Rules vs. Discretion: Lessons from the Volcker-Greenspan Era

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May 1, 2007

The ideas in this paper are those of the author, not the Federal Reserve Bank of Richmond. Over the years, I have benefited from conversations with Marvin Goodfriend.

Consensus in macroeconomics coalesces around common interpretations of major historical events. In the 20th century, the juxtaposition of the Great Depression with its persistent high unemployment and deflation and of World War II with its full employment and inflation created a consensus around Keynesianism. Keynesianism held that in the Depression the price system had failed to maintain full employment and that monetary policy had failed to stimulate economic activity. Friedman and Schwartz (1963) challenged this view by attributing the nominal and real instability of the Depression to the failure of monetary policy.

The second juxtaposition of contrasting economic experiences was the cyclical instability and inflation from 1965 through 1982 followed by significant real and nominal stability. In the mid-1960s, confronted with social fissures coming from the Vietnam War and the civil rights movement, a political consensus formed around the Keynesian prescription of discretionary aggregate demand management to maintain low, stable unemployment and steady, high real growth. Friedman attributed the ensuing instability to stop-go monetary policy with its high money growth and recurrent monetary decelerations and accelerations, and the Keynesian consensus foundered (Hetzel 2007).

Completion of Friedman's attribution of real and nominal instability to monetary instability requires attribution of

the recent Great Moderation to monetary stability. Friedman also believed that the conduct of monetary policy by a rule would eliminate monetary policy as a source of instability. However, the Fed has not followed Friedman's (1960) constant money growth rule. In October 1982, it abandoned its October 1979 procedures for monetary control. Money has ceased to predict inflation and real activity. No consensus can emerge around this latter contrasting historical experience without an agreed upon characterization of monetary policy in the Volcker-Greenspan (V-G) era.[1]

Such a characterization must accord with the practical policymaking consensus. Since the emergence of inflation-targeting, there is a consensus that central banks should maintain trend inflation unchanged at a low level. It follows that they should possess instrument independence — the ability to raise the interbank rate to whatever level necessary to achieve this result. Instrument independence follows from the disappearance of policy based on the taxonomic analysis of the causes of inflation prevalent in the pre-Volcker period with its broad classes of demand-pull, cost-push, special factors, and wage-price spiral. Central banks no longer base policy on the assumption that monetary policy is just one instrument along with fiscal policy available for dealing with demand-pull inflation and is inappropriate for dealing with the other kinds of inflation.[2] Finally, an uncontroversial description

of central bank behavior is “lean-against-the-wind” (LAW) according to which central banks raise the interbank rate when output grows above trend and resource utilization rates rise, and conversely with slow growth. The issue of how to characterize policy then becomes what discipline does the central bank impose on its individual interest rate changes to maintain trend inflation unchanged?

Resolution of that issue requires a model. The workhorse model in monetary economics is the New Keynesian model (Woodford 2003, Ch. 3; Rotemberg and Woodford 1997) or, as named by Goodfriend and King (1998), the New Neoclassical Synthesis, NNS, model (Goodfriend 2004). The two alternative characterizations of monetary policy offered below emphasize different aspects of this model. The monetary characterization emphasizes the forward-looking aspect of price setting and the need for a rule to provide a nominal anchor. It is in the spirit of the NNS Phillips curve with forward-looking expectations (Woodford 2003, Ch. 2.2). The nonmonetary characterization emphasizes price stickiness and inflation shocks. It is in the spirit of Phillips curves with lagged inflation terms, for example, rationalized by backward-looking rule of thumb price setters (Gali and Gertler 1999).[3]

The monetary explanation stresses the real-nominal distinction of the quantity theory that highlights the working of the price system for the equilibria of real variables and

the systematic part of monetary policy for the equilibria of nominal variables. This distinction organizes policy in the V-G era as a rule (LAW with credibility) with a real and a nominal component.[4] The discipline imposed by the desire to restore the nominal expectational stability lost during stop-go caused the FOMC to implement LAW (the real component) so that shocks left unchanged the financial market's expectation of low, constant inflation (the nominal component).[5] This characterization of policy also furnishes a bridge between the emerging intellectual consensus in favor of rules and the practical policymaking consensus.[6]

Section I asks whether a credible central bank can control inflation without periodic recourse to the creation of excess unemployment. In the U.S. context, the issue is whether the dual mandate presents a conflict. Section II presents a nonmonetary view of how the Fed controls inflation. Section III provides an overview of monetary policy in the 20th century designed to distinguish between these views and to highlight the evolution of the monetary standard from stop-go to the V-G era.

I. Rules, expectations and the classical dichotomy

How do central banks stabilize the value of money — the price level? Do they discipline price setting through the discretionary creation of excess unemployment in response to inflation shocks or through following a rule that shapes the

expectational environment? The answer starts with recognition of the intrinsic worthlessness of paper money (or its electronic equivalent of computer entries in bank ledgers). The assumption that individual welfare depends only upon real not nominal (dollar) variables generalizes the observation that money is intrinsically worthless.

The intrinsic worthlessness of money means that apart from transitory frictions its real purchasing power cannot depend upon the number of its units. To give money value, the central bank must make money scarce: it must limit its liabilities — the monetary base. To determine the price level, the central bank could target the base directly. The quantity theory insight is that because the value of real money, which is the product of M and 1/P (the nominal quantity of money times the goods price of money), does not depend upon M, the central bank can control P by controlling M.[7] In his critique of real bills, Mints (1945) drew the broader implication that in order to control prices the central bank must control some nominal variable (provide a nominal anchor).

Although the central bank must maintain the scarcity of money, it can do so indirectly. Individuals accept dollars in return for goods and services, which satisfy real wants, because of the *expectation* that others will part with goods and services for dollars at a later date. The central bank could then constrain monetary base creation indirectly through

maintenance of an unchanged expected future price level (or inflation if it allows the price level to drift). Because central bank use an interest rate instrument renders money endogenous, this indirect alternative is the relevant one.

The assumption that the central bank controls a nominal variable like expected inflation raises the issue of how that control influences the price-setting behavior of individuals whose welfare depends only upon real variables. In discussing the real-balance effect, Patinkin (1965) showed how with nominal money exogenous changes in prices entail real consequences. To understand the nature of a rule that allows central banks to use the expected price level (expected inflation) as an intermediate target for influencing the behavior of price setters, who care about relative prices, it is necessary to understand monetary nonneutrality.

Alternatively, what makes the price system efficient in dealing with real but not monetary shocks? When firms (assumed to possess monopoly power) set dollar prices, they intend only to set relative prices. As a result, they change their dollar prices for two reasons: first, to *change* the relative price of their product; second, to *preserve* its relative price. The latter changes offset the average change in dollar prices that firms expect other firms to make. Assume initially that the central bank determines money exogenously and unpredictably so that the price level must

adjust to endow nominal money with the purchasing power the public desires.[8]

Monetary nonneutrality arises from the absence of a coordinating mechanism for preserving relative prices when the price level changes.[9] Although the price system economizes efficiently on the information needed by individual firms to make relative-price-changing changes in dollar prices, it possesses nothing comparable for relative-price-preserving changes.[10] When these unpredictable changes in money occur, nominal aggregate demand changes and firms' markups move in a corresponding way. However, individual firms do not know how a change in their dollar prices will affect their markup without knowing how all other firms will respond. The first firm to change its dollar price in a way that gropes after the evolving price level incurs a cost from a misaligned relative price. Because it does not capture the externality from moving the price level to its flexible-price value (the price level that leaves firms' markups at optimal values), the firm initially adjusts the quantity it sells.

Imagine now a Walrasian nominal price auctioneer who calls out changes in the price level whenever markups on average differ from their profit-maximizing levels.[11] Firms all change their dollar prices in line with the announced changes and the process ends when markups return to their profit-maximizing levels. There is then monetary neutrality.[12]

Rational expectations is the assumption that the self-interest firms have in getting their relative prices right causes them to coordinate price-preserving changes in dollar prices on the systematic part of monetary policy. With a simple, credible rule that coordinates expectations around an inflation target the central bank makes the auctioneer unnecessary.

To understand whether a V-G rule accounted for the Great Moderation, it is also necessary to understand the implications of use of an interest rate as the policy variable for the operation of the price system. How well does the price system work to return output to potential in response to *real* shocks? Does it work well so that a rule that respects the working of the price system promotes real stability? Alternatively, does it work poorly so that the central bank must trade off between the dual objectives of nominal and real stability? The view here makes the former assumption.[13] Specifically, "moderate" fluctuations in the real interest rate (in a range usually above zero) return real output to trend in response to real shocks. The employment determined by the real business cycle core of the economy is the benchmark for how well the Fed fulfills the dual mandate of the 1946 *Employment Act*.

The assumptions that a credible central bank can control trend inflation through the control of expectations and that the price system works well make possible the conduct of

monetary policy by a rule that provides for a “classical dichotomy.” It allows the central bank to stabilize the contemporaneous values of prices and output by independently stabilizing each of their expected values. The introduction offered “LAW with credibility” as a distillation of the consistent part of policy in the V-G era? How does it work?

Specifically, consider a positive productivity shock perceived by the public as permanent. Individuals feel wealthier and they attempt to smooth their consumption by bringing additional consumption into the present. At the prevailing real interest rate, the contemporaneous demand for resources from consumption and investment exceeds supply and resource utilization rates rise. The FOMC observes a sustained increase in resource utilization (fall in the unemployment rate) and begins to raise the funds rate in a measured, persistent manner.

Because the market understands the rule, the yield curve rises and the entire rise in forward rates is real.[14] In response to shocks, the market continuously assesses the pattern of forward rates necessary to get output back to potential. (Although shocks arrive randomly, a rule is possible because of the continuity in the way that the price system works to equilibrate shocks.) Stability in the expectation of the future value of output tied down by trend growth is enhanced because the forecast of when output will

return to trend is not complicated by the need to forecast monetary nonneutralities. Stability in expected output enhances stability in contemporaneous output.

The FOMC's "search" procedure for keeping the real funds rate in line with the natural rate works because unlike stop-go the FOMC does not attempt to sustain above or below trend growth to control the level of unemployment. By causing the real interest rate to track the natural rate, the rule prevents monetary emissions that force undesired changes in prices.[15] The FOMC can then create a common set of expectations that coordinates the relative-price-preserving dollar price changes that price setters make. This control over the expectational environment allows the central bank to control trend inflation. A nominal variable (expected inflation) controls a nominal variable (inflation) and the FOMC stabilizes the contemporaneous value of money by assuring stability in its expected future value. With a credible inflation target, inflation shocks pass through to the price level, but they average out over time. They do not impose an inflation/output trade-off on the central bank.

This "classical dichotomy" allows the central bank to control prices without interfering with the price system.[16] An implication is that inflation control consists of a rule that provides for monetary control rather than discretionary manipulation of unemployment. To keep trend inflation

constant, the rule must discipline nominal money and prices to grow in line with the inflation target (the credibility component) and must discipline nominal money to grow in line with real money demand (the monetary control component). Each component exercises a discipline on how the central bank sets the interest rate (Hetzel 2004, 2005, 2006).

First, with the funds rate equal to the natural rate plus expected inflation (and expected inflation equal to the inflation target given credibility), expected inflation drives an equal amount of growth in actual inflation and money. Second, with the real funds rate equal to the natural rate, real output grows in a way given by the real business cycle core of the economy. Given the funds rate target, the central bank then accommodates the associated change in real money demand plus random changes. Nominal money growth is equal to this growth in real money demand plus an amount equal to the inflation target and random inflation shocks. As a result, inflation need not deviate from target to bring the purchasing power of nominal money into line with real money demand.

In sum, the rule will guide the central bank about *when* to shock the real economy and, at all other times, *how not* to shock the economy. The central bank must establish credibility. If its announced inflation target is not credible and, say, expected inflation exceeds the announced target, it must raise rates to engineer an unanticipated

monetary contraction.[17] Otherwise, it must allow the real interest rate to serve its role in the price system. In the spirit of Friedman, a credible central bank can stabilize the economy by following a rule that eliminates monetary policy shocks. The constraint imposed is not constant money growth but rather constant expected trend inflation.

Ironically, the role of money disappears from sight when the central bank follows such a rule. The public sees only the correlation between changes in the (real and nominal) funds rate and changes in employment (the rate of resource utilization). Because shocks arrive randomly, the appearance is that the central bank manipulates the funds rate discretionarily to control employment. The central bank gets undeserved credit for the working of the price system.

Moreover, with positive inflation, the public attributes inflation to increases in particular prices ascribed in turn to the real factors affecting the associated markets. It seems natural that the central bank must reduce employment (a real factor) to offset these real factors. The public is also aware of the fall in employment associated with past episodes where the central bank reduced inflation below the level to which expectations had adjusted. It then appears natural that the central bank controls employment to control inflation.

This assignment of causality to the correlations between the funds rate and employment and between changes in

employment and inflation implies that the central bank can exercise discretionary control over inflation and excess unemployment subject to the trade-offs summarized in the inflation-unemployment correlations of the Phillips curve. However, the quantity-theoretic proposition that welfare depends only upon real variables implies that to the extent that individuals can forecast inflation they set prices to offset its real effects. Expressed as the Friedman-Lucas natural-rate/rational-expectations hypothesis, the implication is that the central bank cannot use the real-nominal correlations of the Phillips curve as a lever for controlling either unemployment or inflation (Friedman [1968] in (1969) and Lucas (1972)).

II. The nonmonetary view

In contrast to the monetary view, the nonmonetary view holds that real factors move inflation around like a random walk unless offset by changes in excess unemployment engineered by the central bank. It provides for inflation stability by creating excess capacity to offset positive inflation shocks, and conversely for negative shocks. The Fed is an inflation fighter not an inflation creator. The price level is simply an average of the dollar prices of goods, not an equilibrating variable that can change to endow nominal money with the real purchasing power desired by the public.

The nonmonetary view requires some mechanism to transmit

the effect of real forces to the price level not just relative prices. It is a Phillips curve with intrinsic inflation persistence (backward-looking expectations formation captured by lagged inflation terms that enter with coefficients that sum to one). Inflation shocks (relative price shocks that pass through to the price level) affect inflation directly. In the absence of an increase in unemployment, that inflation propagates. Intrinsic inflation persistence (persistence extrinsic to the monetary regime) means that the central bank must manipulate excess unemployment to control inflation. Control of the expectational environment is irrelevant.

The nonmonetary view also receives content from the assumption that the price system works poorly to equilibrate the economy. The successor to the Keynesian assumption that the price system produces a chronic lack of aggregate demand is the assumption that central bank concentration on price stability would produce significant variability in the real economy. Monetary policy is then a balancing act between raising excess unemployment to lower the inflation produced by positive inflation shocks and reducing excess unemployment by raising inflation to mitigate negative real shocks. Intrinsic inflation persistence is a two-edged sword. It makes possible the discretionary manipulation of unemployment, but makes the control of inflation costly.

III. Monetary history as controlled experiments[18]

Monetary policy is a dialectic between the past and the present intermediated by theory. What theory makes sense of historical experience and how does that theory allow the central bank to make conditional forecasts in the present about the consequences of its rule? Given that economists cannot perform controlled experiments, one must organize historical experience as approximations to controlled experiments. Specifically, one assumes the usefulness of a theory and with its guidance and with documentary evidence identifies how monetary policies (the consistent part of central bank behavior) have changed over time. Conditional on these assumptions about policy, one can then ask how well the theory explains the historical behavior of macroeconomic variables. A theory is superior to alternatives if it requires fewer ad hoc assumptions to explain history.[19]

A key to identifying monetary policy is to note that central bankers like expectational stability. They implement policy through the way that their influence in money markets affects financial markets more generally. For the stability of asset prices, expectations are everything. However, the list below demonstrates that at different times central bankers have held very different beliefs about the expectational stability they wanted to achieve.

William Lidderdale, governor of the Bank of England in

the 1890s at the time of the international gold standard, wanted stability in the expectation that the par value of gold would remain unchanged. George Harrison, governor of the Federal Reserve Bank of New York from 1928 to 1940, wanted stability in the real value of equity on the New York Stock Exchange. William McChesney Martin, FOMC chairman from March 1951 to February 1970, wanted stability in the expectation of the price level. Arthur Burns, FOMC chairman from February 1970 to February 1978, wanted stability in the expectation of businessmen about the future level of real wages. Paul Volcker and Alan Greenspan (FOMC chairmen from August 1979 to August 1987 and August 1987 to January 2006) wanted stability in a low level of expected inflation. Harrison and Burns wanted stability of a real variable while the others wanted stability of a nominal variable. The premise here is that the quantity theory provides a common explanation for the different behavior of prices given these different beliefs.

Under the international gold standard, with the nominal anchor provided by the par (dollar) value of gold, the marketplace determined the central bank's liabilities (monetary base), but subject to the discipline imposed by the need to allow international gold flows to determine money and prices in a way that equilibrated the balance of payments.[20] The monetary disturbances that accompanied the transition from a gold standard to a paper standard in the 20th century arose

from the failure of central banks to understand that in the absence of gold standard rules the market would no longer determine money and prices. Instead, the central bank had to control its liabilities (the monetary base) by managing its asset portfolio in a way that stabilized the value of some nominal (dollar-denominated) variable. The central bank had to provide a nominal anchor by being a creator of money.

With the creation of the Fed, the practical men of business and finance who ran it assumed that the marketplace would continue to determine its liabilities, albeit with a credit allocation constraint that would limit creation of Federal Reserve credit (the Fed's asset portfolio) and the Fed's liabilities (the monetary base) to the demands for productive credit (real bills). This real bills restraint would prevent the creation of credit beyond the needs of commerce that would spill over into financial market speculation and initiate a boom-bust cycle. The real bills doctrine was harmless as long as the Fed followed the rules of the international gold standard. However, prompted by this doctrine, the Fed departed from those rules in 1919-1920 and 1928-1933.[21] In the first instance, floating exchange rates isolated the rest of the world from the resulting U.S. deflation. Later, after 1928 with a reconstructed gold standard, U.S. monetary policy turned domestic deflation into worldwide deflation.

The events leading to the Great Depression began when the Fed raised interest rates in order to bring down the stock exchange. Its free-reserves procedures set money market rates as the sum of the discount rate and a markup over the discount rate that varied positively with the amount of discount window borrowing. Despite the worsening recession, the Fed kept the level of market rates at a level intended to prevent reemergence of stock market speculation. In fall 1931, the Fed raised the discount rate in response to gold outflows triggered by Britain's departure from gold. It wanted to maintain control of bank lending for the time when the economy and bank credit would revive and monetary policy could again become active. That meant maintaining positive discount window borrowing, which together with a positive discount rate meant keeping the interest rate positive. The monetary contraction that led initially to recession became depression when a self-reinforcing cycle set in of deflation, expected deflation, the transformation of positive nominal rates into high real rates, and monetary contraction.

Two events ended the first of the two recessions that defined the Great Depression. First, with the final wave of bank failures in the winter of 1933, banks began to accumulate excess reserves as a source of funds alternative to the discount window. Fear of "inflationist" legislation in Congress checked sentiment within the Fed for open market

sales to absorb the excess reserves. When banks had accumulated sufficient reserves, they no longer required access to the discount window to meet their reserve needs and the Fed's free-reserves procedures no longer determined market rates. The Fed then basically withdrew as a central bank and confined itself to maintaining the size of its government securities holdings at a fixed level. With the Fed sidelined, the monetary base became exogenous.

Second, Roosevelt's attempt to raise the domestic price level by raising commodity prices initiated an expansionary monetary policy in two ways. Gold purchases along with the prohibition on the export of gold increased wholesale prices and replaced the expectation of deflation with inflation. High positive real rates became negative. Dollar devaluation in early 1934 combined with political unrest in Europe to create gold inflows that augmented the monetary base and money. The economy then grew vigorously until 1937.

In 1936 and 1937, the Fed acted on its desire to reduce banks' excess reserves and force them into the discount window again through a series of increases in required reserves. Money stopped growing and recession replaced recovery. A chastened Fed again withdrew as a central bank and monetary base growth continued. In 1938, deflation and expected deflation returned. However, without an interest rate peg, expected deflation was stimulative not contractionary.

Because monetary velocity was approximately constant, rapid money growth translated into growth in aggregate nominal demand. With actual and expected deflation, growth in nominal demand appeared as growth in real output.

After the United States entered World War II, the Fed formally surrendered control of monetary policy to the Treasury by committing to a cap on bond rates of 2.5 percent. With the March 1951 Treasury-Fed Accord, the Fed again began to operate as a central bank. William McChesney Martin created the modern central bank. In the changed intellectual environment after World War II, he focused on macroeconomic rather than asset price stabilization. With the 1953 recession, he began implementation of the LAW procedure where the FOMC lowered money market rates in measured steps in response to sustained declines in resource utilization rates, and conversely for economic strength. The discipline on changes in the FOMC's interest rate instrument came from the desire to maintain the expectation of price stability.

Martin retained the real bills concern for speculative psychology, but with two momentous changes. First, he focused on goods price, not asset price, stability. Second, he looked to the bond market not the stock market for evidence on expectations. With the end of the ceiling on bond rates in March 1951, the Martin Fed worked to make the government bond market into the world's largest market for liquidity. The

Bills Only policy of not conducting open-market operations in the bond market made that market into a useful measure of investor sentiment. Especially after price stability gave way to inflation in 1956, Martin believed that to prevent the emergence of inflationary psychology and inflation the FOMC needed to begin raising short-term interest rates at the onset of economic recovery. That belief became the flashpoint with the Kennedy and Johnson CEA's, which believed that the Fed should wait to raise rates until the output gap neared zero (unemployment neared 4%), and then only if the government did not deal with excess demand through restrictive fiscal policy.

The pressure for stimulative monetary policy began with passage of the 1964 tax cut. Martin's statement that the Fed would not finance a tax cut created a congressional backlash. The LBJ White House and Democratic Congress united in opposition to rate increases. Because of the Democratic appointees to the Board made in the Kennedy and Johnson administrations, Martin could not count on a united Fed Board. With his own house divided, he could not defy the political system. He then worked with the Treasury to find a compromise. If the White House would send legislation to Congress to raise taxes and if Congress would pass it, Martin would not raise interest rates.

A balanced budget would remove the pressure for higher rates. Martin misjudged the time required to pass the tax

surcharge, which finally passed in June 1968, and rapid money growth continued unabated. With inflation rising to 6% in 1969, the Martin FOMC raised rates with the intention of keeping them high until restrictive monetary policy vanquished inflationary expectations and inflation. However, Martin's term ended in February 1970 and Burns succeeded him before the restoration of price stability.

Burns mixed views from his days as head of the NBER and views popular in the business community. He did not view the price system as equilibrating the macro economy and he believed cost-push pressures drove inflation. Although criticized at the time by Keynesians as insufficiently stimulative, monetary policy conformed to Keynesian prescriptions. To reduce unemployment, during economic recoveries monetary policy was stimulative. Belief in the cost-push origin of inflation induced the FOMC to accommodate rising inflation while advocating incomes policies.

As head of the NBER, Burns had continued Wesley Clair Mitchell's program of providing a taxonomy of the business cycle aptly described by Koopmans (1947) as measurement without theory. The psychology of the businessman through waves of optimism and pessimism drove the business cycle rather than shocks equilibrated by the price system (Hetzel 1998). Burns attributed stagflation (the simultaneous occurrence of inflation and unemployment above 4 percent) to

cost-push forces, especially labor union militancy. He believed that a combination of incomes policies (wage controls in the extreme form) and a balanced budget would lower inflation and spur economic recovery simultaneously by changing the psychology of the businessman. Freed from the uncertainty over future labor costs, business would initiate an investment boom. Discipline in government fiscal policy would restore discipline to wage negotiations.

As a result of these views, Burns wanted to influence incomes policies and fiscal policy and was cautious not to offend Congress or the White House. The result was inertia in funds rate increases during economic recovery when the unemployment rate was cyclically high, procyclical money growth, and a ratcheting up of inflation over the business cycle. Burns shared the belief with Keynesians that reducing inflation through monetary policy would require an extended period of high, socially unacceptable unemployment. As a result, there was a policymaking consensus to deal with inflation through incomes policies.

According to the monetary view, the central bank should follow a rule that stabilizes the actual value of a nominal variable by stabilizing its expected value and that allows the real interest rate to vary in a way that respects the working of the price system. Neither real bills nor stop-go policy stipulated a role for the central bank to actively manage the

monetary base to stabilize the value of a nominal variable and neither respected the working of the price system. With stop-go, the presumed existence of cost-push inflation led to a variant of the real bills view that the market should determine the monetary base. Cost-push inflation supposedly required the Fed to accommodate inflation with money growth to avoid high unemployment. As a result, inflation drifted upward. The objective of low unemployment produced cyclical inertia in the funds rate. Stop-go superseded rather than respected the working of the price system. The story of monetary policy in the United States has not been how the Fed learned to manage the economy but rather how the discipline imposed by creation of a stable nominal anchor led to rule-like procedures that allowed the interest rate to play its role in the price system.

By 1979, the residual assumption of inflation stationarity left over from a commodity standard gave way to unmoored inflationary expectations ratcheted upward periodically by inflation shocks and above-trend real growth. Under Volcker, the objective of policy changed from low, stable unemployment to low, stable inflation. To achieve this result, the FOMC changed its intermediate target from an output gap to expected inflation. Initially, Volcker attempted to achieve the credibility required for nominal expectational stability by public commitment to achieving

money targets. However, financial deregulation made M1 an unsatisfactory proxy for aggregate nominal demand and the FOMC dropped its M1 target in fall 1982.[22]

In 1983, the FOMC invented its current expected-inflation/growth-gap procedures. They replaced money as the nominal anchor with the expectation of low, stable inflation as measured by the behavior of long-term bond rates. These procedures evolved as a pragmatic response to the discipline required to reestablish nominal expectational stability. The desire to reduce the inflation premium in long-term bonds constituted one discipline. The other was the desire to eliminate the positive correlation created in the stop-go period between expected trend inflation and positive real and inflation shocks. The desire to restore nominal expectational stability imposed a discipline on FOMC decision-making that gave it a rule-like character.[23]

Above-trend growth in the 1983-1984 economic recovery produced an increase in expected trend inflation (proxied for by a sharp increase in bond rates). The need to respond promptly to strong real growth to stabilize expected inflation effectively gave the FOMC a growth gap indicator for changing the funds rate (borrowed reserves). That is, the FOMC began to raise the funds rate in a measured way in response to persistent increases in resource utilization regardless of the level of the unemployment rate. With stop-go, the FOMC had

attempted to manipulate an output gap to control unemployment by raising rates only long after the gap had begun to decline. With its new procedures, the change in the unemployment rate became an indicator variable and the FOMC effectively turned over economic stabilization and determination of the unemployment rate to the price system.

Greenspan made working down the level of the long-term bond rate an objective in the recovery from the 1990 recession. The result was the “jobless” recovery. The FOMC confronted inflation shocks in 1990 with the invasion of Kuwait by Iraq and again in 2004-2006. In the first, it delayed significant reduction in the funds rate despite the recession. In the second, it raised the funds rate in a persistent way despite the apparent faltering on two occasions in economic recovery. For Greenspan, 1994 was the equivalent of Volcker’s 1983. In 1994, the FOMC raised the funds rate strongly in response to above-trend growth accompanied by a sharp rise in bond rates. By 1995, the Fed finally restored credibility to monetary policy encapsulated in the belief that in response to shocks the FOMC would move the funds rate by whatever amount required to leave trend inflation unchanged. The Fed’s considerable success in reestablishing a nominal anchor has appeared in the relative stability of the five-year, five-year-ahead inflation compensation number inferred from yields on ten- and five-year nominal and TIPS Treasury

yield spreads. By allowing the price system to work to determine unemployment while assuming sole responsibility for inflation, the new procedures turned stop-go on its head.

Markets impose two sorts of discipline on the central bank to maintain the policy rule. First, the central bank likes stability in bond markets. Second, because it does not like to disappoint markets, it attempts to inform them of its evaluation of emerging trends so that markets can anticipate the next policy action. At the same time, markets understand the basic LAW rule. If the central bank, say, failed to respond to sustained strength in the economy, markets would question its inflation resolve and inflation premia in bond rates would rise. To avoid this situation, central banks attempt not to “get behind the curve,” that is, lag behind the increase in rates the market expects.

The advantage of the monetary history related above over a nonmonetary history is the ability to dispense with ad hoc, inflation shocks to explain the combination of monetary and real instability.[24] The monetary theory is then more useful for prediction. The monetary history requires only an explanation of how monetary policy evolved in the context of the contemporaneous intellectual and political environment. Of course, real factors produce economic fluctuations. However, the price system is extraordinarily hardy if monetary policy is not forcing deflation (Friedman 1977).[25]

IV. Concluding comment

The advice from the quantity theory is to attribute to the central bank that for which the central bank is responsible and to the market that for which the market is responsible. With respect to the first injunction, the central bank must manage its liabilities to maintain a nominal anchor. With an interest rate instrument, the nominal anchor is the expectation that trend inflation will remain equal to the central bank's inflation target. To maintain credibility, the central bank must stand ready to "shock" the economy by raising the funds rate (contracting the monetary base) if expected inflation exceeds its target. With credibility, however, it need never create excess unemployment.

With respect to the second injunction, the central bank must move the funds rate in a way that respects the role played by the interest rate in the price system. It raises the funds rate in a measured, persistent way in response to sustained increases in resource utilization rates. The two parts of the rule combine through the discipline placed on LAW funds rate changes by the requirement that in response to shocks financial markets believe that the rate changes will cumulate to whatever amount required to maintain trend inflation unchanged.

Central banks have adopted similar procedures organized around inflation targeting, but they have not articulated a

vision of a central bank. Do they manage the economy through an ongoing discretionary trade off between excess unemployment and the change in inflation? Do they control the commanding heights of the economy and the price system through control of the real interest rate? Alternatively, do central banks follow a rule that stabilizes prices by controlling their expected value while allowing the private sector to determine output and unemployment? Are they part of the broad constitutional framework for allowing free markets to work?

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The Monetary Policy of the Federal Reserve: A History

Table of Contents

[1] Economists have estimated a reduced-form Taylor rule: a regression of the funds rate on inflation and an output gap. There are two problems with the implicit assumption that goodness of fit implies a structural relationship (an identified reaction function). First, there is no documentary evidence that the FOMC ever organized decision making around such a functional form. For one thing, contemporaneous estimates of the output gap are highly problematic. Second, the relationship is not identified. Expected inflation controls the behavior of the left-hand-side variable (the funds rate) and the right-hand-side variable (inflation). The experience of the author is that Taylor-rule regressions always fall apart when estimated as first differences. That fact suggests that the relationship between the dependent and independent variables is dominated by a common trend. Perhaps the most misleading aspect of Taylor rules is the assumption that central banks have available a formula for setting the funds rate (the sum of a fixed real rate plus adjustments for the magnitude of the output gap and the miss from the inflation target). (See Hetzel, forth. Ch. 22.)

[2] References are legion. As an example of a policymaker, see Burns (1979) and for an academic see Modigliani (1976).

[3] Neither version offers a completely satisfactory guide to policy. Neither can explain the behavior of the real interest rate and neither incorporates the significant learning that had to occur because of the erratic evolution of the monetary standard. Nevertheless, policy requires a decision about which one better interprets historical experience.

[4] In the V-G era, the FOMC did not follow a rule in the sense of having explicit objectives and an announced strategy for achieving those objectives. It also departed from the procedures described here at the time of the Louvre Accord and the Asia crisis (Hetzel forth., Chs. 14, 17, 18 and 19). For the V-G era, the term “rule” as used here should be understood as the distillation of the systematic part of monetary policy.

[5] Documentation for this view is in Hetzel (2004, 2005, and 2006) and Hetzel (forth., especially chapters 1, 5, 13, 14, 15, 21 and 22). On stop-go, see Hetzel (forth., Chapters 7, 8, 11, 12, 22, 23 and 24).

[6] Following Lucas (1972), Kydland and Prescott (1977), and Barro and Gordon (1983), which emphasize the optimization problem solved by agents whose behavior depends upon the expected future actions of the central bank, an emerging professional consensus favors rules and commitment.

[7] If “money” is the monetary base (the liability side of the central bank’s balance sheet), real money is well measured apart from issues of how to construct the price level. Broader measures capturing wider measures of liquidity may not be well-defined econometrically. Although clearly relevant for issues such as the implementation of policy, e.g., whether money is useful as an indicator or an intermediate target, the fundamental issue of the monetary character of prices is not affected by the econometric stability of real money demand.

[8] Stop-go was a real world counterpart. FOMC procedures did a poor job of causing the real funds rate to track the natural rate. (The natural rate is the real interest rate consistent with complete price flexibility or equivalently with the operation of the real business cycle core of the economy.) As a result, monetary emissions forced a continuous, unpredictable evolution of prices.

[9] Although information on the money stock may be available, the volatility and interest sensitivity of real money demand render money a poor predictor of prices. In foreign countries in cases of very high inflation, price setters coordinate on the dollar exchange rate to get relative prices right.

[10] This Hayekian (1945) economization on the information needed by firms to determine market-clearing relative prices makes possible the specialization in production that engenders Smithian (1776) wealth creation. With a monetary shock that forces an unpredictable change in the price level, firms lack the information necessary to set dollar prices in a way that both causes relative prices to coordinate production efficiently and collectively endows nominal money with the purchasing power desired by the public.

[11] The auctioneer operates only in response to monetary shocks. He knows the real business cycle core of the economy and knows when the central bank has set the funds rate so that the real rate differs from the natural rate.

[12] Friedman ([1968] in (1969)) and Lucas (1972) argued for nonneutrality arising from unanticipated/anticipated effects rather than short-run/long-run effects. From the former perspective, nonneutrality reflects a coordination failure.

[13] Quantity theorists assume that absent a monetary policy that forces unpredictable changes in prices the price system works well to maintain macroeconomic equilibrium (Humphrey 1999).

[14] The FOMC could observe money growth for evidence of misalignment between the real funds rate and the natural rate. With the real rate below the natural rate, money growth will

rise. However, given the volatility in money demand, the time required to establish a trend rise is excessively long.

[15] From the monetary perspective, a rule that allows the price system to work accounts for the nominal and real stability of the Great Moderation. In contrast, the nonmonetary view, which works off Phillips curve relationships, predicts that increased stability in prices requires increased variability in output.

[16] According to the nonmonetary view, in response to inflation shocks, the central bank should discretionarily choose how to trade off between creation of excess unemployment and the change in inflation. This exercise of discretion would increase the public's difficulty of forecasting the future values of prices and output and would thus destabilize their contemporaneous values. Lucas (Lucas [1980] in (1981)) makes the general argument for rules rather than discretion.

[17] Again, the demand for real money need not be econometrically stable, just well defined.

[18] This section summarizes Hetzel (forth.). Rather than document each statement, I provide this book's table of contents. The reader can go to the relevant chapters in the book for documentation.

[19] The next step is to use the model to structure the policy process as a forecasting exercise contingent on the chosen rule. Ex post, policymakers can then compare their forecast with the realized outcome. This step requires a willingness to state an explicit inflation target and an explicit strategy for achieving it.

[20] Under the gold standard, the real (goods) price of gold tied down the ratio of the fixed dollar (par) price of gold to the British (world) price level. The real terms of trade tied down the ratio of the British (world) price level to the U.S. price level. The equilibrating variables were the British (world) price level and the ratio of the British (world) price level to the U.S. price level. Given the par value of gold, the market determined the U.S. price level and the monetary base. The par values of gold for the dollar and for the pound (world) gave the U.S. price level a well-defined value. If U.S. prices rose above this value, the United States would lose gold and U.S. prices would fall.

[21] By sterilizing gold inflows (and raising the real price of gold) rather than allowing inflows to raise the money stock and prices, the Fed forced deflation on gold standard countries. Policymakers, however, believed that deflation

resulted from the collapse of commodity and stock market speculation. They believed that the Fed needed to maintain the confidence of the businessman in the gold standard by raising interest rates in response to gold outflows.

[22] Financial deregulation in 1980 made the demand for M1 interest-sensitive. As a consequence, for a given money growth rate, cyclical variation in real economic activity and interest rates would have reintroduced procyclicality in monetary policy by making M1 velocity vary positively with growth of aggregate demand.

[23] Forward-looking price-setters faced with shocks form their expectation of the future price level based on their expectation of the future behavior of the central bank. As a result, to stabilize expected inflation, the FOMC had to follow consistent (rule-like) behavior to alter the expectational behavior inherited from the stop-go period (Lucas [1980] in (1981)).

[24] Velde (2004) highlights the issues through the title “Poor Hand or Poor Play.” Did the instability in the stop-go era derive from exogenous shocks or monetary policy and did the increased stability after 1983 reflect a lessening of exogenous shocks or an improvement in monetary policy? Sims and Zha (2006) explain the contrast between pre- and post-1983 stability through the coincidence of exogenous shocks. The persistence of considerable economic stability given the number and magnitude of shocks in recent years has made their explanation less attractive. Those shocks include the Asia crisis, a huge decline in equity wealth starting in 2000, the 9/11 terrorist attack, corporate governance scandals, geo-political uncertainty especially in the Middle East, and an oil price shock.

[25] For example, the economy recovered strongly starting in 1933 when the breakdown in the Fed’s free reserves procedures permitted positive money growth. Certainly, many real factors exacerbated the Great Depression, especially, bank failures that destroyed credit relationships and restrictions on international trade like the Smoot-Hawley tariff. However, countries not experiencing bank failures suffered equally with countries that did. Tariffs restricted trade for all countries, but different countries experienced different degrees of economic downturn. The choice of whether to adhere to or abandon a gold standard that forced deflation provided a simple explanation of differences in economic performance across countries. In 1920-1921, with floating exchanges in force because of the suspension of the international gold

standard, U.S. deflation and recession did not propagate internationally. Britain began its recession when it returned to the gold standard in 1925. In 1931, deflation ended and economic recovery resumed in the countries that left the gold standard in contrast to the countries that remained on it and endured continued deflation (Eichengreen 1995).