

REAL AND PSEUDO MONETARY RULES

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Milton Friedman is perhaps the best-known exponent of monetary rules. He also wrote a well-known paper entitled “Real and Pseudo Gold Standards” (Friedman 1961). I wish here to pay twofold homage to Friedman by insisting on a distinction between real and pseudo monetary rules. Just as Friedman (1961: 67) maintained that, though they may “have many surface features in common,” real and pseudo gold standards “are at bottom fundamentally different,” I shall argue that despite their superficial resemblance, real and pseudo monetary rules are fundamentally different—both in their operation and their consequences. Indeed, I shall argue that what Friedman called a “pseudo gold standard” is really an instance of a pseudo monetary rule, while what he calls a “real gold standard” is an instance of a real monetary rule.

Real Monetary Rules

A monetary rule, as typically defined, encompasses two very different sets of possibilities. For example, Froyen and Guender (2012: 101) define a monetary rule as “a prescribed guide for the conduct of monetary policy.” That broad definition includes both what I consider rules in the strict sense of the term—what I shall call “real monetary rules”—and rules in a much looser sense, which I consider to be “pseudo monetary rules.”

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To understand the difference between a real and a pseudo monetary rule, as well as my reason for insisting on these terms, one must briefly review the traditional arguments for monetary rules. The essence of these arguments is succinctly stated by Leitzel (2003: 50), who notes that while “discretion allows decisions to respond more closely to actual conditions . . . in the hands of a fallible or corrupt decision maker, a greater reliance on judgment may not be such a good idea.”

Jacob Viner (1962: 246) gives a more detailed summary:

On purely a priori grounds . . . it can be said for an unambiguous rule, *provided it is enforceable and enforced*, that it is a complete protection within the immediate area of its subject matter against arbitrary, malicious, stupid, clumsy, or other manipulation of that subject matter by an ‘authority.’ It can be said *for a rule rigid through time, if it works and is counted on to work*, that it provides absolute certainty and predictability, with respect to the behavior prescribed by the rule [emphasis added].

A once popular and still occasionally heard objection to monetary rules is that discretion-wielding authority can almost always do better, since the authority can always reproduce the outcome of the rule yet can also respond to circumstances that the rule doesn’t provide for. As Turnovsky (1977: 331) puts it, except when a rule happens to coincide with an optimal response, “a judiciously chosen discretionary policy will always be superior.” In other words, a discretionary policy need never do worse than a rule, and it might do better.

Such arguments entirely miss the point. There are, first of all, several reasons why discretionary policy may in practice not be “judiciously chosen,” in Turnovsky’s sense of being an optimal response to the current state of the economy. The first, which O’Driscoll (2016) elaborates on in his contribution to this volume, is that the authorities may lack the knowledge required to employ discretion “judiciously.” The essential point was best expressed by Friedman (1960: 93):

We seldom in fact know which way the economic wind is blowing until several months after the event, yet to be

effective, we need to know which way the wind is going to be blowing when the measures we take now will be effective, itself a variable date that may be a half year or a year or two years from now. Leaning today against next year's wind is hardly an easy task in the present state of meteorology.

Friedman is of course referring to “long and variable lags.” His argument hinges on the fact that monetary authorities, being incapable of anticipating such lags with any degree of precision, can be guilty of errors of commission more serious than the errors of omission to which a well-chosen rule might commit them. The more recent findings of behavioral economics tend to reinforce the knowledge-based case for rules. Adam Gurri (2013) sums up those findings pithily: “The fact is that the matter of human beings using their discretion repeatedly in circumstances of high uncertainty has already been settled—they are terrible at it.”

The insights of behavioral economists refer only to what one might call the “best-case scenario”—namely, the “well-intentioned, wise, and skillful exercise of discretionary authority,” as Viner (1962: 247) put it. The case for rules offered by public-choice theorists, in contrast, views discretionary behavior as a worst-case setting (see Buchanan and Brennan 2008), in which the “natural proclivities” of politicians and bureaucrats predominate—including their tendency to make decisions based on a “narrowly defined self-interest” that “run[s] counter to the basic desires of the citizenry” (Brown 1982: 39).

A final, and especially subtle, argument for a monetary rule is that it can serve to avoid the suboptimal, “time-inconsistent” equilibria to which discretionary monetary regimes are prone. For example, suppose that a zero inflation regime is considered optimal, but that, where such a regime is in place and expected to remain so, a discretionary central banker would be tempted to take advantage of the fact by increasing the money stock so as to *temporarily* boost employment and output. The fact that the monetary authority will be tempted to do so means the public will anticipate inflation; thus, inflation surprises won't have any real impact. Consequently, the discretionary equilibrium is suboptimal. By tying the authority's hands, a zero inflation monetary rule can

achieve an optimal outcome that could not be achieved otherwise (White 1999: 204–5).

It seems obvious that a genuine or real monetary rule must be capable of accomplishing the things that monetary rules are supposed to accomplish. Yet, it is no less obvious that most “prescribed guides for the conduct of monetary policy” fail to meet that requirement. As Jacob Viner (1962: 247) observed, “A rule doubtfully or irregularly enforced, and a rule subject at any time to revision, may involve less certainty and predictability than a control operated by a discretionary authority which follows a known set of principles.” Such a rule may also involve more sheer error, causing more rather than less economic instability.

It follows that a real monetary rule, as opposed to a mere guide for policy, must be both strict and robust. By “strict” I mean that it must be rigorously enforced so that the public is convinced there will be no deviations from the rule. As Mullineaux (1985: 14) notes, “The monetary authority . . . *must* do what the rule says and not something else.” By “robust” I mean that the rule must be capable of perpetuating itself, by not giving either politicians or the public reason to regret its strict enforcement and to call either for its revision or its abandonment in favor of discretion.

Pseudo Monetary Rules

A pseudo monetary rule is one that is either not well enforced or not expected to last. Although real monetary rules have existed in the past, such rules are almost unknown today. In contrast, pseudo monetary rules are perhaps even more common than avowed monetary discretion.

To distinguish real from pseudo monetary rules, one must recognize the difference between a rule that is merely *implemented* and one that is *enforced*. Kenneth Rogoff (1986: 1) identifies three “institutional devices for implementing monetary policy rules”—namely, a constitutional amendment, an independent monetary authority, and an arrangement in which reputational considerations encourage abiding by the rule. In fact, of these three devices, only the first is capable of providing for anything like the strict enforcement that a real monetary rule requires. The other devices, in contrast, can serve only as the basis for pseudo monetary rules, for none offers any reliable assurance that a

“prescribed guide for the conduct of monetary policy” will actually be heeded.¹

As I have noted, the distinction between a real and a pseudo monetary rule matters, because a pseudo monetary rule—that is, a monetary policy “guide” that can easily be evaded, or that is likely to invite calls for revision if strictly enforced—lacks the advantages of a real rule. As Leitzel (2003: 51) has observed, “Evasion of the rule (or, relatedly, the possibility of varying the enforcement of the rule) lessens the distinctions between the alternatives. . . . When those who are governed by the rules have the power to enforce or amend or avoid the rules, resistance [to the temptation to take advantage of this] cannot be purchased cheaply.” A pseudo rule is as likely as discretion to turn monetary policy into a plaything of politics: the main difference being that lobbying efforts, instead of being directed toward the authorities themselves, are directed toward the rulemakers.

Although the “Fed Oversight Reform and Modernization Act” (H.R. 3189, U.S. Congress 2015) is widely understood to call for the implementation of a genuine monetary rule, and it has been denounced for that reason by its critics, it would, if passed, establish a very weak sort of pseudo monetary rule. The Act calls for the Federal Open Market Committee (FOMC) to adopt a “directive policy rule,” but allows the FOMC to specify in advance circumstances under which it might amend that rule.

The Act also includes a “changing market conditions” clause, allowing the FOMC to abandon its directive policy rule if it determines that the rule “cannot or should not be achieved due to changing market conditions.” In that case, the FOMC would have to submit a report explaining its decision, together with an

¹Rogoff (1986: 1) writes: “The main problem with passing a constitutional amendment to govern monetary policy is the lack of flexibility in dealing with unforeseen events. In principle, of course, a law can be made fully state-contingent. But it is unrealistic to think that the designers of a law will have the imagination to plan for every type of shock and the analytical brilliance to guess how to deal with shocks which have seldom or never been experienced.” This is true. However, the problem is not a particular “institutional device for implementing” a monetary policy rule; it is the very concept of a monetary rule itself in the strict sense of the term. Indeed, it is an instance of what Friedman (1962: 239) characterized as “the stereotypical” complaint about rules. The answer, of course, is that it is at least as “unrealistic” to expect discretion to be used in an “analytically brilliant” rather than a short-sighted or otherwise irresponsible way.

appropriately updated directive policy rule, to the comptroller general within 48 hours of its decision; and the comptroller general would, in turn, be required to “conduct an audit and issue a report determining whether such updated version and the Federal Open Market Committee are in compliance with this section.” A determination of noncompliance would oblige the Fed chair to testify and explain why the monetary authority is not in compliance with the policy directive. Moreover, the committees in question could call for a more comprehensive GAO audit of the Fed. Nevertheless, the Act does not provide for enforcement of the directive policy rule. Hence, the Fed Oversight Reform and Modernization Act of 2015 is a perfect example of a pseudo rule made almost indistinguishable from discretion by the fact that “those who are governed by the rules have the power to enforce or amend or avoid the rules.”

Yet a pseudo rule, as long as it remains in effect, retains the more obvious shortcoming of a genuine rule relative to discretion, to wit: the lack of flexibility. That is, it continues to be a source of errors of omission that might, in principle, be avoided under a judicious and perfectly informed discretionary regime. Instead of being a middle-ground between a real rule and complete discretion, a pseudo monetary rule can end up being worse than either.

Consider, for example, the case in which a definite value for a particular foreign exchange rate serves as a monetary authority’s “prescribed guide for the conduct of monetary policy,” where the authority enjoys complete autonomy to implement the guide as it sees fit, subject only to potential reputational repercussions of failing to do so. Such a pegged exchange rate regime is an example of a pseudo monetary rule. It is distinct from a fixed exchange rate regime, such as a currency-board system, in which a rigid exchange rate is constitutionally prescribed and enforced. Because it lacks any strict enforcement mechanism, a pegged exchange rate regime is less than fully credible, and it is consequently vulnerable to speculative attacks. Consequently, such a regime may end up combining the disadvantages of monetary policy inflexibility with those of exchange-rate uncertainty and associated risk premia (Schuler 2007).

Enforcement by Contract

A monetary rule can be enforced either by means of contracts binding upon monetary authorities, or by means of automatic arrangements

that dispense with such authorities altogether. I'll refer to these alternatives as enforcement by contract and enforcement by design.

Enforcement by contract involves subjecting monetary authorities to loss when they fail to comply with a monetary rule. The loss might consist of outright penalties, of reduced compensation, of loss of ownership equity, or of dismissal. This sort of enforcement is often considered in discussions of means for enforcing monetary rules. Yet it is a solution practically unknown in contemporary monetary arrangements.

The one contemporary arrangement that comes closest to involving a monetary rule enforced by contract is New Zealand's Policy Targets Agreement (PTA). The PTA supposedly "represents a contract between the Minister of Finance/Treasurer and the Governor of the Reserve Bank, and it forms a central element of the Bank's mandate and accountability" whose "specific objective is maintaining CPI inflation within the specified target band" (Reserve Bank of New Zealand, n.d.). However, a look at the actual details concerning this contractual arrangement makes it clear that it does not actually provide for strict enforcement of New Zealand's CPI target. New Zealand's monetary arrangement is, in other words, yet another instance of a pseudo rather than a real monetary rule.

According to section 49 of the Reserve Bank of New Zealand (RBNZ) Act of 1989, which established the current New Zealand arrangement, "The Governor-General may, by Order in Council, on the advice of the Minister, remove the Governor from office," and "the Minister may tender advice" provided the governor-general is "satisfied" that one of several conditions has been met, one of which is "that the performance of the Governor in ensuring that the Bank achieves the policy targets fixed under section 9 or section 12(7)(b) has been inadequate" (New Zealand Parliament 1989).

In fact, although the targets were violated on several occasions during the 1990s, no action was taken. And although inflation declined after New Zealand switched to inflation targeting, it isn't clear that the RBNZ Act, and the PTA in particular, had much to do with it. According to Sherwin (2010: 264), "Governments that were willing to commit themselves to far-reaching reforms across all sectors of the economy were never likely to be tolerant of continuing high inflation, or to shrink from the hard decisions needed to contain inflation, regardless of the precise policy regime in place."

While the strict contractual enforcement of official monetary rules is practically unknown today, such enforcement operated effectively

in the past, when rule violations led to loss of shareholder wealth. I have in mind the means by which issuers of paper money were compelled to abide by metallic standards.

Although the fact is sometimes overlooked today, in the past, most banks of issue were wholly private institutions, and as such were bound by the same sort of contractual obligations to which deposit-granting banks are subject today. In particular, they were required by law to redeem their demandable liabilities in specific amounts of “outside” money or legal tender, and were held to be in default if they failed to do so.

Gary Santoni (1984: 12–13) offers the Bank of England as a case in point. That Bank, he notes, “was a privately owned for-profit central bank from its inception in 1694 until the early 1930s.” Furthermore, the Bank’s obligation to redeem its notes in a fixed quantity of gold was a matter of private contract rather than one of government policy. These arrangements created “a unique incentive structure” that effectively “related the wealth of the Bank’s owners inversely to the rate of inflation”:

If bank notes were issued in such quantities as to cause their market price in terms of gold to fall below the price promised by the Bank, people would arbitrage the difference by trading gold for notes in the market at the low price and exchanging notes for gold at the Bank for the higher price. In the process wealth would be transferred away from the stockholders to those engaging in the arbitrage. The guarantee was believable because customers knew that stockholders would lose wealth if the Bank over issued its notes relative to the supply of goods in general and gold in particular [Santoni 1984: 18].

Santoni goes on to show how the British government’s decision to authorize the Bank to suspend gold payments in 1797—and to assume effective control of the supply of paper money for the duration of the Napoleonic Wars and beyond—changed the structure of constraints dramatically, eventually resulting in both higher inflation and lower share values. In general, the conversion of banks of issue from private firms to public or semipublic monetary authorities had the effect of undermining the strict enforcement of convertibility rules, transforming former real gold standards everywhere into pseudo gold standards that ended up being no more credible than the more recent pegged exchange rate regime discussed previously (Selgin 2015a).

While the historical gold standard depended on a combination of profit incentives in the gold mining industry and strict convertibility

of paper money into gold, Hayek (1978) envisions a system in which unrestricted competition among both private and public issuers of inconvertible (or fiat) paper money are compelled by considerations of profit and loss to regulate their currencies so as to stabilize their purchasing power, lest their failure to do so should cause them to lose market share to rival issuers. Although intriguing, Hayek's scenario is entirely hypothetical. Moreover, as Lawrence White (1999: 227–39) and others have shown, it is far from clear that profit considerations alone would always suffice to rule out the possibility that an issuer might prefer the one-time gain from hyperinflating to the long-run profits to be had by supplying a currency of stable purchasing power.

Robust Contract-Enforced Monetary Rules

Besides being strictly enforced, a real monetary rule must also be “robust.” That is, it must be chosen so that its strict enforcement is not likely to be a cause of such regret as might lead to its frequent revision or abandonment.

A strictly enforced monetary rule might become a cause for regret for either of two reasons. Most obviously, the rule might be one whose strict enforcement occasionally leads to economic distress that a different rule, or monetary discretion, might easily have avoided. Somewhat less obviously, the rule's strict enforcement might result in frequent punishment or dismissal of monetary authorities who have in fact acted in good faith, using the best available information.

I shall say relatively little concerning the relative merits of alternative rules with respect to the first of these potential causes of regret, as the topic is already the subject of a vast literature, and one that includes some of the other contributions to this volume. Instead, my concern is mainly with the other possible cause of regret that a robust rule ought to avoid. What sort of rules can we reasonably expect a central banker to abide by, assuming that he or she is subject to sanctions when the rule is violated?⁹ The question is crucial because no amount of sanctions can suffice to guarantee strict adherence to a rule that even the most competent central banker cannot avoid breaking.

If one is to answer the question, it is useful to distinguish three sorts of macroeconomic variables: (1) variables that the central bank controls more-or-less directly; (2) variables whose long-run values it can control only indirectly and, therefore, imperfectly; and (3) variables over which it exercises no long-run influence. Call these variables “instruments,” “nominal control variables,” and “real variables,” respectively.

A robust monetary rule, in the sense of one that is bound to be adhered to provided it is enforced with sufficient stringency, must, in the first place, refer to an objective or target variable the long-run value of which is subject to the central bank's control. That means a rule concerning either an instrument, such as B (the monetary base) or i (the nominal federal funds rate), or a nominal control variable, such as M (any monetary aggregate), P (some measure of the price level), or Py (a measure of nominal income or spending), rather than a real variable like real output, the unemployment rate, or the velocity of money.

But among rules involving nominal target variables, some are more robust, because they are subject to less "control error," than others. The most robust rules, subject to the least control error, involve targets that depend on the fewest weasel variables, where a "weasel variable" is any real variable that can influence the short-run behavior of the target variable.

Consider, for example, three different monetary rules, each calling upon a central bank to stick to a prescribed growth rate for B , M , and P , respectively. The most robust rule is the one that involves the fewest weasel variables—that is, the one that offers a central banker the fewest opportunities to weasel out of trouble if the rule is violated. To see which of the three rules meet that requirement, consider the equation of exchange:

$$(1) \quad MV = Py.$$

Let $M = mB$, where m is the base-money multiplier, a real variable that depends on the banking system reserve ratio and the public's preferred ratio of currency to deposits. Taking natural logarithms gives

$$(2) \quad \ln m + \ln B + \ln V = \ln P + \ln y.$$

If, using (2), we write the target variable for each of the three rules as a function of B , the instrument over which the central bank has complete control, we get

$$(3) \quad \ln B = \ln B,$$

$$(4) \quad \ln M = \ln m + \ln B, \text{ and}$$

$$(5) \quad \ln P = \ln m + \ln B + \ln V - \ln y.$$

Evidently, of the three rules, the one calling for a fixed growth rate for the monetary base is the most robust, as there can be no legitimate

reason for a central banker to fail to adhere to it—and hence no way for him or her to weasel out of trouble if the rule is, in fact, violated. A money-stock growth target, in contrast, appears to involve one weasel variable—the base-money multiplier—but actually involves several, as the multiplier is itself a function of several real variables. An inflation-rate rule, finally, involves the same weasel variables as a money-stock rule, and two more besides—namely, the velocity of money and real output—making it the least robust of the three.

Consider again, for the sake of concreteness, New Zealand's PTA, and forget for the moment the many ifs, mights, and mays, that call to question the likelihood of its ever really being enforced. According to the agreement,

On occasions when the annual rate of inflation is outside the medium-term target range, or when such occasions are projected, the Bank shall explain . . . why such outcomes have occurred, or are projected to occur, and what measures it has taken, or proposes to take, to ensure that inflation outcomes remain consistent with the medium-term target.

Now suppose that the Reserve Bank governor, having allowed New Zealand's inflation rate to exceed the prescribed range, is called upon to offer such explanations, on the understanding that he will be dismissed unless the explanations are fully compelling. It is easy to imagine the governor blaming the error on the Bank's having overestimated New Zealand's real rate of economic growth, or its having underestimated the rate of growth of velocity, or the money multiplier. Moreover, it is easy to see how such mistakes may be entirely innocent, so that dismissing the governor would achieve very little, though it would almost certainly increase the pressure to revise the rule. Accepting the excuses, on the other hand, would risk undermining the rule's credibility.²

²A nominal GDP rule is also less easy for a central banker to weasel out from than a price-level rule, because it does not call on policymakers to anticipate and accommodate changes in output. That is, unlike a strict inflation target, it doesn't require that the central bank be capable of accurately forecasting supply innovations or "shocks." The contrary suggestion that a nominal GDP rule, because it involves targeting Py , requires the central bank to control both P and y , and is therefore harder to enforce than a price-level rule, is based on a crude misunderstanding. A central bank that controls or targets Py actually has an easier, not a harder, task to perform than one that attempts to target P .

Milton Friedman (1962: 242) presumably had similar considerations in mind in claiming that a price-level rule “is the wrong kind of rule because the objectives it specifies are ones that the monetary authorities do not have the clear and direct power to achieve by their own actions.” However, a constant monetary growth rule, which was Friedman’s preferred rule at the time, though better, is itself subject to the same criticism. As Leitzel (2003: 52) notes, “[T]he monetary authorities cannot control the growth rate of a monetary aggregate precisely”; hence, rigorous enforcement of such a rule “would itself be a questionable practice.” Such considerations, together with the collapse of what had previously been regarded as a relatively stable “money demand function” over the course of the 1970s, ultimately led Friedman to favor a monetary base rule—that is, a rule involving no weasel variables.

The disadvantage of a base rule is of course that, although its strict enforcement may never be a cause of regret stemming from the necessity of punishing well-meaning and competent central bankers, it would almost certainly be a recipe for regret concerning avoidable economic distress. For it is all too easy to imagine occasions in which a strictly enforced base rule would prove inconsistent with a relatively stable level of overall spending, and, hence, with the avoidance of macroeconomic disturbances.

Certain rules can, however, avoid both sorts of regret, making them particularly robust. An example is the monetary rule proposed by McCallum (1987), a simplified version of which might be written as

$$(6) B_t = k + \lambda (X^* - X_{t-1}),$$

where $X (= \ln P + \ln y)$ is the nominal GDP (NGDP) growth rate, X^* is the target rate, and k is the base growth rate estimated to be consistent with achieving the long-run NGDP growth rate target. Because it calls for a particular pattern of adjustments to the monetary base, McCallum’s rule, like Friedman’s monetary base growth rule, is one that the monetary authorities cannot possibly violate unintentionally. But instead of calling for the base to grow at a constant rate, McCallum’s rule calls upon the authorities to adjust the base in response to perceived changes in nominal spending (Py), with the ultimate objective of maintaining a stable level or growth rate of such spending—a goal much more likely to avoid macroeconomic disorder. In the case of such a “feedback rule,” the authority is subject to sanctions, not for failing to achieve the desired spending

target—the feedback rule itself, if properly designed, sees to that—but for failing to adjust the monetary base according to the prescribed feedback rule.

My discussion of robust monetary rules will recall for many the debate some years ago concerning target versus instrument rules for monetary policy. In that debate, a monetary instrument was defined just as I have defined it, that is, as “a variable the central bank administers or controls so closely that control error can be ignored” (Froyen and Guender 2012: 101). However, participants in that debate (for example, Svensson 2005) understood a “robust rule” to be one that minimized some postulated policy loss function. That definition conforms to mine only to the extent that it favors rules limiting the incidence of potentially avoidable (and therefore regrettable) economic distress. The targets versus instruments literature ignored entirely the second potential sort of regret—that stemming from having to punish innocent central bankers. Consequently, and not surprisingly, that literature concluded that target rules were more robust than instrument rules, including instrument rules involving feedback from some ultimately desired target.

Enforcement by Design

A monetary rule can be said to be enforced by design, rather than by contract, when the monetary system itself automatically implements the rule, without need for an authority that might fail to comply with it, and therefore without any need for sanctions. Enforcement by design eliminates the possibility of either unintentional rule violations or intentional ones resulting from political pressure and like influences. As Leitzel (2003: 50) notes, “A fixed rule that is implemented automatically, like a machine, eliminates this incentive for politicking. Machines are notoriously difficult to persuade, being immune to the blandishments of reason, love, or money.” Because a monetary rule enforced by design does not rely on sanctions, such a rule is necessarily robust to the extent that there is no question of its not being properly enforced. Such a rule may however be a cause of avoidable distress that could put its sustainability in doubt, thereby undermining its credibility.

Officially dollarized monetary systems are the only prominent examples today of monetary arrangements involving rules enforced by design. By employing a foreign nation’s paper currency as their

own circulating means of payment, often without establishing any monetary authority of their own, dollarized nations effectively commit themselves to the equivalent of a fixed exchange rate rule, while depriving themselves of any immediate means for modifying or abandoning the rule. Such arrangements are examples of what Schuler (2007) regards as genuinely fixed (as opposed to less-credibly “pegged”) exchange rate regimes. According to my own terminology, they supply a foundation for real rather than pseudo monetary rules.

Orthodox currency boards—arrangements in which a domestic monetary authority issues a distinct domestic currency that is both freely convertible on demand into a “host” foreign currency and fully backed by host foreign currency reserves—also serve to fix rather than merely peg the domestic–host currency exchange rate (Hanke 2002). Because a currency board holds 100 percent foreign-currency reserves, it can never be forced to suspend, and is therefore neither as vulnerable to speculative runs nor as likely to be confronted by them as a conventional pegged-rate system. The persons in charge of the currency board may also lack any power to alter its fixed-rate commitment, which might be embodied in the board’s enabling legislation or even in the national constitution. For these reasons, we might also consider a currency board as an instance of a real monetary rule enforced by design. In any event, it comes much closer to such a rule than an ordinary, central bank based exchange rate commitment, which is no more than a pseudo rule.

Dollarization and currency boards are designed to implement currency convertibility rules. But it is also possible to conceive of monetary arrangements designed to automatically enforce other sorts of rules. A hypothetical possibility of this sort was proposed years ago by Milton Friedman, when he (perhaps somewhat facetiously) suggested replacing the FOMC with a computer programmer so as to regulate the New York Fed’s open-market operations in a manner guaranteed to keep the money stock growing at a prespecified rate. Importantly, the success of such a scheme rests no less on the elimination of the FOMC—or any other body capable of either reprogramming the computer or overriding its instructions—than on the adequacy of the computer program itself.

Although Bitcoin as yet doesn’t quite qualify as money—that is, as a generally accepted medium of exchange—a monetary regime using Bitcoin’s blockchain technology, whether based on Bitcoin or some

other cyberrcurrency, would represent a variation on Friedman's computer-controlled open-market purchases, and one having the decisive advantage of relying on an open-source software that is highly tamper resistant. In the case of Bitcoin, the software is programmed so that the supply of bitcoins increases at a diminishing rate, eventually leveling-off as the limit of 21 million bitcoins is approached. Because such a quantity rule hardly seems calculated to avoid long-run economic distress stemming from growth and fluctuations in the real demand for money balances, its long-run sustainability as the basis of an actual, national, or international monetary regime, would be quite doubtful. A modified program using the same blockchain technology might, however, provide for more flexible and macroeconomically friendly patterns of money stock adjustment (Selgin 2015b).

An interesting proposal for a monetary rule enforced by design is Scott Sumner's plan for a "market-driven" NGDP targeting regime. According to Sumner (2013: 4), his plan involves "setting up a nominal GDP futures market and then adjusting the monetary base to stabilize nominal GDP futures prices. The market, not central banks, would set the level of the monetary base and short-term interest rates under this sort of policy regime."

To arrive at his market-driven arrangement, Sumner would first establish a contract-based NGDP targeting scheme, in which FOMC members' salaries are tied to the accuracy of their NGDP forecasts (Sumner 2013: 11), with hawks being punished and doves rewarded if NGDP increases too slowly; and doves being punished and hawks rewarded if it rises too quickly. Next, Sumner imagines that FOMC members "vote" by actually taking either long or short positions in NGDP futures contracts, with the Fed offering to buy or sell unlimited quantities of NGDP futures contracts at a fixed price of \$1.0365 per contract (reflecting a 3.65 percent NGDP growth target), while at the same time "linking" its open-market security purchases to NGDP futures market transactions. Finally, he would allow anyone to participate in the NGDP futures market and to thereby influence the Fed's open-market operations.

But while Sumner's proposal, assuming it would work as he suggests, would in a sense make monetary policy and NGDP targeting automatic, it is not clear that it would do so in the crucial sense of ruling out departures from, or even the complete abandonment of,

the proposed rule. For suppose that the Federal Reserve chose to cease buying and selling futures contracts, or to buy and sell them at a different value. Or suppose it modified or severed the “link” connecting its NGDP futures market transactions from its open-market purchases and sales. Are such steps altogether impossible under the proposed system? If so, why? And if not, what is to prevent them from being taken? What, if any, sanctions would be applied, and to whom? If the answer is none, the NGDP futures targeting arrangement, despite its presumed “automaticity,” is, in fact, another instance of a pseudo rather than a real monetary rule.³

Conclusion: A Matter of Degree

In distinguishing between real and pseudo monetary rules, I do not wish to be understood to suggest that these alternatives are separated by a hard and fast line. On the contrary, the line is a very fine one, the difference ultimately being one, not in kind, but in degree to which adherence to a rule is regarded as unbreakable. In fact, there is no such thing as an absolutely unbreakable monetary rule, for monetary arrangements are human creations and there is nothing human beings can create that they cannot also destroy.

Yet, however fine the line between the two may be, the distinction between real and pseudo monetary rules seems to me necessary and important. For unless that distinction is made, the difference between monetary rules and monetary discretion becomes hopelessly blurred, and there can be no reasonable accounting for the relative advantages and shortcomings of the two alternatives.

³Some years ago, Sumner (2009) wrote of his proposal in a manner expressly suggesting that its long-run viability rested, not on either sanctions or other devices serving to guarantee its perpetuation, but solely on the likelihood that it would avoid macroeconomic distress. “Even if the program stabilized 12-month forward NGDP expectations, it might not stabilize longer term NGDP expectations if the public expected the Fed to abandon the policy at some point in the future. However, I don’t see this as a major drawback, as I believe stabilizing 12-month forward NGDP expectations would keep nominal wage rates well behaved, and . . . I regard aggregate nominal wage instability as the key factor behind macroeconomic instability.”

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