate path associated with an flexible target rule (Svensson 1997 and 2020):

$$i_t = r^* + \pi^* + a(\pi_{t-1} - \pi^*) + b(y_{t-1} - y^*) \quad (9)$$

$$i_t = r^* + \pi^* + \alpha(\pi_{t-1} - \pi^*) + \beta(y_{t-1} - y^*) + \gamma x_t \quad (10)$$

In the interest rate path à la Taylor the parameters reflect the central bankers' preferences, while in the interest rate path à la Svensson the coefficients depend on the macro models the central bankers use, including the role of other macro variables, different from inflation and output growth. Now, the more there will be consistency between the central bankers' preferences and the analytical tools they used, including the set of the relevant macro variables, the more the two interest rate paths tend to be similar.

8. Future Steps: Central Bankers and their Preferences, and Behavioral Biases

In general, in the literature of flexible monetary rules the researchers, given a central bank, select one Taylor rule to analyze its monetary policy. This perspective typically neglects the fact that that monetary policy is conducted by committees (Blinder and Morgan 2005 Gerlach-Kristen 2006, Rieder 2021). This feature of central bank governance can deeply affect monetary policy decisions. It is worth noting that, aside from heterogeneity between different central bankers, it can further be assumed that heterogeneity can exist also within each central banker, i.e. she can have in mind more than one reaction function (Gross and Zanhner 2021).

Therefore, it is crucial to review the studies that look at the link between monetary policy choices and board members' diversity in order to uncover which could be the future promising directions in developing the analysis of the central bank reaction function. Zooming on the studies on how the composition of committees can shape monetary policy outcomes, the more disputed issue is related to the degree of activism, i.e. the central banker's preferences for an anticyclical interest rate policy.

In this stream of literature, specific terminology is used: hawks versus doves (Eijffinger and Masciandaro 2018). A "dove" is a policymaker who likes to implement active/easy monetary policies, while a "hawk" is a policymaker who dislikes such policies (Chappell et al. 1993 and 1997, Jung 2013, Jung and Kiss 2012, Jung and Latsos 2014, Eijjfinger et al. 2013, Neuenkirch and Neumeier 2013, Wilson 2014, Eijffinger et al. 2015, Istrefi 2017, Bordo and Istrefi 2018, Istrefi et al. 2019).

The degree of activism is related to the role of the interest rate policy as an anticyclical element used to smooth the business cycle. The doves claim that activism improves overall macroeconomic performance, and exploits the trade-off between inflation and output growth from time to time. The hawks assume that the interest rate policy is more effective when it is solely focused on monetary stability. Over time, the dovish/hawkish attitudes have become a main focus in analyses of monetary policy board decisions. Thus far, the conclusions in this stream of literature are relatively heterogeneous (Masciandaro 2022).

Moreover, what happens if we assume that psychological drivers can influence central bankers' decisions? Behavioural economics has been introduced to explain monetary policy decisions (Favaretto and Masciandaro 2016), assuming that loss aversion can characterize the behaviour of central bankers. When loss aversion affects a central banker, losses loom larger than gains for every monetary policy choice, and both are evaluated with respect to the current interest rate. A more specific assumption could be that policy reversal aversion can characterized central bankers (Hasui et al. 2021).

The introduction of loss aversion produces "pigeons" – central bankers who like the status quo. Then, given the three possible types of central bankers (doves, pigeons and hawks), the more loss aversion characterizes individual behaviour, the more likely monetary inertia will be. This inertia can occur through at least three different channels. First, a *moderation effect* emerges in which the absolute number of pigeons increases. Second, a *hysteresis effect* can arise in which both doves and hawks soften their stances and become more similar to the pigeons. Finally, under a *smoothing effect*, only large macroeconomic shocks can trigger changes in monetary policy. In this way, psychology can become a new driver of monetary inertia independent from the existence of information frictions or the governance design. Notably, loss aversion is just one source of behavioural biases. As discussed by Orphanides (2015), the cognitive psychology perspective can be usefully

employed to understand the intertemporal challenges embedded in any monetary policy analysis.

Furthermore, this classification can be useful for analysing a fourth central bank type: the swingers (Bordo and Istrefi 2018). An empirical investigation (Istrefi 2017) identified those central bankers who switched type over their tenure as swingers. In this framework, the importance of swingers depends on the extent to which a change in individual preferences is relevant. In fact, swingers emerge when a relevant change in the distribution of conservatism occurs.

The empirical results on the Fed (Malmendier et al. 2021, Bordo and Istrefi 2018) show swings during the early to mid-1970s and from the 1990s to the mid-2000s. This supports the assumption that times of economic hardship can shape central bankers' preferences. Life experience, a psychological factor, is likely to matter (Istrefi 2017). In the same view it is possible to identify a cautiousness bias that turns the central banker's psychological concern over uncertainty against her own goal of inflation expectation stabilization (Dupraz et al. 2020). In the same perspective it can be interpreted the fact that in uncertainty times the dispersion in central banker views does not increase, and there is no significant increase in voting dissent rates (Firrell and Reinold 2020).

9. Conclusion

Central banking has changed dramatically over the past years. In response of the Great Financial Crises of 2008, major central banks implemented a series of unconventional monetary policies. Now the need to normalize monetary policy took again the stage, and consequently it is even more important to reconsider the state of the art on the flexible monetary policy rules.

Consensus on the relevance of flexible monetary rules has been achieved in recent years. The exploration of the possible central bank reaction functions has become a benchmark for evaluating the effectiveness of actual monetary strategies, supported by empirical analyses that aim to the association between central bank policies and macroeconomic performance. Nevertheless, a consensus does not constitute complete agreement. At the same time, critical views can stimulate further advances in the research. In particular, the abovementioned discrepancies between the literature on monetary policy rules and actual central banking practices deserve further research explorations, to uncover its economic and political drivers.

Finally, in the literature is increasing the acknowledge that central bankers are individuals who are subject to the same sources of behavioural biases that all individuals face. In the presence of a behavioural bias, the outcome of considering different information sets or different policy rules can be differ significantly from the outcome of the standard analysis. In other words, central bankers can justify their actions using informational reasons (i.e. "we adopted a data-dependent strategy") or governance drivers (i.e. "we need to reach a greater consensus"). However, as they are both bureaucrats (i.e. career-concerned players) and humans, other elements can be at play. In particular, central bankers can act based on behavioural biases.

Also this approach can deserve attention, given the fact that the analysis of central bank reaction function must take into account the potential relevance of behavioural biases. Future researches can devote additional effort to uncovering the relationship between behavioural biases and alternative monetary policy actions. In such as perspective, The main

policy implication could be that, the more it is likely that psychology plays a role, the more a new motivation arises for a central bank to adopt a flexible rule to strengthen both the predictability and the credibility of its monetary policy action. In fact, if the overall rationale of the flexible rule approach is to increase, inside and outside the central bank, the degree of clarity not only on the monetary policy decisions, but also with regard to the reasoning behind collective and individual choices, such practice can be even more useful if both full and bounded rationality can motivate the central bankers. More constrained discretion is better, if psychology matters.

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