

MONETARY ORDERS AND INSTITUTIONS: A HAYEKIAN PERSPECTIVE

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ABSTRACT: An adaptive systems approach is used to compare a free banking system and a central banking regime with respect to their respective capacities to use and generate relevant knowledge. Monetary equilibrium, as a byproduct of a free banking system, has also been proposed as a norm for central bank policy. Differences in the way each system functions are found to cast doubt on that claim. The central problem identified is the difficulty of exporting results from one institutional setting (free banking) to a qualitatively different one (central banking).

KEYWORDS: monetary institutions, adaptive systems, knowledge, Hayek

JEL CLASSIFICATION: B53, B52, E52

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1. SOCIAL ORDERS AND THEIR EMERGENT CHARACTERISTICS

We know from Hayek that a vital characteristic of markets is that they transmit local knowledge in a form that is widely available to market participants—that they solve the problem of the division of knowledge. But the basic idea that I wish to promote is that this knowledge-enhancing characteristic is to be found in certain other social arrangements as well, and that a fruitful way of looking at social orders in general is to focus on understanding their ability not just to transmit knowledge but to generate it as well; not just to react to external events but to adapt to them.

As Hayek pointed out in “Economics and Knowledge” (1937), once we move from the analysis of a single person to the interactions of many persons, we really do enter an entirely different realm of investigation. I wish to take seriously Hayek’s claim and explore more specifically the idea that social orders differ with respect to their knowledge-using and adaptive capacities, especially with respect to the emergence of knowledge, and that such differences are significant. These ideas, whether always explicit or not, have played an important role in the development of Austrian economics and, as I show here, provide a framework for discussing the epistemic significance of institutions. In particular, I will discuss the functioning of monetary orders under different institutional frameworks in terms of their knowledge-using and adaptive capacities.¹

Social “orders” come in various guises and forms. I shall refer to them as structures comprised of individuals interacting according to specific routines, institutions and rules. We can envision a particular order, such as the catallaxy, as referring in the abstract to an open-ended system of voluntary exchange of claims to property in which actors pursue ends under scarcity and whose behaviors are constrained by rules and conventions governing those exchanges. The aim of each agent is to engage in action to relieve, as Mises (1998 [1949]) describes it, “felt uneasiness.” In so

¹ My Hayek Lecture also discussed science as an emergent social order and the effects on its operation of an institutional setting dominated by government funding and oversight. That discussion has been excised from the present paper, given that a more extensive treatment of that topic is now forthcoming in the *Journal des Économistes et des Études Humaines* (Butos and McQuade [2012]).

doing, and within the framework of property rights, the ongoing interactions of agents produce as a byproduct of that process an “order” having various attributes and outcomes.

I wish to highlight two central features of a catallactic process based on monetary exchange. First, as a byproduct and unintended consequence of individuals’ interactions, monetary market prices are generated as an emergent characteristic of the exchange process and could only have arisen by that process and in no other way.² The system of exchange under the conditions specified—its institutional arrangements—transform the actions of individuals into system-level outputs—market prices—that could not have been generated or known in the absence of the actual process from which they emerge. Such system-level outputs are not aggregated from the attributes of the system’s individuals because during the process of interaction those attributes undergo change and adjustment. The system’s outputs represent a transformative process. We can say that market prices are a *kind* of knowledge generated by the market process.³ This suggests that institutional arrangements matter for the market process and that the specific outputs the system generates will be institutionally-dependent. For example, the rental market for apartments will generate “outputs” in the form of prices, quantities, and the characteristics of the rental properties available to consumers. But these kinds of outputs will be different under *laissez-faire* versus a regime of rent-control and other kinds of interventions. And while individuals in both cases are “doing the best they can,” we also know that the system’s capacity to produce prices and other outputs to best meet the wishes of the consumers is different under each regime.

A second central feature of a catallactic process is that it should be understood as an open-ended feedback system. The emergent constellation of monetary prices constitutes relevant knowledge-inputs for agents to revise their plans and actions for engaging

² See Boehm (1994, p. 169).

³ Although we ordinarily identify “knowledge” as originating from the brain of an individual, a system composed of many interacting individuals has the capacity to produce outputs that are unique to its processes and recognizable to us as knowledge. This is not to suggest that such knowledge emanates from a collective consciousness or some super-brain. Rather, using the term knowledge as a characteristic of a social order is simply a useful way to understand the epistemic attributes of social phenomena.

in subsequent exchanges. More than that, the changing pattern of market prices induces a self-generating discovery process of entrepreneurial activity and also the discovery of new preferences by consumers. How well the system is able to satisfy the wishes of consumers will depend on the feedback properties of the system and these properties cannot be divorced from the framework of institutions governing the system's functioning.

For example, returning to the rent-control case mentioned above, the market under rent control is affected by the absence of price feedback signals that correspond to underlying supply and demand conditions. The familiar makeshifts and workarounds we see in regulated markets, such as deterioration of the quality of rent-controlled apartments or the "disappearance" of high quality ones, reflect feedback processes conditioned by the price controls. The system has adapted to the prevailing institutional situation, but its adaptive responses are not the same as those that *laissez-faire* would have produced. Feedback systems, like the market (both under *laissez-faire* and intervention), are adaptive systems and their adaptive qualities will be contingent on the governing institutional arrangements.

Social orders differ with respect to their knowledge-generating and adaptive capacities. This perspective provides a way to analyze how alternative institutional arrangements are likely to affect the way social orders function and reinforces the importance of looking at social orders from the vantage point of the use and production of knowledge and the way orders adapt. I believe this approach yields important insights about the comparative analysis of centrally planned economic systems, specifically in connection, as Mises and Hayek remind us, with the devastating implications caused by the absence of a market price system, as well as interventionist schemes which attempt to selectively circumvent individual markets, such as mentioned earlier with respect to rent-control. For short, I'll refer to this overall perspective on social orders as an "adaptive systems" approach.⁴

⁴ McQuade (2007) provides an excellent analysis of science and market as adaptive social systems.

2. MONETARY ORDERS

Monetary arrangements can also be usefully modeled as social orders, in which the transactions pertain to banks, their customers, and the constraints imposed on them. Here, the transactions involve the issuing of loans and the redemption of notes; the knowledge generated is visible as the level of reserves at individual banks and any market premium required for transactions in the notes of specific banks. By drawing contrasts between the adaptive capabilities of different monetary arrangements, we can carry out a form of comparative institutional analysis to highlight their respective knowledge-generating and adaptive qualities.

Turning first to central banking, the appropriate framework for analyzing central banking is an interventionist system dominated by an institution that conducts centralized monetary planning and which is effectively exempt from the consequences of its own actions.⁵ Since its inception in 1913, the Federal Reserve has been complicit in causing economic disruption and failing to meet its mandates of price stability and full employment.⁶ The recent financial crisis and recession highlight the failure of central banking (and, of course, other government policies as well). But it also ushered in Fed actions that are more opaque and disturbing. Under Bernanke, the Fed has used “quantitative easing” (QE)—that is, non-traditional ways to affect bank reserves and the quantity of money—by which it purchased over a trillion dollars of mortgage backed securities under QE I and more recently \$600 billion of long-term Treasury bills under QE II, which ended in June 2011. These programs resulted in Fed’s balance sheet increasing more than two-fold from August 2007 to January 2011, but have also had the effect of making the Fed a fiscal agent of the government—effectively carrying out fiscal policy by other means.

Bernanke defended QE II on the grounds that “core inflation” (a price index that excludes food and energy) was too low at about 1 to 1.5 percent and should be increased to about 2 percent. For

⁵ See Koppl and Yeager (1996) on central banks as “Big Players,” market players that have the capacity to affect market outcomes but who are immune to the consequences of their own actions.

⁶ Selgin, Lastrapes, and White (2012) analyze the Fed’s success in satisfying its mandate. They provide compelling evidence that the Fed has failed in its charge.

Bernanke, the risks of inflation are small while those of deflation in his judgment are large.⁷ The conduct of recent monetary policy has attracted much attention, and there are many economists who have not opposed or would have favored the Fed increasing the money supply early during the financial crisis. This line of reasoning argues that the failure of the Fed to satisfy the excess demand for money, i.e., the Fed not increasing the stock of money, induces a costly and possibly self-reinforcing deflationary process as individuals attempt to restore their cash balances to desired levels. If some prices are sticky or even stuck via regulation at certain levels, the adjustment occurs principally through quantities, such as outputs and employment. The consensus among mainstream economists was that any deflation, regardless of its source, called for aggressive monetary expansion to at least prevent deflation and for most to actively target the inflation rate in the 2 percent range.⁸

But as emphasized and explained by monetary equilibrium theorists (for example, see Selgin [1997] and Horwitz [2001]), it is important to differentiate between “benign deflation” and “harmful deflation.” The basic finding is that falling prices are benign when output is increasing, but harmful if the deflation is caused by an excess demand for money. Monetary equilibrium, defined as a zero excess demand for money at the existing level of prices (Selgin [1988], p. 54), requires constancy in the flow of monetary expenditures. The free banking model presented by White,⁹ Selgin, Horwitz, and others demonstrates that under *laissez-faire* a system of free banking will generate, as a byproduct of its operation, monetary equilibrium. This means that productivity gains will appear as price declines emanating from the affected areas. Ongoing productivity gains across widening swaths of the economy will lead to generally falling consumer prices. On the other hand, at the macro level monetary disequilibrium brought on by an excess demand for money at the prevailing level of prices provides signals inducing banks to satisfy that excess demand by increasing bank liabilities, thereby easing

⁷ See, for example, Bernanke (2002).

⁸ At its January 2012 meeting, the FOMC approved a “Statement on Longer-Run Goals and Monetary Policy Strategy” specifying a targeted long run annual inflation rate of 2 percent as measured by the price index for personal consumption expenditures. See <http://www.federalreserve.gov/monetarypolicy/fomcminutes20120125.htm>.

⁹ See White (1984a; 1989 [1984b]).

the severity of adjustment costs associated with prices declining until the demand for real balances has been satisfied. The tendency toward monetary equilibrium is an emergent property of the system itself. This result—monetary equilibrium—constitutes a benchmark against which a comparison can be made between two qualitatively distinct institutional orders: a central banking regime and a free banking system. The free banking system responds to an excess demand for money and falling prices by increasing the quantity of money in such a way as to promote resource use consistent with the wishes of the consumers via a market adjustment process. In the course of these adjustment operating at the level of interconnected markets, monetary equilibrium as an unintended byproduct of that process is generated at the system level. If the way this is achieved is contingent on the institutions that make up a free banking system, we might also wonder if a monetary system functioning under qualitatively different institutional arrangements can produce the same results. In particular, do the results of a free banking system carry over to a central banking regime?

While money stock responsiveness to an excess demand for money makes sense in one institutional context (free banking), applying that proposition as a policy approach to a fundamentally different institutional context (central banking) is problematic. This is because monetary orders operating under different institutional arrangements imply different capacities in their use and generation of knowledge and their adaptive properties. This point is analogous to the knowledge using and generating differences and outcomes we make with respect to a catallaxy and a centrally planned economic system.

My aim in these remarks is to consider whether the Fed, given its control over bank reserves (or the monetary base) and to a lesser extent over the supply of credit, is more or less able to mimic the functioning of a free banking system. The specific context I will use to discuss this matter concerns the recent recession that began in late 2007 and lasted (according to the NBER) through the summer of 2009. Some monetary equilibrium theorists have suggested that the Fed in early 2008 should have acted more forcibly in expanding the monetary base in response to the fall in money velocity.¹⁰

¹⁰ This is consistent with Hayek's (1966 [1935], p. 27 n.1) call for maintaining a constant "effective money stream" or, in today's parlance a constancy of MV. For Hayek, this norm was a requirement for "neutral money." It is also relevant to

a. Adaptation Under a Free Banking System

To address this question, let me outline the main features of a free banking system of the kind analyzed by Lawrence White (1984a; 1989 [1984b]) and George Selgin (1988). In particular, I would like to highlight how a free banking system modulates the quantity of inside money (or bank liabilities) in response to disequilibria between the supply and demand for money. My interest is to examine the adaptive workings of a free banking system as it responds to new information and how that compares to the agility and timeliness of a central banking system.

So, let us make the following assumptions about a free banking system:

1. It is a decentralized and fully deregulated (*laissez-faire*) banking system;
2. There is an absence of regulatory entry/exit constraints or requirements;
3. Bank notes of issue are redeemable on demand by depositors for a commodity reserve (e.g., gold) at a pre-determined fixed rate of exchange;
4. Bank liabilities have no pre-specified reserve requirement.

Let us turn to the case under free banking if individuals wish to increase their demand to hold the currency of a bank, as discussed by Selgin (1988). An excess demand for the liabilities or notes of a bank means that individuals wish to increase the “holding period” of notes. The flow of its notes passing through clearing houses diminishes and the exchange value of the bank’s notes increases. Less frequent and smaller turnover of bank notes would be reflected in a lower volume of reserve outflows so that the bank’s reserves would increase. It is now in a position to increase the size of its balance sheet by increasing its loans and the quantity of bank notes it keeps in circulation. The increased demand to hold this bank’s currency can thereby be matched by a corresponding increase in

note that the Fed’s more than doubling of the monetary base was accompanied by a more than one trillion dollar increase in the banking system’s excess reserves, reserves available to banks for commercial and consumer loans that could have supported a substantial increase in bank liabilities and the money stock.

the quantity of its currency. What might have become a decrease in the stock of money is circumvented.

It is relevant to note that this adjustment of bank notes to satisfy the increased demand for money does not require any specific directive for the system to respond appropriately. It is simply and importantly an implication of the institutional arrangements that govern how the system functions. The main point for the purpose here is that the quantity of money responds in the correct direction to situations where there is an excess demand for money at the prevailing constellation of market prices.

Under free banking, the system adjusts in piecemeal fashion according to specific (local) conditions should an excess demand for money (or, for that matter, an excess supply of money) arise. These signals promptly affect individual banks and induce self-correcting adjustments at that level. Banks which have issued excessive liabilities will have to contract their balance sheets, while those that have issued too few will be able to expand theirs. These adjustments affect particular components of the system and their effects will tend to be relatively confined to those banks and their customers for whom the adjustments are warranted.

The institutions that instantiate the market process provide scope for feedback mechanisms to promote the necessary adjustments by profit-seeking banks consistent with consumer preferences. Notably, individual banks react to relevant flows of information and to make adjustments in their respective behaviors based on that information. That is, adjustments are themselves decentralized. Because feedback and adjustment function at a micro level, the overall system will reveal increased agility and timeliness in its responses.

b. Knowledge Inputs and Outputs of Federal Reserve Policy

Now, let us consider how feedback and adjustment work under a regime of central banking such as the U.S. Federal Reserve System. The key feature here is that a single entity—the central bank—has the capacity to dominate the system's responses, in both real and nominal terms. My claim is that relative to a decentralized *laissez-faire* system, the central bank suffers from feedback and adjustment deficiencies. We can imagine several

conditions that might give rise to such deficiencies—such as constraints or policies arising from political pressure, its incentives as a bureaucracy to respond in certain ways, or subservience to Treasury and government fiscal policies.¹¹ But let me simply frame the discussion in terms of the information available to the Fed that induces it to take action, which corresponds to how effectively it can access and use relevant knowledge, and second, the kind of policy adaptation and response it implements, which corresponds to the kind of knowledge its actions generate. A brief overview of each will suffice, I believe, to adumbrate the difficulties a central bank encounters when there is an excess demand for money at the prevailing constellation of prices.

If there is an excess demand for money, the velocity of money decreases. The central bank, or the Fed in our case, must identify that such a decline has in fact occurred, its likely magnitude, whether it is localized or systemic, and whether it is transitory or chronic. These questions, while ascertainable *ex post*, remain problematic in terms of when that information becomes available to the Fed. The inescapable uncertainties surrounding the future (or expected) movement of velocity and other economic variables over the relevant policy horizon pose serious dilemmas for central bankers.

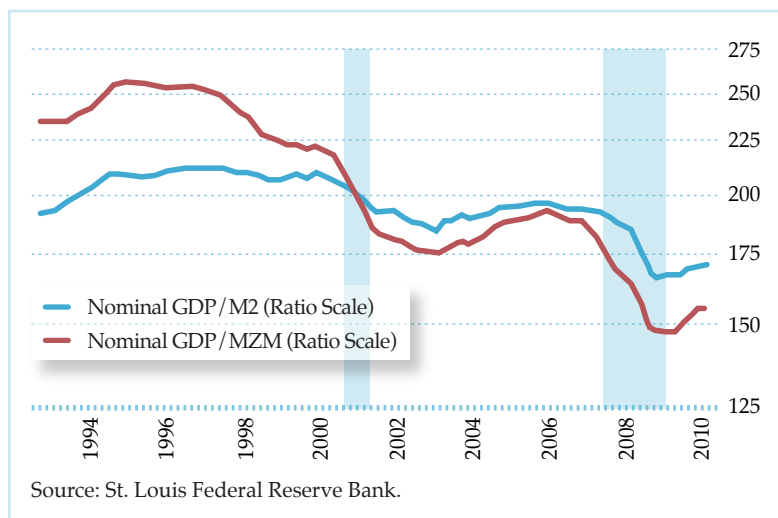
In the category of “what did the Fed know and when did it know it,” we can use Chart 1 to illustrate that from our *ex post* vantage point that the velocity of M2 in late in 2007 began to fall. Its decline, however, was initially mild and even consistent with what could have appeared as a generalized continued downward trend since 2000. While we know *ex post* that M2 velocity began to decline substantially in the fall of 2008, the information that might have convinced policymakers to head-off the decline in velocity earlier in the recession was not available to them or unambiguous. Although MZM¹² velocity, which I included in the chart, would have been *ex post* a better predictor of the decline in velocity during this episode, the Fed does not use that measure of money, perhaps because its volatility relative to M2 velocity is larger. So, despite

¹¹ These considerations are clearly germane to central bank policymaking, but are not considered here.

¹² MZM is a monetary aggregate of “zero maturity assets” that equals M2 less the time deposits plus all money market funds.

its precipitous decline beginning in 2007, MZM's velocity from the Fed's vantage point is not reliable as a useful signal upon which to adjust monetary policy.

Chart 1.

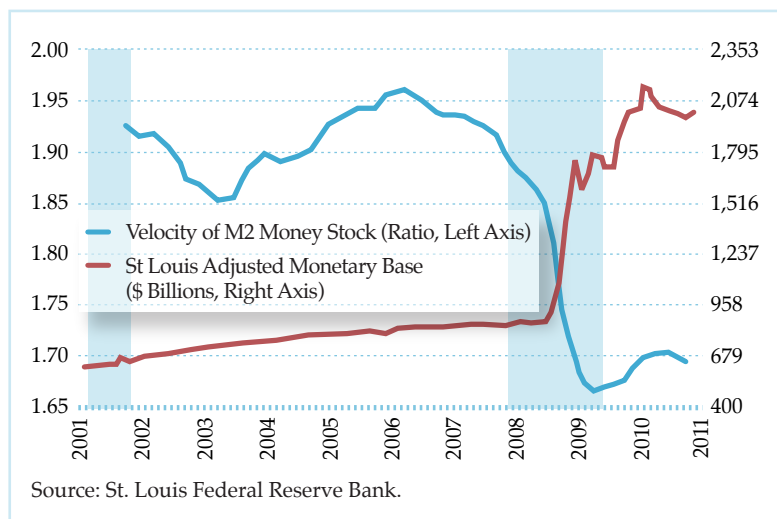


The question of whether the Fed could have better predicted the 2008 decline of M2 velocity is complicated by policies the government and the Fed began to implement in late 2007 to deal with the financial crisis and the recession. The policies themselves—e.g., the Fed's Term Auction Facility and other lending facilities that opened in late 2007 and early 2008, TARP (signed into law in October of 2008), and Fed-assisted bank bailouts of Bear Stearns—by which the Fed and Treasury got into the business of credit allocation to financial firms and later non-financial ones as well, may actually have had a negative effect on the economy due to inefficiencies associated with selective credit allocation programs. The induced uncertainties surrounding the hodgepodge of policy responses are factors that seem to have contributed to the continued fall in velocity through mid-2009.

Fed actions through the end of August 2008, from TAF lending and Fed funds rate reductions, increased loans to domestic (and

foreign central) banks by \$250 billion. However, the Fed kept the monetary base largely unchanged by purchasing an equal amount of Treasury securities. It was only later, in the early fall of 2008 when the Fed dramatically increased its lending, that we saw an increase in the monetary base from about \$0.5 trillion to about \$1.25 trillion by January 2009. As seen in Chart 2 below, the increase in the monetary base had little impact on M2 velocity and that even as the base approached \$2 trillion in 2010, velocity leveled out at 1.7, suggesting that using velocity as a benchmark for changing the monetary base is not necessarily sufficient in all circumstances for reducing an apparent excess demand for money. About 18 months after the recession “officially” ended, the enormous expansion in reserves showed up as excess bank reserves and only in early 2011 did the banking sector show some tentative signs of increasing its lending. Indeed, it seems that while the plunge in M2 velocity was no doubt connected to the financial crisis and the recession, factors other than these were in play and contributed to their severity, including most particularly the various distortions and uncertainties induced by Federal Reserve and government policies.

Chart 2.



Interpreting data and the lags in getting information affect the timeliness of Fed policy responses precisely because the decisionmaking is centralized. Information flows that originate at the level of individual banks or within specific sectors of the economy are aggregated into data thought to be essential for informed policymaking. Because policy mistakes affect the entire system and possibly the reputation of the policymakers themselves, we can understand why policymakers at the margin might have an incentive to wait for additional corroborating evidence before embarking on new policies. In contrast, the information flowing to banking institutions under free banking can be remediated quickly. Moreover, because these responses are highly decentralized, their effects are marginal and focused. The absence under free banking of *monetary policy* is strength of the system.

What appears as macroeconomic problems are real enough, but solutions ordinarily center on addressing difficulties dogging interconnected individual markets. Let us call this “the macro-micro problem.” Because policy measures principally are applied to the system at large, it is difficult to use the sorts of tools ordinarily available to policymakers to address subtle problems and market imbalances of a complex system and its multidimensional latticework of interconnected activities. A recent example is the housing crisis and the difficulty of addressing an excess stock of housing and the accompanying drop in housing prices using monetary policy tools, especially when fiscal policies, which aimed to provide a floor for housing prices and to subsidize homeowners, very likely made these problems more deep and long lived.

Such “macro-micro problems” can be approached from a somewhat different vantage point by highlighting that given increases in the money stock by a free banking system and a central banking regime in response to an excess demand for money will have different effects on market outcomes. Even if we stipulate that nominal income (MV) increases by the same amount in each context, the way that those increases cannot be the same. As noted earlier, under free banking, specific banks respond to the excess demand for *their* liabilities while the central bank responds systemically with a general increase in its liabilities coursing through the entire banking system. Under free banking the response, in contrast to that of a central banking regime, is decentralized, focused, and justifiable for

those banks, and results in the elimination of an excess demand for money in particular areas of the economy. In addition, under central banking, and unlike free banking, there is no mechanism to ensure that the increase in the (aggregate) money stock will be directed to where it is most needed. The way new money is introduced into each system is qualitatively different; hence, the allocative effects on the economy will be different under each system. The transmission channels by which some evident excess demand for money is resolved will generate different outcomes in the economy, assuming the restoration of MV is the same under each institutional setting. While monetary equilibrium under free banking has the prospect of generating equilibrating tendencies in specific markets or sources of disequilibrium, the transmission channels available under central bank policy cannot replicate what happens under free banking. These differing allocative effects suggest that the attainment of monetary equilibrium under central banking, such that the stream of MV is unaffected by an excess demand for money at the prevailing price level, will involve an underlying configuration of outputs and relative prices in the economy that is not the same as would have occurred under a free banking system. Even if monetary equilibrium, defined as a constant MV stream, could be achieved under central banking, we cannot assume it will have eliminated the pockets of disequilibrium in all markets.¹³

The Fed's difficulties arise because incoming and outgoing flows of information operate at a highly centralized level. This arrangement, in turn, does not provide or possess the requisite feedback paths for timely and appropriate adaptive responses by the Fed to the economic conditions it seeks to manipulate. As noted earlier, a free banking regime by its very structure is able to more effectively solve these knowledge problems—both in using and generating relevant

¹³ In contrast to the “macro-micro” views expressed here, Horwitz and Luther (2010) couch their discussion of central bank policy in terms of aggregates: “In our view, monetary stability means continuously adjusting the supply of money to offset changes in velocity. Given the current monetary regime, where such adjustments are in the hands of the central bank, they should be made as mechanical as possible. ... Given our monetary equilibrium view, we hold that the Fed should adopt a nominal income target. ... Under a nominal income targeting regime, monetary policy would have the best chance to maintain our goal of monetary equilibrium, at least to the extent that central bankers can accurately estimate and commit to follow an aggregate measure of output” (pp. 14–15).

and appropriate informational flows, and in so doing to adapt with greater agility and to greater effect. Table 1 summarizes these points.

Table 1.

| | Capacity for Using Knowledge | Capacity to Adapt |
|-----------------|--|---|
| Free Banking | Individual banks obtain and act on local knowledge Strong and timely feedback effects for guiding bank behavior | Individual banks have the incentive and ability to adjust quickly and appropriately to local conditions Banks are able to generate appropriate local responses on basis of profit calculation Mistaken responses have limited effects |
| Federal Reserve | Aggregate data to centralized decision makers Information feedback flows ambiguous and delayed | Policy tools operate at highly aggregative level Responses determined by a central board and subject to significant lags Mistaken policies are systemic |

In retrospect, we might be tempted to urge the Fed to respond more quickly and forcibly. But this does not solve the underlying problems confronting any centralized policy-making entity, like the Fed, that attempts to make policy in real time amidst substantial uncertainty about the future. And it is necessary to note that quick and decisive responses by the Fed may actually increase the frequency of discretionary interventions and also the number of interventions that will turn out to be over- or under-reactions. Milton Friedman’s image of a truck driver over-steering down a narrow and twisting country road, careening from one side to the other, captures the point. In short, we have good reason to think that a central bank is likely to encounter difficulties in solving its policy charge.

Although we may rant at specific policymakers and their decisions, my argument is that these deficiencies cannot be

disassociated from the institutional context in which they operate. The problem resides with central banking and policymaking as such. The problem of central banking is an institutional one and only regime change can solve that.

3. CONCLUDING REMARKS

My central claim is that social orders differ with respect to their knowledge-using and adaptive capacities and that these differences are significant. This, I believe, captures a long-standing and crucial insight in the development of Austrian economics, one that has been put to powerful effect in analyzing and comparing the market order and a centrally planned economic one. A centrally planned system cannot possibly acquire the dispersed knowledge of its constituent elements and it cannot generate market prices for allocating resources. The feedback channels essential for adaptation simply do not exist; consequently, the system cannot respond with agility, timeliness, or correctness.

But the lessons of central planning versus the market order may also be applied to other social orders, as well. Here, though, I have drawn attention to the monetary order and to the possibility of whether a system of central banking is capable of mimicking the functioning of a free banking system. I have tried to show that the knowledge-using and adaptive capacities of each are quite different. The institutional arrangements of a free-banking system provide appropriate feedback and responses that are not available to a central banking system. The kinds of outcomes that can be generated under these circumstances cannot be replicated by processes specific to a set of different institutional arrangements. The problematic nature of doing so, as discussed above, has centered on the adaptive properties of monetary orders and suggests that particular attention needs to be given to the question of exporting results generated by one set of arrangements to a system functioning under very different institutional arrangements.

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