Monetary Policy and the Knowledge Problem

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> The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design.
>
> —F. A. Hayek (1988: 76)

The knowledge problem in economics is most closely associated with Friedrich Hayek, who articulated it in analyzing the role of prices in markets, the socialist calculation debate, and monetary policy. In this article, I summarize and apply Hayek's analysis to contemporary monetary policy debates. I also connect Hayek's work with that of Milton Friedman, who articulated his own version of the knowledge problem in his monetary work. Friedman's views in this area are underappreciated.

Hayek argued that knowledge is inherently dispersed and localized across the population of economic agents. It is not possible to assemble the totality of knowledge existing in society in any one mind or place. Individuals may reveal their localized knowledge by

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their actions, but only if incentivized. Moreover, knowledge is often tacit and cannot be articulated. What the totality of individuals knows far exceeds what any policymaker can know, no matter his or her expertise and wisdom.

Hayek on the Knowledge Problem

Hayek presented his analysis of the knowledge problem in society in the course of what came to be known as the socialist calculation debate (Hayek [1935] 1975a).[1] He developed the argument further in a series of lectures and articles in the 1930s and 1940s. They were made more accessible by being reprinted in one place (Hayek 1948).

Early supporters of socialism supposed they could dispense with economic problems. Some thought of societal resource allocation as an engineering problem. Hayek (1975a: 5) pointed out that engineering problems involve a singleness of purpose. Resource allocation involves competing uses of resources, and accounting for opportunity costs is necessary (Hayek 1975a: 6–7). What is being introduced here is the basic knowledge problem of a diversity of actors with different preferences. The difficulty for socialists wanting to abolish private property and markets was "how in the absence of a pricing system the value of different goods was to be determined" (Hayek 1975a: 27). He supported Mises' argument that only a system of money prices, including for factors of production, could produce a rational solution to resource allocation. That system necessitated private property, including in capital goods.

Hayek's essays bookended the 1935 volume. His concluding chapter dealt with various responses to Mises' original critique. These were the "alternative socialist systems which differ more or less fundamentally from the traditional types against which the criticism was directed" (Hayek 1975a: 202). The debate took many twists and turns, but I will follow the knowledge argument. Hayek reiterated that knowledge is dispersed, and for any variant of central planning, it must somehow become concentrated in one mind or those of a very few experts. Much knowledge is not preexisting, but it is created only

[1]The knowledge problem is also known as the coordination problem (O'Driscoll 1977). Notably, there are blogs by each name: www.coordinationproblem.org and www.knowledgeproblem.com.

in the process of adapting to change (Hayek 1975a: 210–11).[2] "Every passing whim of the consumer is likely to upset the carefully worked out plans" of the central planning authority (Hayek 1975a: 214).

Hayek (1975a: 227) emphasized the importance of disruptive change and the dynamic nature of the economic problem. Economists ignored the importance of change because of "the excessive preoccupation with the conditions of the hypothetical state of stationary equilibrium" (Hayek 1975a: 226). In response to suggestions for marginal cost pricing in a socialist state, Hayek (1975a: 229) argued that "the competitive or necessary cost cannot be known unless there is competition." What are the assumed "givens" or data of an economic model are information to be discovered in the real world in a competitive process. That is the knowledge problem in a nutshell.

The socialist calculation debate ended inconclusively for many economists, "a draw" as Caldwell (2004: 338) phrased it. But Hayek continued working on the knowledge problem. "Economics and Knowledge," reprinted in Hayek (1948), was originally a 1936 lecture, published in *Economica* in 1937. It thus follows temporally on the socialist calculation debate, though I will soon connect it logically to a different part of Hayek's work.

First, Hayek (1948: 34) linked the equilibrium concept to having correct foresight. He also observed that the concept of equilibrium has "a clear meaning only when confined to the analysis of the action of a single person." Analyzing the interactions of different individuals introduces "a new element of altogether different character" (Hayek 1948: 35). Actions for a single individual are in equilibrium only if they are part of "one plan" (Hayek 1948: 36). We can speak of a state of equilibrium for a moment in time only if the plans of all individuals are "mutually compatible." Any change in data would upset such equilibrium (Hayek 1948: 41).

In this seminal article, Hayek introduced the concept of equilibrium as plan coordination. To achieve it, the economist must assume perfect foresight or introduce assumptions about learning (Hayek 1948: 42, 45–46). Both moves are fraught with difficulties.

[2]Hayek dealt here with the narrow issue of an engineer's acquisition of new technical information. The broader issue of acquisition is taken up from different perspectives in the Austrian economics and human capital literatures. Kirzner (1973) and Schultz (1975) are classics in their respective fields.

Equally important as his equilibrium concept was Hayek's analysis of the "division of knowledge," the fact that the knowledge needed to achieve equilibrium is dispersed among all the individuals in the economy. Equilibrium could be brought about "by deliberate direction only by somebody who possessed the combined knowledge of all those individuals" (Hayek 1948: 51).

I agree with Caldwell (2004: 337) that "Economics and Knowledge" is a "key document," but I don't agree with him that it "marked a change in the direction" of Hayek's thinking. Caldwell elaborates by saying that "Hayek came to have doubts about the ability of static equilibrium theory to capture certain essential features of a free market economy." But Hayek harbored such doubts long before this article, and the article is neither the first nor even the most complete statement of Hayek's views on equilibrium over time. Those descriptions belong to a 1933 lecture, "Price Expectations, Monetary Disturbances, and Malinvestments."

Hayek delivered that lecture in Copenhagen. It was published in German in 1935 and next in French in 1935. It was not available to English speakers until translated and included in Hayek ([1939] 1975b). So Hayek's 1937 article was novel at the time for an English audience.[3] But modern researchers should not be confused by the chronology.[4]

Hayek (1975b: 137–38) began by clarifying that he was explaining "dynamic phenomena" —that is, processes that take place over time. He focused on the problem of economic fluctuations, and explored the self-reversing character of expansions financed by money creation. Intertemporal equilibrium entails correspondence between the multiperiod spending plans of consumers with "the separate and independent decisions" of entrepreneurs to supply the desired consumption goods at all relevant future dates. Correspondence among all these plans is what is entailed when economists say that "savings are equal to investments" and there is "an equilibrium rate of interest" (Hayek 1975b: 153–54).

Hayek's analysis presented a challenge for all who would extend the concept of the equilibrium of an individual, or static equilibrium, to

[3]Hayek ([1939] 1975b: 140n1) refers to Hayek's 1937 article as presenting a "further elaborated and partly revised" discussion of the relationship between equilibrium and foresight.

[4]O'Driscoll (1977: 94, 102) identified the priority and importance of the Copenhagen lecture.

dynamic equilibrium in a world of monetary disturbances and changing expectations. The essay's title reflected the focus on monetary policy. If the achievement of intertemporal equilibrium is a challenge, then so, too, is the implementation of an optimal monetary policy. Hayek's articulation of the knowledge problem called into question demand management or countercyclical monetary policy before those concepts were fully developed. As he stated it in an earlier work, "We must be painfully aware at the present time . . . how little we really know of the forces we are trying to influence by deliberate management; so little indeed that it must remain an open question whether we would try if we knew more" (Hayek [1933] 1966: 23).[5]

Hayek returned many times over the ensuing decades to the knowledge problem. He extended his analysis from monetary policy to economic and social policy. Hayek (1973: 12) observed that "complete rationality of action in the Cartesian sense demands complete knowledge of all the relevant facts." An engineer needs all the data in order to control an engineering process, as does a social engineer. "But the success of action in society depends on more particular facts than anyone can possibly know." The "division of knowledge"—its dispersal throughout society—impedes the exercise of social control.

Added to the problem of localized or dispersed knowledge is the fact that knowledge is often tacit. Individuals have unarticulated knowledge of how to act and adapt to circumstances, but they have no "theory" or explicit understanding why certain behavior "works." It is a distinction famously made by philosopher Gilbert Ryle ([1949] 2002) between "knowing how" and "knowing that." As Caldwell (2004: 337) observed, "The dispersion of such knowledge is a permanent condition of life." The dispersion is permanent because, by its nature, tacit knowledge cannot be articulated and, hence, cannot be conveyed.

Hayek's earliest work on the knowledge problem was in monetary economics and the problem of the formation of intertemporal equilibrium, a problem that appeared almost insurmountable at the time. It is a profound coordination problem among millions of consumers and producers with entrepreneurs at the center of it. To superimpose

[5]Once again, there is a chronology issue. *Monetary Theory and the Trade Cycle* is an English translation of an earlier work published in German, which constituted the theoretical underpinnings of *Prices and Production* and other works. Hayek's works did not appear in English in the order in which they were originally written.

monetary shocks on the process is to put a spanner in the works. To suppose that a monetary authority could counterbalance shocks is to assume that the authority can resolve the knowledge problem. The monetary authority is very much in the same position as the planning authority in a centrally planned economy. The monetary authority must be able to assemble all the dispersed bits of information in an economy to ascertain, much less achieve, a monetary equilibrium. In essence, the problem of implementing an optimal monetary policy is one with the problem of socialist calculation. Implementing optimal monetary policy requires surmounting the knowledge problem, which cannot be done.

Friedman on the Knowledge Problem

It is well known that Friedman believed monetary policy had a more powerful impact on the economy than did fiscal policy. His empirical work, and that of his students, led him to conclude: "There is extraordinary empirical stability and regularity to such magnitudes as income velocity that cannot but impress anyone who works extensively with monetary data" (Friedman 1956: 21). According to that and similar statements, a simple version of Friedman's monetarism emerged.

Velocity is more stable than the fiscal multiplier; thus, monetary policy is more effective at stabilizing macroeconomic variables than is fiscal policy. Such an interpretation is an impoverished view of Friedman's position.

I don't believe it was anyone's intent to present this simplified view as the whole of monetarism—and certainly not Friedman's. It may have been an unintended consequence of the empirical work done at the Research Department of the St. Louis Federal Reserve Bank, and especially the pioneering article by Andersen and Jordan (1968). They did indeed run a horse race between monetary and fiscal variables to explain changes in the growth rates of nominal GDP. The St. Louis Fed research played an important role in the acceptance of monetarism. Nelson (2015: 297–303) assesses the research and the responses.

In a retrospective, Jordan (1986: 8) found it "ironic that the 'St. Louis equation' unintentionally strengthened the views of the public policymakers who wanted to 'manage' monetary policy to achieve different economic results." He noted that the use of his research for

activist policy was "neither intended nor anticipated by us." Indeed, the purpose of the 1968 article was quite the opposite.

Friedman (1962) discussed the argument over rules versus discretion in monetary policy. With monetary discretion, "The wrong decision is likely to be made in a large fraction of cases because the decision-makers are examining only a limited area and not taking into account the cumulative consequences of the policy as a whole." By contrast, "If a general rule is adopted for a group of cases as a bundle," the rule has "favorable effects on people's attitudes and beliefs and expectations" (Friedman 1962: 53). Today, we would say that a rule anchors people's expectations.[6]

Friedman factored the knowledge problem into his condemnation of discretionary monetary policy conducted by an independent central bank. He described it as "a bad system" for two interrelated reasons. First, it is bad "for believers in freedom" to give a few men "such power without an effective check by the body politic." Second, "mistakes, excusable or not, cannot be avoided" in such a system (Friedman 1962: 50). Unavoidable errors are an essential feature of discretionary policy. In this early statement of his position, such risks can be reduced by adherence to a rule. Reliance on rules in the face of ineluctable uncertainty is what most closely links Friedman to Hayek in monetary economics.[7]

Friedman's 1967 presidential address at the American Economic Association meeting advanced his position on the knowledge problem for a wide professional audience. On the question of what monetary policy can accomplish, he first presents a negative proposition: "Monetary policy can prevent money itself from being a major source of economic disturbance." His second proposition is a positive statement: "Monetary policy [should] provide a stable background for the economy" (Friedman 1968: 12–13). Neither statement suggests a view that monetary policy is an appropriate tool for activist, macroeconomic stabilization. Indeed, he quickly rejected such a view.

Friedman allows for the ability of monetary policy to offset "major disturbances" (known exogenous shocks) such as high fiscal deficits

[6]Friedman's statement is Humean in tone, which links him to Hayek philosophically. It embodies a rule utilitarian argument. On Hayek and Hume, see O'Driscoll (2015a).

[7]Friedman (1962: 11) is the only citation to Hayek in that work, and it is for the latter's "emphasis on economic freedom as a means toward political freedom."

and wars. He is not sanguine about a monetary authority's ability even in the case of large, known shocks. But he cautions against attempts to offset minor disturbances because "We simply do not know enough." He also cautions for policy humility: "The best is likely to be the enemy of the good. Experience suggests that the path of wisdom is to use monetary policy explicitly to offset other disturbances only when they offer 'a clear and present danger'" (Friedman 1968: 14).

The knowledge problem led Friedman (1968: 17) to a simple monetary rule that fixed the growth rate of a monetary aggregate, which he first proposed in 1960, that "would provide a monetary climate favorable to the effective operation of those basic forces of enterprise, ingenuity, invention, hard work, and thrift that are the true springs of economic growth. That is the most that we can ask from monetary policy at our present stage of knowledge."

Friedman's concern with the knowledge problem and his adoption of policy rules as a solution to it predates his presidential speech and the other cited works. "Friedman was already advocating rules . . . before his monetarist theoretical position came to fruition. But Friedman's case for rules did rely on a strong theoretical motivation: in particular, the possibility that stabilization policies might give rise to destabilization of the economy" (Nelson 2015: 204).

That concern goes back at least to his 1947 review essay of Abba Lerner's *Economics of Control.* Also, in 1948, Friedman coined the "long and variable lags" phrase. He continued developing the idea of "destabilizing stabilization policy" in other papers (Nelson 2015: 204). The focus on the knowledge problem goes far back in Friedman's work, again predating monetarism itself.

Though not his last, "The Role of Monetary Policy" is an authoritative statement of Friedman's view of the subject. The argument is fundamentally about knowledge and its limitations. He viewed monetary policy institutionally, and monetary institutions as a background condition. The "true springs of economic growth" lay elsewhere. The argument relies not at all on the relative stability of velocity. Indeed, tellingly, neither "velocity" nor its counterpart—the demand for money—appear in the text.

The knowledge problem was not as all pervasive in Friedman's work as it was in Hayek's. With Hayek, it pervades the entire corpus of his work from early work on monetary theory through the socialist calculation debate, the articles on prices and competition, the work

on political theory, and especially the later work on law and liberty. It is likely that the argument on the necessity of rules for an uncertain world in Hayek (1960) and Hayek (1973) influenced as many economists today as did the earlier works on economics.

Friedman never fully resolved the tension between two arguments: one for the efficacy of monetary policy and one for a monetary rule. First, he argued for the relative stability of velocity over the fiscal multiplier. That made monetary policy powerful. The argument for the efficacy of monetary policy assumes knowledge about the structure of the economy.

Second, he invoked the knowledge problem in support of a monetary rule. That is a statement of the economist's constitutional ignorance of the economy's structure.

The first argument supports a monetary rule, especially if deviations in velocity from trend are unpredictable. The second argument makes the stronger case for rules over discretion.

The profession at large accepted Friedman's argument for the efficacy of monetary policy, but not his argument for a monetary rule. The profession rejected or just overlooked Friedman's analysis of the knowledge problem. In effect, the profession has accepted what I term the impoverished view of Friedman's position.

There are two reasons for this outcome. First, as noted, Friedman did not consistently emphasize the knowledge problem. Friedman's intellectual biographer, Edward Nelson, notes that there is a general problem in interpreting Friedman. "Friedman wrote prolifically—and yet nothing that consolidated his views into a single definitive statement" (Nelson 2015: 13).

Second, Friedman was not generally given to theorizing for its own sake. He developed a theoretical argument only as far as needed to make an empirical argument or conduct an empirical test. Consequently, Friedman's argument was not as fully developed as Hayek's.

Nonetheless, a full reading of Friedman puts the knowledge problem at the center of his work on monetary policy. Friedman and Hayek belong in the same monetary tradition in so far as they both took the problem seriously. Their congruence on this important issue has been overlooked in part because they disagreed fundamentally on what constitutes the appropriate monetary rule. Friedman advocated a rule of steady money growth. Hayek rejected that for a number of reasons (Ebenstein 2001: 277–78; and Caldwell 2004: 297–98n11).

After entertaining a number of options over the years, including free banking and 100 percent reserve banking, Hayek opted for competitive currencies (Hayek [1937] 1971, 1976).

I have focused on the contributions of Hayek and Friedman. Other monetary economists have emphasized the importance of uncertainty in a manner congruent with the Hayek/Friedman analysis. Karl Brunner and Allan Meltzer are notable. Meltzer (2015) reprises their contribution. Meltzer (2015: 4) notes that "uncertainty in the sense of Knight and Keynes" was central to their monetary theory and analysis of monetary policy. Axel Leijonhufvud must also certainly be cited for his work on information and coordination (Leijonhufvud 1981). And, though not a monetary economist (though he wrote about money), I must cite the work of Armen Alchian for whom uncertainty was a fundamental element in every economic problem. Benjamin (2006) contains seminal Alchian contributions. On the knowledge problem generally, Sowell (1996) represents a seminal contribution. All these figures had an association with UCLA, which is not surprising. UCLA in that era was where Chicago and Vienna intersected, and the UCLA tradition drew from both schools.

Knowledge Today

The work of John B. Taylor (2009) and others continues the Hayek/Friedman tradition in monetary economics today. The literature on nominal GDP targeting is outwardly rule based. McCallum (2015) has argued, however, that looks can be deceiving. Depending on how the rule is specified, one can end up with a policy that looks more like discretion.

Many economists who advocate a monetary rule do so based on purely technical arguments. These, in essence, conflate Friedman's two separate arguments in support of a monetary rule. If one were to go back to Friedman, it would be to Friedman (1968).

Hayek provides an even firmer foundation. And one need not go back to his early writings. His later work, particularly Hayek (1973), provides his fullest statement of the case for employing rules in social policy (broadly conceived). He analyzed the process by which an order becomes emergent.

> By "order" we shall throughout describe a state of affairs in which a multiplicity of elements of various kinds are so related

> to each other that we may learn from our acquaintance with some spatial or temporal parts of the whole to form expectations concerning the rest, or at least expectations which have a good chance of proving correct [Hayek 1973: 36].

Hayek substituted the concept of order for the more stringent, and unattainable concept of equilibrium. There is "order" if individuals can orient themselves to each other and form expectations with a tolerable degree of certainty as to what others will do. Individuals will be coordinated with respect to patterns, and make inferences about what is unobserved.

O'Driscoll and Rizzo (2015: 130) provide an example. Two professors meet regularly to discuss a book they are writing jointly. They are coordinated with respect to the typical features of their meetings, such as time and place. They know that they will discuss the broad themes of the book, and perhaps even a particular set of them. They cannot know or predict the exact content of their discussions, however. Those will be the unique and unpredictable features.

> The plans of [professors] A and B are coordinated, therefore, in the sense that each will come into the office on the proper day and at the proper time, but they are not coordinated in the sense that each has planned what to say to the other. There is an open-endedness to their plans that allows for spontaneity or novelty. This is pattern coordination.

Hayek used the term "pattern prediction," while O'Driscoll and Rizzo used "pattern coordination." The concept is the same. The future cannot be predicted or forecast, though we can form expectations on the basis of recurrent patterns. There will always be an element of surprise, however. There will be features of such an economic order that would not exist in a full, intertemporal general equilibrium model.

For example, in the face of uncertain demand, firms will hold inventories to minimize the costs of transitory or unanticipated shifts in demand. Constant repricing would be more costly than the costs of holding inventories. As Alchian ([1969] 2006: 58) noted, "Inventories economize on costs of information. Inventories may appear to be idle, excess, or unemployed resources, but they can be interpreted as an economical use of resources." These economic conventions are adaptations to a world in which perfect plan coordination ("equilibrium") is impossible. What would be waste in a general equilibrium model is adaptive behavior in a world of uncertainty and partial knowledge.

What then can we say about achieving monetary order? First, it must be rule based. Actors can orient to each other if they are following rules. Each actor is unable to predict precisely the actions of all other actors with whom he interacts. If he knows they are following rules, however, he can narrow the scope of uncertainty. To take a nonmonetary example, if there is a strong rule of law applicable to all, the purchaser of a product from a stranger faces a reduced risk of a fraudulent transaction.

If monetary policy is rule bound, then expectations can be more readily formed. Today, Federal Reserve officials attempt to anchor expectations without a rule. They do so by "forward guidance." The problem with forward guidance is that it is a statement about what officials believe today, not what they will do tomorrow. Forward guidance is a nonbinding commitment, which is data driven. Absent a binding rule, policymakers will make repeated journeys down the road to time inconsistency (Kydland and Prescott 1977). Not surprisingly, the forward guidance on when the FOMC will raise short-term interest rates has changed numerous times. In the process, monetary policymakers have generated increased volatility in financial markets. Forward guidance is producing the opposite of its intended result. By contrast, a credible rule would reduce uncertainty and volatility.

Second, the complexity of the world suggests simple rules.[8] Rules are effectively ways to reduce the information requirements of a complex coordination problem. Rule complexity would defeat the purpose of having rules. The more complex the phenomena, the stronger the case is for simple rules.

The Hayekian analysis of the emergence of order confirms Friedman's intuition for a simple monetary rule. I am not suggesting that the analysis ratifies Friedman's precise choice of a rule. That would be paradoxical, since Hayek famously disagreed with Friedman on that point. I am simply arguing that a Hayekian analysis buttresses the case for rule-governed behavior in monetary policy. And it does so based on an intellectually rigorous analysis of the role played by rules in an uncertain world. Understanding the knowledge problem is critical in the debate over monetary reform. Evolving a monetary order is more than a problem of technical economics.

The argument for a monetary rule is ultimately the same as that for the rule of law (O'Driscoll 2012). One can always construct an

[8]I am consciously borrowing the title, if not the argument, of Epstein (1995).

example in which it would be "better" to suspend legal rules in order to effect a better outcome in a particular case. The problem with this attitude is that soon you would have no rule. More to the point for this article, we do not in fact have the knowledge of all the consequences of suspending a rule in discretionary fashion. The knowledge assumed in the constructed example is not given in the real world (Friedman 1962: 51–53).

Some public choice theorists have made money into a quasi-constitutional issue and even used the term "monetary constitution." White, Vanberg, and Kohler (2015) revive that tradition. Money as a constitutional issue was perhaps first articulated by Ludwig von Mises, who influenced some of the public choice theorists. Mises (1971: 414) described "the idea of sound money . . . as an instrument for the protection of civil liberties against despotic inroads on the part of government. Ideologically it belongs in the same class with political constitutions and bills of rights." Mises carried the argument over monetary policy from the merely technical to the political.

Both Hayek and Friedman argued that monetary discretion was a danger to both political and economic liberty. In *Capitalism and Freedom*, Friedman (1962: 50) described monetary discretion as "a bad system . . . because it gives a few men such power without any effective check by the body politic—this is the key argument against an "independent" central bank." In volume 1 of *Law, Legislation, and Liberty,* Hayek (1973: 56) argued that "freedom can be preserved only by following principles and is destroyed by following expediency."

Conclusion

The knowledge problem in society is an idea most closely associated with Hayek, who analyzed it extensively in different contexts over a period of more than five decades. He developed a comprehensive theory of the production and use of knowledge in society. He emphasized that knowledge is inherently dispersed and localized, and cannot be concentrated in one mind or the minds of a few experts.

Hayek first analyzed the knowledge problem in presenting his theory of monetary disturbances, expectations formation, and malinvestments. He advanced the theory later in his work about political and legal theory and about the organization of society. Some of his later work about rules and order appears to have influenced contemporary economic theorists.

In this article, I have emphasized the importance of the arguments about knowledge and decisionmaking articulated by Hayek and later by Friedman in the context of monetary policy. The idea of optimal monetary policy is problematic in a world of dispersed information. The consequence of the knowledge problem for monetary policy is encapsulated in the Hayek quote at the beginning of this article. Hayek and Friedman agreed that we know too little to design an optimal monetary policy. We can achieve monetary order but may have neither order nor equilibrium if we try for more. A monetary rule facilitates the emergence of a monetary order. The argument for a monetary rule has gained increasing acceptance among monetary economists today. Rep. Kevin Brady (R-Tex.) has proposed the creation of a Centennial Monetary Commission. The commission would examine alternative monetary regimes and make recommendations. In the last Congress, the "Federal Reserve Accountability and Transparency Act of 2014" (H.R. 5018) was introduced to mandate the Federal Reserve adopt a rule (the Taylor rule or an alternative). And O'Driscoll (2015b) advocated the creation of a private committee to study and make recommendations for monetary reform. So there is today the prospect for adopting a monetary rule. What is unresolved is the choice of a particular rule. That will require a great deal of additional analysis.

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