

Monetary Rules Without Romance*

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Abstract

How much independence should the monetary authority retain in a rules-based regime? The conventional wisdom holds that while the political system - particularly in a democratic society - should determine the overarching goal of monetary policy, the central bank should remain free to select whichever “levers” it deems most appropriate for achieving the goal. This paper evaluates whether instrument independence is consistent with the goals of a rules-based regime by examining the monetary and macroeconomic effects of allowing the monetary authority discretion over the choice of control procedures when its objectives are at odds with the public interest. I argue that while a benevolent monetary authority would always select the most “efficient” policy instrument, i.e., the instrument consistent with achieving its stated objective, an opportunistic one may intentionally choose instruments that obscure its objectives, thereby undermining the purpose of monetary rules.

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Political writers have established it as a maxim, that, in contriving any system of government, and fixing the several checks and controuls [sic] of the constitution, every man ought to be supposed a knave, and to have no other end, in all his actions, than private interest.

- David Hume (1777, 42)

1 Introduction

How much independence should the monetary authority retain in a rules-based regime? The conventional wisdom holds that while the political system - particularly in a democratic society - should determine the overarching goal of monetary policy, the central bank should remain free to select whichever “levers” it deems most appropriate for achieving the goal.

There is a potential problem with this view, however, and it relates to the type of monetary rule adopted and the assumptions made about the authority’s objectives.

Some monetary rules specify the path of a nominal variable - known as targeting rules - while others specify the behavior of the monetary authority’s operating procedures - referred to as instrument rules.¹ Under a targeting rule, the monetary authority typically retains discretion over the policy instruments used to achieve the specified objective - a principle known as instrument independence.² This in-

¹Examples of the former include inflation and nominal gross domestic product targeting like those discussed by Bernanke & Mishkin (1997) and Sumner (2014), whereas examples of the latter include interest rate and monetary base rules, such as those proposed by Taylor (1993) and McCallum (1989), respectively.

²Note that in this case, the monetary authority may still use an approach like the Taylor Rule to achieve a legally-mandated target, e.g., 2 percent per year inflation. In this case, however, the rule refers to the target rather than the instrument since it is the former that has been mandated by the political system.

dependence is supposed to insulate the monetary authority from political influence, thereby avoiding the problems that exist under a discretionary regime (Cukierman, 1994; Fischer, 1995; Fratianni et al., 1997). However, the effectiveness of this approach depends on the assumptions made about the monetary authority's objectives.

This paper evaluates whether instrument independence is consistent with the goals of a rules-based regime by examining the monetary and macroeconomic effects of allowing the monetary authority discretion over the choice of control procedures when its objectives are at odds with the public interest. I argue that while a benevolent monetary authority would always select the most "efficient" policy instrument, i.e., the instrument consistent with achieving its stated objective, an opportunistic one may intentionally choose instruments that obscure its objectives, thereby undermining the purpose of monetary rules. To illustrate this possibility, I draw on Cukierman and Meltzer's (1986) model of an opportunistic monetary authority and Poole's (1970) analysis of policy instruments to determine whether a targeting rule with instrument independence is sufficient to insulate monetary policy from political influence.

The debate over targeting versus instrument rules has focused on identifying rules that minimize a social loss function rather than on which type better constrains the monetary authority (Froyen & Guender, 2012; McCallum & Nelson, 2005; Svensson, 2003, 2005). While setting aside political considerations has the benefit of providing analytical clarity when comparing the technical operation of alternative institutional arrangements, doing so can lead to misleading conclusions about how a particular monetary rule will work in practice. This paper differs in that it relaxes the assump-

tion that the monetary authority’s objective is to minimize a social loss function. My analysis contributes to this debate by demonstrating that under a targeting rule the monetary authority may still enjoy considerable discretion that it can exploit for political purposes if its objectives are less than fully benevolent, which points to the need to consider seriously the extent to which targeting rules are robust to different assumptions about the monetary authority’s objectives.³

This article also contributes to the literature on the political economy of monetary rules and institutions that has emerged in the wake of the 2008 financial crisis. This literature has stressed the epistemic limitations that monetary policymakers face (Salter & Smith, 2017), the institutional pressures that influence monetary policymakers’ decisions (Salter & Smith, 2019; Salter & Luther, 2019), the role that politics plays in shaping monetary policy (Binder & Spindel, 2017; Conti-Brown, 2016; Smith & Boettke, 2015; Meltzer, 2011), and the need to adopt a rules-based framework that establishes monetary policy as one of the “rules of the game” (Boettke et al., 2018; Buchanan, 2010; Hetzel, 2012; Salter, 2014; White et al., 2015). The analysis in this paper builds on these studies by highlighting the importance of thinking about the potential margins of adjustments that can be exploited when monetary rules are under-specified.

Finally, this paper complements earlier work on monetary policy games such as Backus & Driffill (1985), who examine a setting where the public are uncertain about

³The notion of robust used in this paper differs from that found in the monetary literature, which typically refers to how well a particular monetary rule works under a range of assumptions regarding the relationship between money and output. By robust, I mean the extent to which rules continue to perform effectively under less than ideal conditions regarding monetary policymakers knowledge and incentives (Leeson & Subrick, 2006).

the monetary authorities objectives, and Canzoneri & Gray (1985), who argue that if the monetary authority has private information with respect to its objectives and forecasts then establishing credibility with a monetary rule is much more difficult than is commonly recognized. I extend these arguments by showing that even under a targeting rule the monetary authority can exploit its instrument independence to obscure its objectives from the public, thereby allowing it to use monetary policy for political purposes.

I proceed as follows. The next section briefly sketches the case for monetary rules, which establishes a benchmark against which the monetary and macroeconomic effects of instrument independence can be assessed. In Section 3, I provide a brief overview of the literature on the political economy of monetary policy in order to illustrate the need to consider seriously the possibility that the monetary authority may not always act in the public interest. Section 4 builds on this discussion by presenting a monetary policy game wherein I relax the assumption of benevolence on the part of the monetary authority, which I then use as the backdrop of the simple model that I use to illustrate the monetary and macroeconomic consequences of instrument independence in Section 5. The final section concludes.

2 The Reason of Monetary Rules

Broadly speaking, the overarching purpose of any monetary rule is to establish a monetary order wherein the price system can function as effectively as possible, i.e., to ensure that monetary policy does not alter the structure of relative prices

and output (Buchanan, 1962). To accomplish this goal, the public must be able to predict with reasonable certainty the future path of the price level, the primary determinant of which is the nature of the monetary system (Leijonhufvud, 1987). For instance, under a discretionary regime there will likely be more uncertainty about the behavior of the price level, whereas under a rules-based one the opposite will be the case - assuming that the monetary authority's commitment to the rule is credible, of course.

There are several factors that prevent a discretionary regime from establishing the type of monetary order described in the previous paragraph. The first is that such regimes are dynamically inconsistent (Barro & Gordon, 1983; Calvo, 1978; Kydland & Prescott, 1977).⁴ Even when the monetary authority acts in the public interest and the public is fully informed about the authority's objectives, the lack of a credible commitment to the monetary authority's announced policy leads to sub-optimal outcomes. Once the authority announces the future path of the price level and the public have set their expectations, the monetary authority will be tempted to deviate from the announced policy to reduce current unemployment. The public, however, are aware of this temptation, and, wanting to avoid the costs of unanticipated inflation, update their expectations accordingly. In equilibrium, on the vertical long-run Phillips Curve, the chosen inflation rate is higher without an offsetting reduction in unemployment. This outcome is unambiguously inferior to that where the monetary authority can credibly commit to zero inflation.

The second factor is that counter-cyclical policy may actually destabilize the

⁴See McCallum (1995) for a criticism of this literature.

economy. For instance, if the economy returns to its long-run equilibrium faster than the monetary authority can recognize and respond to shocks, then stabilization policy may actually have a destabilizing effect. These “long and variable lags” as Milton Friedman (1961) called them, mean that even well-meaning policymakers may be unable to exercise discretion in a manner that ensures that the economy is as close as possible to its natural rate of output.⁵ The source of this problem is that the monetary authority lacks the knowledge necessary to implement well-timed and appropriately-sized monetary stimulus (Salter & Smith, 2017). While it is possible that discretionary monetary policy could be effective in a world wherein policymakers had perfect knowledge, the fact such a world does not exist makes adherence to a monetary rule the second best alternative (Lipsey & Lancaster, 1956).

Thus far, the underlying assumption regarding the monetary authority’s objective is that it acts to further the public interest but is unsuccessful because it cannot credibly commit to its announced policy or because it lacks the requisite knowledge to implement effective counter-cyclical policies. Note that if this were the extent of the problems facing a discretionary regime, and if the monetary authority always acted in the public interest, then it would be entirely appropriate for the comparative analysis of alternative monetary rules to focus exclusively on their technical operation. As long as the chosen rule was credible and did not place unrealistic knowledge burdens on monetary policymakers then it would effectively address the issues I discussed in the previous paragraphs.⁶

⁵Meltzer (1987) makes a related point regarding the accuracy of macroeconomic forecasts, which, he argues, are themselves influenced by the uncertainty created by a discretionary regime. See also: Orphanides (2003).

⁶See Orphanides (2001) for a discussion about the importance of considering the knowledge

As it happens, however, there is a substantial body of work indicating that central banks are both subject to external political pressure and pursue their own interests at the expense of the public's. This factor I argue, has been largely ignored in the literature on monetary rules.⁷ In the next section, I briefly survey the literature on the political economy of monetary policy to emphasize the importance of taking this factor seriously when considering alternative institutional arrangements.

3 The Politics of Monetary Policy

Economists do not generally regard the realism of their assumptions about the underlying motivations of actors in their models as being particularly important (Friedman, 1953). Nonetheless, assuming that monetary policymakers act in a way inconsistent with the public interest remains controversial. Accordingly, it will be useful to briefly survey the literature on the political economy of monetary policy in order to justify my argument that the comparative analysis of alternative monetary rules should be done under the assumption that monetary policymakers may not always act in the public interest.

A note of caution is in order, however. I am not claiming that monetary policymakers are any more-or-less self-interested than their private sector counterparts.⁸ Instead, I am assuming that monetary policymakers are no different than everyone

burdens that monetary policy rules place on the monetary authority.

⁷There are, of course, exceptions. See Selgin (2016), for example.

⁸See Salter & Luther (2019) for a discussion on this point. They extend Alchian's (1950) "evolutionary" approach to the selection of monetary policymakers, noting that the institution of central banking selects individuals with certain characteristics that are conducive to the institutional environment. See also: Salter & Smith (2019).

else, i.e., they are self-interested. The assumption of behavioral symmetry across private and public spheres shifts the analytical focus away from policymakers' motivations, which cannot be subjected to empirical verification, and refocuses it on the constraints generated by the institutional context.

Monetary policy is made within a complex network of overlapping institutional environments, each exerting influence on monetary policymakers and elected officials (Kane, 1982; Meltzer, 2011; Poole, 1987). Hetzel (1984, 1990), for example, argues that the overall stance of monetary policy must be consistent with the current state of the economy, otherwise monetary policymakers will face backlash from the political system. In consequence, monetary policymakers resist committing to a specific policy in order to ensure that they can respond appropriately to an ever-changing political environment, which can lead to political business cycles (MacRae, 1977; Nordhaus, 1975).

There are essentially two distinct channels through which the political system can influence monetary policy in the United States. The first is via the executive branch. Chappell et al. (1993), for instance, argue that the President influences monetary policy primarily through his authority to appoint members to the Board of Governors.⁹ Other studies - such as Abrams (2006), Auerbach (1985), and Smith & Boettke (2015) - argue that the President can influence monetary policy by directly pressuring the Chairperson of the Board of Governors. Regardless of the exact mechanism, empirical studies have found support for the conjecture that monetary policy responds to the President's wishes (Grier, 1987, 1989; Weintraub, 1978).

⁹See also: Kane (1988) and Puckett (1984).

The second channel through which the political system can influence monetary policy is pressure from the legislature. The Federal Reserve owes its existence to Congress, which is well-situated to pressure monetary policymakers (Binder & Spindel, 2017). Consistent with the congressional dominance approach to politics (Weingast & Moran, 1983), several studies have found evidence suggesting that Congress takes an active role in monetary policy (Grier, 1991; Hess & Shelton, 2016). That Congress would do so is unsurprising given the effect that monetary policy can have on elected officials' constituents (Kane, 1980).¹⁰

Of course, neither the President or Congress can monitor the behavior of the Federal Reserve at zero cost, which creates a potential principal-agent problem of the sort described by Niskanen (1968). Unlike normal bureaucracies, however, the Federal Reserve does not rely on Congress for its budget. Instead, the Fed earns income on the assets it owns, which it turns over to the Treasury after covering its operating expenses. M. Toma (1982) argues that this arrangement creates an inflationary bias in the Fed's monetary policy because it can increase the size of its budget by selecting a production function that is inconsistent with the least-cost method of producing base money - a conjecture for which Shughart & Tollison (1983) provide additional evidence.¹¹

Before proceeding, I want to emphasize that these findings are not uncontroversial. Nor do they demonstrate beyond a reasonable doubt that monetary policymakers are incapable of acting in the public interest. What this evidence does suggest,

¹⁰See Anderson et al. (1988), Blau (2017), Blau et al. (2013), and Skaggs & Wasserkrug (1983) for examples of the link between interest groups, Congress, and the Federal Reserve.

¹¹See Timberlake (1985) and E. F. Toma & Toma (1985) for additional evidence of the bureaucratic hypothesis of the Fed's behavior.

however, is that consideration must be given to the political economy of monetary policy when designing monetary institutions intended to serve the public interest.¹² To be effective, therefore, a monetary rule must account for the type of behavior described in this section; otherwise, there is no guarantee that it will be able to effectively a predictable monetary and macroeconomic regime.

4 A Monetary Policy Game Without Romance

Consider the following monetary policy game between the public and the monetary authority.¹³ In this game, deviations of output and employment from their natural rates are positively related to unanticipated money growth. In addition, the monetary regime is one in which the monetary authority possesses unlimited discretion over the conduct of monetary policy, both in terms of setting the policy goal and the instruments used to achieve it.

To be consistent with the political economy literature discussed in the previous section, I assume that the monetary authority has a state-dependent objective. At any given point in time, the state of the this objective reflects the current political equilibrium, which emerges via competition among various interest groups (including the monetary authority itself). Some of these groups will favor economic stimulation and others low inflation. I assume also that this equilibrium changes over time in ways that the monetary authority cannot predict with certainty, though the equilib-

¹²Moreover, as Leeson (2006) demonstrates, if only a fraction of monetary policymakers are benevolent, i.e., motivated by the public interest, then the dominant strategy may still be to cater to special interest groups, which only strengthens the case for considering rules that are robust to less than ideal behavioral assumptions regarding monetary policymakers' motivations.

¹³See Cukierman & Meltzer (1986) for a formal version of the game discussed in this section.

rium does exhibit some degree of persistence.¹⁴ Because the monetary authority's actions in the current period affect the public's inflation expectations and perforce the authority's ability to influence output and employment in the future, it selects a rate of money growth that accounts for this influence. If, for example, the authority expects to place more importance on economic stimulation in the future, it will select a lower rate of money growth in the present and vice versa.

I assume that the public's objective is to avoid the costs associated with unanticipated inflation, i.e., to form accurate inflation expectations. I assume also that while the public is aware of the structure of the monetary authority's objective, they are unaware of its current state at any given point in time. The source of this asymmetry is the monetary authority's proximity to the political process; simply put, the monetary authority will be better informed about the various political pressures impinging on it than will the public. That said, because the political equilibrium exhibits some degree of persistence, the public can gradually detect changes in the monetary authority's objective by observing the past behavior of the money supply. However, the information asymmetry between the two means that the monetary authority will be able to influence output and employment in the short run through unexpected money growth.

This information asymmetry is complicated by the monetary authority's lack of complete control over the money supply, which interferes with the public's ability to

¹⁴By persistence, I mean the extent to which the current equilibrium influences subsequent periods. For instance, let the equilibrium in the current period be given by: $z_t = \rho z_{t-1} + \epsilon_t$, where $0 < \rho < 1$ and $\epsilon_t \sim N(0, \sigma_\epsilon^2)$. Here, ρ measures the persistence of the political equilibrium and ϵ_t captures the uncertainty faced by the monetary authority with respect to the state of its objective. As ρ increases, so too does the persistence of the political equilibrium. On the other hand, as σ_ϵ^2 increases the political environment becomes increasingly unstable.

infer the authority's objective. In consequence, the public face a signal extraction problem: does an unanticipated change in growth rate of the money supply reflect a change in the monetary authority's objective or is it due to a control error? In order for the behavior of the money supply to convey meaningful information the public must disentangle the effects of control errors from actual changes in the monetary authority's objective. Accordingly, the public rationally attribute only a fraction of the fluctuation in the growth rate of the money supply to a shift in the monetary authority's objective while attributing the rest to the possibility of a control error.

The public's expectations regarding the growth rate of the money supply in the current period will reflect the actual growth rate that obtained in the previous period and their expectations thereof. All else equal, as the variance of the control errors increases the public will assign more weight to their expectations and less to the actual behavior of the money supply. The intuition here is straight forward: the noisier the signal becomes the less meaningful is the information it conveys, i.e., the more likely it is that unanticipated money growth was caused by a transitory control error rather than a change in the monetary authority's objective.

Since the political equilibrium can shift randomly over time the monetary authority's objective in one period may differ from that in previous periods. However, due to the authority's superior knowledge of the prevailing political equilibrium the public will only detect such changes gradually. The speed with which they will become aware of a change in the monetary authority's objective is negatively related to the variance of the control errors; the more tightly the monetary authority controls the money supply, the quicker the public is able to recognize a change in the authority's

objectives, all else equal.

Recall that in this game the monetary authority has complete discretion over both the monetary policy goal as well as the instruments it can use to achieve it. Under this assumption, the variance of the control errors, and thus the speed with which the public can detect a change in the political equilibrium can be influenced by the monetary authority. By intentionally choosing noisier policy instruments the monetary authority can increase the length of time it takes for the public to recognize a change in its objective. Doing so increases the authority's control over the timing of monetary surprises, thereby enabling it to respond appropriately to changes in the political equilibrium.

Whether the monetary authority selects noisier instruments will depend on its degree of time preference and the stability of the political environment. If the monetary authority heavily discounts the future then it will opt for noisier controls. Likewise, as the political environment becomes less stable the public will place more weight on the behavior of the money supply in the previous period when forming their expectations. The monetary authority can counterbalance the public's focus on the recent behavior of the money supply by adopting control procedures that increase the variability of the growth rate of the money supply thereby increasing the amount of time it takes for the public to recognize a change in the state of the authority's objective.

In equilibrium, the monetary authority chooses the current and future rates of monetary expansion that maximize the expected value of its objective. This decision will reflect the monetary authority's prediction of its own future objectives as well as

the effect that its actions will have on the public's expectations and thus its ability to influence output and employment in subsequent periods. In addition, the monetary authority will select policy instruments that provide it with the desired degree of ambiguity. The public, on the other hand, will form their expectations by observing past rates of money growth, which they then use to infer the state of the monetary authority's objective. The equilibrium in this case is self-fulfilling; both the monetary authority and the public have selected the best strategies given each others' actions.

Whether this game is an accurate description of the environment within which monetary policy is made can certainly be debated. However, it serves as a useful framework for assessing how robust a monetary rule is with respect to assumptions about the monetary authority's objectives. For instance, it suggests that a targeting rule with instrument independence may not be sufficient to insulate monetary policy from political influence. In the next section, I examine this issue in further detail from the perspective of monetary equilibrium.

5 The Effect of Alternative Policy Instruments on Monetary Equilibrium

In the previous section, I described a monetary policy game between the monetary authority and the public wherein the monetary authority, in an effort to obscure its objective from the public, intentionally selects policy instruments that increase the amount of noise in the money supply process, which prevents the public from ascertaining the current state of the authority's objective. In consequence, the monetary

authority can respond to political pressure to influence output and employment in the short run.

In this section, I model the effects of alternative policy instruments on output and prices using a monetary equilibrium framework. I demonstrate that only under a highly restrictive set of assumptions will the variability of macroeconomic variables be invariant to the choice of control procedure. What this analysis suggests is that while a benevolent monetary authority would always select the control procedure that minimized the variance of the money supply process, an opportunistic authority may not. In consequence, a monetary rule that allows the monetary authority to retain independence over the instruments of monetary policy may undermine its own purpose.

5.1 Monetary Equilibrium

To begin with, I assume that the demand for nominal money balances is a function of nominal income:

$$M^d = kPY \tag{1}$$

where $k \in [0, 1]$ and represents desired fluidity - the fraction of nominal income that people wish to hold in the form of nominal money balances - with P denoting the price level and Y real output.¹⁵

Even under a central banking regime, the monetary authority does not control the

¹⁵Desired fluidity is a function of several factors including the level of income and the returns on various assets such as money and bonds. In equilibrium, the return on the various forms of wealth must be equal at the margin. See Friedman (1956) for an in-depth discussion of the factors influencing the demand for money.

supply of money directly. Instead, it adjusts the various instruments at its disposal, e.g., high-powered money or a short-term interest rate, to influence the total quantity of money in the economy. Leaving aside for now how it is that the monetary authority influences the quantity of money in the economy, I assume simply that the money supply can be expressed as:

$$M^s = M \tag{2}$$

Money equilibrium requires that (1) and (2) be equal:

$$M = kPY \tag{3}$$

When this condition is met, people's actual money balances will equal the quantity demanded at the prevailing price level. More importantly, in equilibrium, money will be neutral in the sense that it will not affect the structure of relative prices and thus will not have an effect on real variables such as output and employment.

The goal of most monetary policy rules is to ensure that the monetary authority adjusts M in a manner consistent with preserving monetary equilibrium. An increase in desired fluidity unmet by an increase in the money supply means that the price level needs to adjust to restore equilibrium. The issue, however, is that because prices cannot adjust instantaneously an increase in desired fluidity will cause output to fall in the short run as people attempt to build up their money balances (Yeager, 1956).¹⁶ This costly adjustment process can be avoided if the monetary authority responds with appropriately-sized and correctly-timed monetary stimulus.

¹⁶There is a substantial literature on the causes of short-run price stickiness. See, for example, Alchian (1969), Fischer (1977), and Lucas (1972).

Recall that the monetary authority does not have direct control over the money supply. This fact can make the aforementioned stimulus difficult to implement in practice. Moreover, as I argue in the paragraphs that follow the degree of control that the monetary authority has over the money supply process is not invariant to the policy instrument. In consequence, a rule-bound central bank may still be able to respond to political pressure for economic stimulation by opting for control procedures that not necessarily the most “efficient” in the sense of being able to produce a certain quantity of money with the lowest amount of variance in the process of doing so.

5.2 Alternative Policy Instruments

I now turn to the issue of maintaining monetary equilibrium under different assumptions about the monetary authority’s policy instruments. Throughout this section, I assume that a monetary policy rule is in place. I do not specify which type of rule, other than assuming that the rule requires the monetary authority to target a nominal variable such as the inflation rate or the growth rate of nominal gross domestic product. I assume also that the monetary authority retains instrument independence.

I will consider the effects of two different control procedures: the quantity of high-powered money and a short-term interest rate like the federal funds rate. To do so, it will be helpful to adopt more specific money supply and demand equations that are both dynamic and reflect the possibility of stochastic disturbances. I assume that the money demand and supply functions take the following form:

$$m_t = p_t + a_0 + a_1 y_t - a_2 R_t + \epsilon_t \quad (4)$$

$$m_t = b_0 + b_1 h_t + b_2 R_t + \zeta_t \quad (5)$$

where lower-case variables denote the natural logarithm, e.g., $m_t = \ln(M_t)$, and the subscript t reflects that variables value in the current period. The variable R_t denotes the level of the nominal interest rate such that the parameters a_2 and b_2 reflect the semi-elasticity of both money demand and supply with respect to the nominal interest rate, and the variable h_t is the natural logarithm of high-powered money. Next, I assume that all of the parameters are positive. Finally, I assume that the disturbances ϵ_t and ζ_t are random, i.e., that in each period $\epsilon_t \sim N(0, \sigma_\epsilon^2)$ and $\zeta_t \sim N(0, \sigma_\zeta^2)$, and serially independent.

5.2.1 Money Stock Control and High-Powered Money

I begin with the case where the monetary authority uses the quantity of high-powered money as its policy instrument. Here, the authority uses the supply and demand relations expressed by (4) and (5) to determine the quantity of reserves consistent with producing a quantity of money, denoted as m_t^* , required by the monetary rule to which it is subject. To do so, the authority will determine the expected values of (4) and (5):

$$m_t^* = p_t^e + a_0 + a_1 y_t^e - a_2 R_t \quad (6)$$

$$m_t^* = b_0 + b_1 h_t + b_2 R_t \quad (7)$$

where the superscript e denotes the monetary authority's forecast at $t - 1$ of that variable's expected value at t .¹⁷ Eliminating the nominal interest rate and solving the (6) and (7) indicates that the monetary should set the quantity of high-powered money according to the following relation:

$$h_t = \frac{(a_2 + b_2)m_t^* - b_2(p_t^e + a_1y_t^e) - (a_0b_2 + a_2b_0)}{a_2b_1} \quad (8)$$

However, in any given period, the stochastic disturbances can differ from their expected values, and the same is true for output and prices. Thus, in order to determine the quantity of money that will actually exist in period t , it will be necessary to solve (4) and (5) for m_t and then substitute (8) into the resulting function. Doing so indicates that the money supply in any given period will be determined by the following relationship:

$$m_t = m_t^* + \frac{b_2(p_t - p_t^e) + a_1b_2(y_t - y_t^e) + a_2\zeta_t + b_2\epsilon_t}{a_2 + b_2} \quad (9)$$

Subtracting m_t^* from either side indicates that the control error associated with using the quantity of high-powered money as the policy instrument will be:

$$m_t - m_t^* = \frac{b_2(p_t - p_t^e) + a_1b_2(y_t - y_t^e) + a_2\zeta_t + b_2\epsilon_t}{a_2 + b_2} \quad (10)$$

¹⁷While I do not consider the possibility here, the variance of the monetary authority's forecast errors are a choice variable from the authority's perspective, to a certain extent. Using noisier forecasts will also increase the variability of the money supply process, thereby preventing the public from accurately detecting changes in the monetary authority's objective.

5.2.2 Money Stock Control and the Interest Rate

Alternatively, the monetary authority can use a short-term interest rate to influence the public's demand for money. In this case, because the authority is not trying to target a specific quantity of money, it will only be necessary to analyze the relationship between the demand for money and the interest rate. Here, the monetary authority will simply select a value for R_t that will produce a quantity of money demanded consistent with the target stipulated by the monetary rule based on its expectations regarding output, prices, and the element of randomness associated with the demand for money. Formally, this procedure can be expressed as:

$$m_t^* = p_t^e + a_0 + a_1 y_t^e - a_2 R_t \quad (11)$$

Identifying the control error is a straightforward exercise: simply subtract (11) from (4):

$$m_t - m_t^* = p_t - p_t^e + a_1(y_t - y_t^e) + \epsilon_t \quad (12)$$

5.2.3 Comparing Policy Instruments

Recall that in the monetary policy game with the opportunistic monetary authority that it may opt for policy instruments that introduce more noise into the money supply process, thereby preventing the public from ascertaining the current state of the authority's objective. Here, I compare the variances of the two control procedures discussed in the previous paragraphs and show that only under a highly restrictive set of assumptions about the model's parameters will the variance of the money

supply be invariant to the choice of policy instrument.

To determine and compare the variance of the control errors associated with either policy instrument, it will be helpful to define the following composite variable:

$$z_t = p_t - p_t^e + a_1(y_t - y_t^e) + \epsilon_t \quad (13)$$

Thus, (10) and (12) can be rewritten as:

$$m_t - m_t^* = \frac{a_2\zeta_t + b_2z_t}{a_2 + b_2} \quad (14)$$

$$m_t - m_t^* = z_t \quad (15)$$

It follow from (14) and (15) that the variance of the control error using high-powered money as the instrument will be:

$$\frac{a_2^2\sigma_\zeta^2 + b_2^2\sigma_z^2}{(a_2 + b_2)^2} \quad (16)$$

and the variance of the control error using the interest rate as the instrument will be: σ_z^2 .

Thus, the money supply process will be invariant to the choice of policy instrument if, and only if:

$$\frac{a_2^2\sigma_\zeta^2 + b_2^2\sigma_z^2}{(a_2 + b_2)^2} = \sigma_z^2 \quad (17)$$

When the variance of the money supply disturbance is less than or equal to the variance of the composite variable z_t , the variance of the money supply process will be less under the use of high-powered money as the instrument and vice versa.

5.3 Discussion

The point of the preceding analysis is not to argue in favor of one instrument over another. Instead, what this simple model illustrates is that a targeting rule that leaves the monetary authority free to select whichever operating procedures it desires may allow the authority to retain more discretion than is commonly recognized. This discretion is not necessarily a problem as long as the monetary authority's objectives are consistent with the public interest; in this case, there would be little value in opting for noisier control procedures. On the other hand, if the monetary authority's objectives are inconsistent with the public interest, then a monetary rule that allows the authority to select the policy instruments may create a space for the sort of opportunistic behavior rules-based regimes are intended to prevent, namely using monetary policy for political purposes.

Two examples illustrate this point. First, the amount of seigniorage revenue the government can collect is inversely related to the speed with which people update their inflation expectations. Thus, the more imperfect is the monetary authority's control over the money supply, the greater the amount of seigniorage the authority can collect for a given rate of monetary expansion. Second, the extent to which monetary policy can influence real variables such as output and employment again depends on the speed with which the public adjust their inflation expectations. By adopting noisier control procedures, the monetary authority can have a greater influence on real variables for a given amount of money growth. Of course, a targeting rule (assuming that its enforced) limits the extent to which the monetary authority can engage in either of these activities, but it will not be able to prevent them.

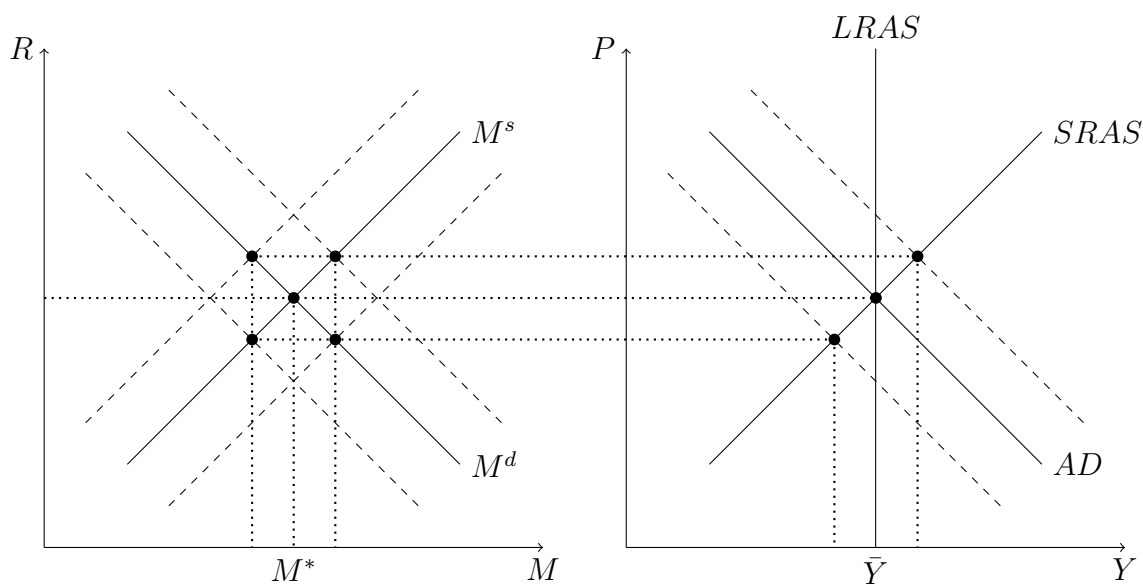


Figure 1: Monetary Equilibrium, Output, and Prices

In addition to opening the door to the politicization of monetary policy, such an arrangement also introduces the possibility of monetary and macroeconomic instability. Consider the simple model illustrated in Figure 1. The panel on the left shows the supply and demand for money balances and the panel on the right shows aggregate demand and supply. As the monetary authority's control over the money supply decreases the distribution of potential monetary equilibria increases, illustrated by the distance between the money supply curve and the randomness bands that flank it. As can easily be seen in Figure 1, as this distance increases, deviations of output and employment from their natural rates will increase as will uncertainty with respect to the price level.

6 Conclusion

This paper has taken a “politics without romance” approach to determine how much independence is consistent with a rules-based regime. I have shown that when a monetary rule is under-specified, there are other margins of adjustment that the monetary authority can exploit. For instance, a monetary authority that retains instrument independence under a targeting rule may still be able to influence monetary policy for political purposes, potentially contributing to monetary instability. This analysis suggests that advocates of monetary rules need to consider seriously the extent to which the monetary authority should be free to select its own operating procedures.

The implications of my analysis are not limited to the operating procedures considered here. For instance, the Federal Reserve has, and will likely continue to lobby Congress for changes in the set of permissible control procedures.¹⁸ Some economists have criticized the Fed’s recent policy of paying interest on excess reserves on the grounds that it has the potential to subject monetary policy to the vagaries of politics (Jordan & Luther, n.d.; Selgin, 2018). The analysis of such changes should not be limited to the technical merits of allowing the Federal Reserve to use this-or-that instrument. Instead, political economists should consider whether the instruments under discussion could be exploited in a manner that is inconsistent with the overarching goal of establishing a rules-based regime.

While the analysis in this paper suggests that instrument independence may be

¹⁸M. Toma (1982), for example, has argued that the Federal Reserve has lobbied for statutory changes to its operating regime that are consistent with increasing its revenue.

incompatible with the objectives of a rules-based regime, a few words of caution are in order. First, establishing a rules-based framework that stipulates both the target of monetary policy as well as the set of permissible instruments that can be used to achieve that target also has costs that should be considered. For instance, committing the monetary authority to a particular policy instrument may mean foregoing the use of superior instruments in particular circumstances. Moreover, it will likely be difficult, if not impossible to know *ex ante* which instrument will be better suited to ensuring monetary stability.¹⁹ In short, some amount of independence may be optimal, even under less than ideal conditions, because the costs of eliminating its deleterious effects are less than the benefits.

If the rules-based framework does stipulate the operating procedure, then there is additional factor that must be considered, namely that of addressing how to amend the set of approved policy instruments in the event that a superior one emerges. It would seem naive to assume that leaving this to the political process will produce results consistent with the overarching goal of a rules-based framework. Moreover, the amendment process needs to be sufficiently difficult to ensure that changes are not done to address a particular macroeconomic episode. How to implement this idea in a manner that does not undermine the *raison d'être* of a monetary rule needs to be considered in future work on this important topic.

On the other hand, the analysis in this paper also points to the consideration of more radical monetary alternatives, like free banking. The exploitable margins of

¹⁹A confounding factor here is that the parameter estimates necessary to compare the performance of alternative control procedures are not invariant to the choice of procedures themselves (Lucas, 1976). In consequence, it is not clear whether empirical research will be capable of answering questions about the efficacy of different policy instruments.

adjustment may be too difficult to predict and thus the problems associated with crafting a rules-based may be too great to justify such an arrangement. As Steve Horwitz (2011) has argued, a rules-based regime may be unnecessary. Instead, monetary stability may only require a system of contracts, private property, and the rule of law.

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