

Monetary Policy in the 2008–2009 Recession

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Powerful real shocks combined to buffet the economy in 2007 and 2008. A combination of a fall in housing wealth from declining house prices and a fall in real income from increasing energy and food prices made individuals worse off. Although a moderate recession began at the end of 2007, it intensified in the summer of 2008. Based on the view that dysfunction in credit markets intensified the recession, monetary policy has focused on intervention into individual credit markets deemed impaired.

The alternative explanation offered here for the intensification of the recession emphasizes propagation of the original real shocks through contractionary monetary policy. The intensification of the recession followed the pattern of recessions in the stop-go period of the late 1960s and 1970s, in which the Fed introduced cyclical inertia in the funds rate relative to changes in economic activity. For example, in late 1973 and early 1974, an inflation shock because of an oil-price rise and the end of price controls reduced real income. The recession that began in November 1973 intensified in the late fall of 1974. In the summer of 1974, the Fed backed away from its procedures calling for reductions in the funds rate in response to deteriorating economic activity (Hetzel 2008a, Ch. 10). However, with a funds rate that peaked in July 1974 at 13 percent, the Fed eventually had ample room to lower significantly the nominal and real funds rate. What is unusual about the current period is the zero-lower-bound (ZLB) constraint that arises with a zero-funds rate.

The argument advanced here is that in the summer of 2008 the Federal Open Market Committee's (FOMC) departure from its standard procedures

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calling for reductions in the funds rate in response to deteriorating economic activity produced a monetary shock that exacerbated the recession. Such an argument involves a “what if?” counterfactual about policy. The complexity of forces affecting economic activity renders the validity of policy counterfactuals for individual episodes uncertain. Nevertheless, the explanation advanced here for the intensification of the recession falls into a longer-run pattern of recessions. The spirit of this article is to use empirical generalizations deduced from historical experience and constrained by theory so that they are robust for predicting the consequences of monetary policy. The two contenders matched here are the credit-cycle view and the quantity-theory view of cyclical fluctuations. The credit-cycle view explains cyclical movements in output as a consequence of speculative booms leading to unsustainable levels of asset prices and leveraged levels of asset holdings followed by credit busts that depress economic activity through the impairment caused to the functioning of financial intermediation from insolvencies and deleveraging. The quantity-theory view explains significant cyclical movements in output as a consequence of monetary disorder deriving from the introduction by central banks of inertia in adjustment of the interest rate to shocks.

Section 1 summarizes these two alternative frameworks for understanding cyclical fluctuations. Section 2 provides an intuitive overview of the quantity-theory framework. Section 3 provides an empirical characterization of the evolution of monetary policy, which relates that evolution to the degree of cyclical instability in the economy. Using this empirical generalization, Section 4 argues that monetary policy became contractionary in the summer of 2008. Section 5 makes normative recommendations for monetary policy faced with the ZLB constraint and argues for the creation of institutional arrangements that replace discretion with rules. Section 6 argues that, for a productive debate on institutional arrangements to occur between academic economists and policymakers, the latter will have to use the language of economics. An appendix, “Lessons from the Depression,” uses the Depression as a laboratory for distinguishing between the efficacy of credit-channel and money-creation policies.

1. WHAT IS THE RIGHT FRAMEWORK FOR THINKING ABOUT MONETARY POLICY?

Very broadly, I place explanations of cyclical fluctuations in economic activity into two categories. The first category comprises explanations in which real forces overwhelm the working of the price system. According to the credit cycle, or “psychological factors,” explanation of the business cycle, waves of optimism arise and then inevitably give way to waves of pessimism. These swings in the psychology of investors overwhelm the stabilizing behavior of the price system. “High” interest rates fail to restrain speculative excess while

“low” interest rates fail to offset the depressing effects of the liquidation of bad debt. In the real-bills variant, central banks initiate the phase driven by investor optimism through “cheap” credit (Hetzel 2008a, 12–3 and 34). Speculation in the boom phase drives both asset prices and leveraging through debt to unsustainable levels. The inevitable correction requires a period of deflation and recession to eliminate the prior speculative excesses. At present, this view appears in the belief that Wall Street bankers driven by greed took excessive risks and, in reaction, became excessively risk-averse (Hetzel 2009b).

Within this tradition, Keynesianism emerged in response to the pessimistic implication of real bills about the necessity of recession and deflation as fore-ordained because of the required liquidation of the excessive debts incurred in the boom period. As with psychological-factors explanations of the business cycle, investor “animal spirits” drove the cycle. The failure of the price system to allocate resources efficiently, either across markets or over time, produced an underemployment equilibrium in which, in response to shocks, real output adjusted, not prices. In a way given by the multiplier, real output would adjust to the variations in investment driven by animal spirits. The Keynesian model rationalized the policy prescription that, in recession, government deficit spending (amplified by the multiplier) should make up for the difference between the full employment and actual spending of the public. Monetary policy became impotent because banks and the public would simply hold on to the money balances created from central bank open market purchases (a liquidity trap).

Another variant of the view that periodically powerful real forces overwhelm the stabilizing properties of the price system is that imbalances create overproduction in particular sectors because of entrepreneurial miscalculation. When these mistakes reinforce each other, an inventory correction inevitably occurs. Recession lasts until the correction of the prior imbalances has occurred. Monetary policy possesses only limited ability to offset the resulting swings in output.

At present, the real-bills variant of the psychological-factors view of cyclical instability explains the focus of monetary policy on subsidizing intermediation in financial markets judged dysfunctional. According to this view, financial market dysfunction because of prior speculative excess manifests itself in the apparent failure of investors to arbitrage disparate returns across markets and the apparent failure of banks to arbitrage the marginal cost of borrowing and the marginal return to lending. Contrary to the pessimistic real-bills view that a period of recession and deflation must inevitably accompany correction of the prior excesses of a speculative bubble and analogous to the Keynesian critique of real bills, the assumption of policymakers is that government can shorten the adjustment period by taking losses off the private balance sheets of banks, for example, by recapitalizing banks. Also, central

banks can directly replace the intermediation formerly provided by the private market.

Accordingly, after the FOMC's reduction of the funds rate to near zero in December 2008, many policymakers began to characterize monetary policy in terms of financial intermediation, that is, in terms of the Fed's purchases of debt in particular credit markets and how those purchases affect the cost of credit. The premise for this credit-channel view of the transmission of monetary policy is the existence of frictions in financial markets accompanied by negative externalities, which the central bank can mitigate by taking risky debt into its own portfolio. At the same time, in the spirit of the Keynesian liquidity trap, with a near-zero-funds rate, the resulting behavior of the monetary base (currency held by the public and commercial bank deposits at the Fed) possesses no implications for aggregate demand because banks and the public are operating on a flat section of their demand schedules where the monetary base and the debt acquired through open market operations are perfect substitutes.

In the second class of explanations of cyclical fluctuations, the price system generally works well to maintain output at its full employment level. In the real-business-cycle tradition, the price system works well without exception. In the quantity-theory tradition, it does so apart from episodes of monetary disorder that prevent the price system from offsetting cyclical fluctuations. Milton Friedman (1960, 9) explicated the latter tradition:

The Great Depression did much to instill and reinforce the now widely held view that inherent instability of a private market economy has been responsible for the major periods of economic distress experienced by the United States. . . . As I read the historical record, I draw almost the opposite conclusion. In almost every instance, major instability in the United States has been produced or, at the very least, greatly intensified by monetary instability.

An implication of the quantity-theory view that the price system works efficiently to allocate resources is that investors arbitrage risk-adjusted yield differences among financial markets. While the frictions that operate in financial markets may become a greater impediment to intermediation in recession, these frictions derive from the general environment of economic uncertainty. There is little the central bank can do with credit market interventions apart from rearranging risk premia among different markets. In December 2008, the relevant friction was with the existence of money that created a ZLB constraint on the level of the interest rate. Even with a zero-funds rate, given the expectation of low inflation, the real interest rate, which becomes the negative of expected inflation, may be too high to offset the pessimism of individuals about their future income prospects. Nevertheless, through the creation of reserves resulting from the aggressive purchase of illiquid assets, the central bank can push banks and the public out of the flat section of their money

demand schedules and stimulate asset acquisition and expenditure through portfolio rebalancing by the public.¹

Attribution of a particular recession to one of these two broad categories is inevitably problematic because of the large number of special factors at work. The claim made here is that the current recession adds one observation favorable to the quantity-theory or monetary-shock explanation of the business cycle. Whether readers find that explanation convincing will depend upon whether they interpret the long-run historical record as supporting this view.

The debate is perennial and appears in interpretation of the monetary transmission process going from central bank actions to the spending of the public. Should one understand it from the perspective of the ability of the central bank to influence conditions in credit markets or from the perspective of central bank control over money creation? John Maynard Keynes ([1930] 1971, 191) highlighted the two views:

A banker...is acting both as provider of money for his depositors, and also as a provider of resources for his borrowing-customers. Thus the modern banker performs two distinct sets of services. He supplies a substitute for State Money by acting as a clearing-house and transferring current payments...But he is also acting as a middleman in respect of a particular type of lending, receiving deposits from the public which he employs in purchasing securities, or in making loans...This duality of function is the clue to many difficulties in the modern Theory of Money and Credit and the source of some serious confusions of thought.

2. A HEURISTIC DISCUSSION OF A QUANTITY THEORY FRAMEWORK

The quantity theory guides the formulation of empirical generalizations deduced from historical experience and constrained by theory so that they are robust for predicting the consequences of monetary policy. The heart of the quantity theory is the nominal/real distinction that derives from the assumption that individual welfare depends only upon real variables (physical quantities and relative prices). It follows that in a world with fiat money central banks

¹ Friedman ([1961] 1969, 255) explains the portfolio rebalancing that occurs when the central bank undertakes open-market purchases and how that rebalancing stimulates expenditure: "The [public's] new balance sheet [after an open-market purchase] is in one sense still in equilibrium...since the open-market transaction was voluntary....An asset was sold for money because the terms were favorable; however...[f]rom a longer-term view, the new balance sheet is out of equilibrium, with cash being temporarily high relative to other assets. Holders of cash will seek to purchase assets...The key feature of this process is that it tends to raise the prices of sources of both producer and consumer services relative to the prices of the services themselves: for example, to raise the prices of houses relative to the rents of dwelling units, or the cost of purchasing a car relative to the cost of renting one. It therefore encourages the production of such sources (this is the stimulus to 'investment'...) and, at the same time, the direct acquisition of services rather than the source (this is the stimulus to 'consumption'...)."

have to give nominal (dollar-denominated) variables well-defined values. Beyond this fundamental implication, Friedman used the nominal/real distinction to give the quantity theory empirical content through two empirical generalizations. First, Friedman ([1963] 1968, 39) argued that inflation is “always and everywhere a monetary phenomenon.” Specifically, the rate of inflation depends positively upon the rate of money growth. Second, Friedman ([1963] 1968, 34–5; [1968] 1969) argued that, while unexpected inflation can stimulate output, expected inflation cannot. That is, the central bank cannot exercise systematic or predictable control over real variables (the natural-rate hypothesis). Nevertheless, monetary instability, which Friedman measured using fluctuations in the money stock relative to steady growth, destabilizes real output.

These empirical generalizations require reformulation for the world of unstable money demand that prevailed in the United States after 1980 (Hetzel 2004, 2005, 2006, 2008a, 2008b). The first generalization appears in the assumption that central banks determine trend inflation through their (explicit or implicit) inflation targets. The “monetary” character of inflation, which entails denial of exogenously given powerful cost-push forces that raise prices, implies that central banks can achieve their target for trend inflation without periodic recourse to “high” unemployment. The second generalization appears in the assumption that monetary stability requires that the central bank possess consistent procedures (a rule) that both allow the price system to work and that provide a nominal anchor (give the price level a well-defined value). As explained in Section 3, I characterize these procedures as “lean against the wind with credibility.” Furthermore, I argue that the Fed departed from this rule in the summer of 2008 by failing to lower the funds rate in response to sustained weakness in economic activity.

An essential quantity-theory assumption is that central banks are special because of their monopoly over creation of the monetary base—the money used to effect finality of payment among banks (deposits with the Fed) or among individuals (currency). A central bank is not simply a large commercial bank engaged in intermediating funds between savers and investors. It follows that the central bank controls the behavior of prices through procedures that provide for monetary control. For a central bank using the short-term interest rate (the funds rate) as its policy variable, monetary control imposes a discipline that derives from the role played by the real interest rate in the price system. This discipline takes the form of procedures that must respect Friedman’s natural-rate hypothesis, that is, the assumption that the central bank cannot systematically control real variables, like the real interest rate. The implication is that monetary policy procedures must stabilize expected inflation so that changes in the central bank’s nominal funds rate target correspond to predictable changes in the real funds rate. These procedures must then cause the real funds rate to track the “natural” interest rate. The natural

interest rate is the real interest rate consistent with an amount of aggregate demand that provides for market clearing at full employment. The real interest rate provides the incentive for individuals to change their contemporaneous demand for resources (consumption and investment) relative to that demand in the future in a way that smooths changes in output around trend.

Price theory yields useful intuition for the natural interest rate. Imagine supply and demand schedules for the wheat market. There exists a well-defined dollar price for wheat that clears the market. Similarly, there exists such a dollar price for barley. The ratio of these dollar prices yields a relative (real) price (the barley price of wheat) that clears the market for wheat. If the government uses a commodity-price stabilization program to fix the price of wheat, it will either need to accumulate wheat or to supply it depending upon whether it fixes a price above or below the market-clearing price.

For a central bank with an interest rate instrument, the relevant price is the real rate of interest—the price of resources today measured in terms of resources promised or foregone tomorrow. Note that this price is an intertemporal price whose determination requires analysis in a multiperiod model. Furthermore, the central bank does not create wealth but creates the monetary base, which derives value from its role as a temporary abode of purchasing power. Although money facilitates exchange, it possesses no intrinsic value. Individuals accept money today in return for goods, which satisfy real wants, only because they believe that others will accept goods for money tomorrow. Stability of prices requires the expectation of future stability. Just as with the real interest rate, this intertemporal dimension to the price of money (or the money price of goods—the price level) will also require a multiperiod model. It follows that the public's expectations about the future are essential and that a characterization of central bank policy must elucidate the systematic behavior that shapes these expectations.

Analogously with the market in wheat, if the central bank sets an interest rate that is too low, it will have to create money. Conversely, an interest rate set too high will require destruction of money. An implication of the quantity theory is that such money creation and destruction will require changes in the price level to maintain the real purchasing power of money desired by the public to effect transactions. The quantity theory receives content through the natural-rate assumption that there is a unique market-clearing real interest rate that lies beyond the systematic control of the central bank. As a condition for controlling prices, the central bank must possess systematic procedures for tracking this natural interest rate.²

² Although the natural-rate hypothesis is associated with the names of Wicksell ([1898] 1962) and Friedman ([1968] 1969), it possesses a long history (Humphrey 1983). The term “natural” goes back to the Bullionist/anti-Bullionist debate of the early 19th century (Hetzel 1987). In the 1970s, the issue was whether central banks faced a menu of unemployment rates associated inversely with inflation. The combination of high inflation and high unemployment in the 1970s supported the

These procedures require consistency (a rule-like character) because of the central role of expectations. What is relevant for macroeconomic equilibrium is not only the real funds rate but also the entire term structure of real interest rates. The central bank requires a procedure for changing the funds rate so that, in response to real shocks, financial markets will forecast a behavior of current and future funds rates consistent with a term structure of real interest rates that will moderate fluctuations of real output around trend. Moreover, these procedures must be credible in that financial markets must believe that, in response to shocks, funds rate changes will cumulate to whatever extent necessary to leave trend inflation unchanged (Hetzel 2006 and 2008b).

Credibility for these procedures allows the central bank to influence the way that firms set dollar prices. Specifically, firms will set their dollar prices based on a common assumption about trend inflation (equal to the central bank's inflation target). Moreover, they do not alter that assumption in response to real or inflation shocks. The combination of assumptions that the price level is a monetary phenomenon (the central bank determines trend inflation) and that expectations are rational (consistent with the predictable part of central bank behavior) implies that the central bank can control the expectational environment in which price setters operate. Given stability in this nominal expectational environment, that is, given credibility, the central bank can then set the real funds rate in a way that tracks the natural interest rate and, as a result, allows the private sector to determine real variables such as unemployment.

From the perspective of the quantity theory, the credit-cycle view of the business cycle leads to the mistaken belief that alternating waves of optimism and pessimism overwhelm the stabilizing role of the real interest rate and, by extension, monetary policy. The reason is because of the association of low interest rates (cheap money) with recession and high interest rates (dear money) with booms. For example, the Board of Governors (1943a, 10) stated:

In the past quarter century it has been demonstrated that policies regulating the...cost of money cannot by themselves produce economic stability or even exert a powerful influence in that direction. The country has gone through boom conditions when...interest rates were extremely high, and it has continued in depression at times when...money was...cheap.

The mistake lies in thinking of monetary policy as stimulative when the funds rate is low or as restrictive when it is high. Instead, the focus should be on whether the central bank possesses consistent procedures (a rule) that

implication of the natural-rate hypothesis that central banks cannot systematically control the level of real variables.

cause the real funds rate to track the natural rate. A low real interest can still exceed the natural rate if the public is pessimistic enough about the future.

3. LAW WITH CREDIBILITY, MONETARY CONTROL, AND MONETARY DISTURBANCES

An implication of the above formulation of the quantity theory is that there exists a policy procedure (a central bank reaction function) that, when adhered to, yields price and macroeconomic stability but that, when departed from, creates instability. That is, a consistent procedure exists that allows the FOMC to move the funds rate in a way that causes the real funds rate to track the natural interest rate and that provides a nominal anchor. The historical overview in Hetzel (2008a), summarized below, argues for such a baseline policy, labeled “lean-against-the-wind with credibility” and developed by William McChesney Martin (FOMC chairman from the time of the March 1951 Treasury-Fed Accord through January 1970). As encapsulated in Martin’s characterization of policy as “lean against the wind” (LAW), the Fed lowers the funds rate in a measured, persistent way in response to sustained decreases in resource utilization rates (increases in unemployment) and conversely in response to sustained increases in resource utilization rates (decreases in unemployment). The Martin FOMC (prior to populist pressures from the Lyndon B. Johnson administration) imposed discipline on the resulting funds rate changes through the requirement that they be consistent with maintaining the expectation of price stability read from the behavior of bond rates (LAW with credibility).

Departures from LAW with credibility correlate with periods of economic instability. After the establishment of the Fed in 1913 and before the 1951 Treasury-Fed Accord, within the Fed, real-bills views predominated. The focus of monetary policy was on limiting the development of asset-price bubbles. The focus on asset prices instead of sustained changes in rates of resource utilization was accompanied by a high degree of economic instability (see Appendix). With LAW, Martin changed the focus of monetary policy from speculation in asset markets to the cyclical behavior of the economy. Also, by looking to bond markets for evidence of “speculative activity” rather than real estate and equity markets, he changed the focus to inflationary expectations and, as a result, credibility for price stability.

Fluctuations in economic activity diminished significantly in the post-Accord period. However, on occasion, the Martin FOMC departed from the nascent LAW-with-credibility procedures. In the period before the August 1957 cyclical peak, the FOMC, concerned about inflation, kept short-term interest rates unchanged despite deterioration in economic activity. Prior to the April 1960 cyclical peak, the FOMC, concerned about balance of payments

outflows, kept short-term interest rates unchanged despite deterioration in the economy. In each case, recession followed.

The period known as stop-go began in 1965 when the political system, despite strong economic growth, pressured the Fed not to raise interest rates and thwart its desire to stimulate the economy through the 1964 tax cuts. FOMC chairmen Arthur Burns (February 1970–March 1978) and G. William Miller (April 1978–July 1979) retained LAW, but imparted cyclical inertia to funds rate changes. After cyclical peaks, the funds rate remained elevated while gross domestic product (GDP) growth declined and money growth fell. After cyclical troughs, the funds rate remained low while GDP growth rose and money growth increased (see Hetzel 2008a, Chs. 23–24). The result was procyclical money growth. The view that powerful cost-push factors drove inflation caused Burns and Miller to allow inflation to drift upward across the business cycle (Hetzel 2008a, Chs. 1, 8, 11). As a consequence, they destroyed the nominal anchor they had inherited in the form of the expectation that inflation would fluctuate around a low level with periods of relatively high rates followed by periods of relatively low rates. Instead, the expectation of trend inflation drifted with real and inflation shocks.

After stop-go monetary policy, FOMC chairman Paul Volcker (August 1979–July 1987) re-created the Martin LAW-with-credibility procedures, albeit with a nominal anchor in the form of the expectation of low, steady inflation rather than price stability. In doing so, he removed the procyclical bias of money growth characterized as “stop-go.” FOMC chairman Alan Greenspan (August 1987–January 2006) continued the Volcker version of LAW with credibility. Both Volcker and Greenspan accepted responsibility for the behavior of inflationary expectations as a prerequisite for controlling inflation. After 1979, given the sensitivity of financial markets to inflation, symbolized by the “bond market vigilantes,” the result was largely to remove the cyclical inertia in funds rate movements that had characterized the earlier stop-go period. The significant degree of economic stability that characterized the Volcker-Greenspan era earned the appellation of The Great Moderation.

However, in the Volcker-Greenspan era, the FOMC departed from the baseline LAW-with-credibility procedures twice. In each instance, mini go-stop cycles ensued. The go phases began with a reluctance to raise the funds rate in response to strong real growth because of a concern that the foreign exchange value of the dollar would rise. The first episode occurred with the Louvre Accord in early 1987 and the second occurred with the Asia crisis, which began in earnest in the fall of 1997 (Hetzel 2008a, Chs. 14, 17–19). Each time, with a lag, inflation began to rise and with the rise in inflation the FOMC responded with significant funds rate increases.³

³ Based on the observation that the funds rate lay below the funds rate forecast by a Taylor rule starting in 2002 (Taylor 2009, Figure 1) and the resulting inference that monetary

LAW with credibility treats the interest rate as part of the price system and creates a nominal anchor by stabilizing the public's expectation of inflation. The LAW characteristic of moving the funds rate in response to sustained changes in rates of resource utilization embodies a search procedure for discovering the natural interest rate. The constraint that financial markets anticipate that, in response to macroeconomic shocks, the Fed's rule will cause funds rate changes to cumulate to whatever extent necessary to prevent a change in the trend inflation rate set by the central bank's (implicit) inflation target creates a nominal anchor in the form of the expectation of low, stable inflation. By maintaining expected inflation equal to its steady (albeit implicit) target for inflation, the Fed controls the nominal expectational environment that shapes the price-setting behavior of forward-looking firms setting prices over multiple periods. Credibility thus allows the Fed to control trend inflation while allowing inflation shocks (relative price changes that pass through to the price level) to cause headline (total or noncore) inflation to fluctuate around trend inflation.⁴

Friedman (1960, 87) proposed a rule for steady money growth because of the assumption that responding directly to inflation creates monetary shocks to the real economy. The LAW-with-credibility rule is in that spirit in that it maintains steady expected trend inflation while allowing the price level to vary because of transitory real and inflation shocks. With the energy price shock that began in the summer of 2004, central banks initially allowed headline inflation

policy was accommodative, Taylor (2009) argues that monetary policy under Chairman Greenspan contributed to the run-up in house prices starting in 2003 (Taylor 2009, Figure 6). Hetzel (2008a, Ch. 22, Appendix) criticizes the use of estimated Taylor rules to characterize FOMC behavior. Estimated Taylor-rule regressions are reduced forms that capture the interrelated behavior of inflation, cyclical movements in the economy, and short-term interest rates, but not structural relationships (an FOMC reaction function) running from the behavior of the economy to the FOMC's funds rate target. One important reason that estimated Taylor rules do not express a structural relationship is the misspecification that arises from omitting a central variable shaping FOMC behavior in the Volcker-Greenspan era, namely, expected inflation. Another problem with Taylor rules is that there are many different ways of measuring the right-hand variables: inflation relative to target, the output gap, and the "equilibrium" real rate that appears in the constant term. One can easily choose these variables to arrive at contradictory assessments of the stance of monetary policy. For example, Mehra (2008, Figure 22) fits the period after 2002 very well using a Taylor rule with core PCE (personal consumption expenditures) inflation.

In 2003–4, the public was pessimistic about the future because of the decline in equity wealth after 2000, the 9/11 terrorist attack with the fear that more attacks were imminent, and the corporate governance scandals such as Enron and WorldCom. At the same time, productivity growth was soaring, perhaps because of the earlier investment in information technology. The economy needed a low real rate of interest (a low cost of consuming today in terms of foregone consumption tomorrow) to provide the contemporaneous consumption and investment demand necessary to absorb the supply of goods coming onto the market. If Taylor were correct that monetary policy was expansionary starting in 2003, inflation would not have remained near the FOMC's implicit inflation target, which I take to be 2 percent core PCE inflation.

⁴ This latter characterization clashes with Taylor-rule prescriptions, which require the central bank to respond directly to realized inflation. According to the characterization here of LAW with credibility, the FOMC does not respond to inflation shocks that exercise only a transitory influence on inflation as long as they leave expectations of trend inflation unchanged (see footnote 3 on the Taylor rule).

to rise. I argue in the next section that the world's major central banks, in the summer of 2008, despite deteriorating economic activity, became unwilling to lower their policy rates because of fear that headline inflation in excess of core inflation would raise inflationary expectations. The resulting monetary stringency turned a moderate recession into a major recession.

The FOMC's LAW-with-credibility procedures possess a straightforward interpretation in terms of monetary control. Through a rule that makes the real funds rate track the natural rate as a consequence of its interest rate target, the Fed accommodates the demand for money associated with trend growth in the real economy. Money growth then equals the following components: (1) an amount consistent with trend real growth; (2) expected trend inflation (the FOMC's implicit inflation target); (3) changes in the demand for money because of changes in market interest rates relative to the own rate on money; (4) random changes in the demand for money; and (5) transitory deviations of headline inflation from trend inflation because of inflation shocks (Hetzel 2005, 2006, and 2008b). If the FOMC departs from such a rule so that the real funds rate does a poor job of tracking the natural rate, as explained by Wicksell ([1898] 1962), the resulting money creation (for a real interest rate below the natural rate) or money destruction (for a real interest rate above the natural rate) will engender instability in the price level.

However, given both instability in money demand and heightened interest sensitivity of money demand since 1981 and, recently, given inflation shocks, money growth has become uninformative about whether monetary policy is expansionary or contractionary measured according to the Wicksellian criterion of central bank success in tracking the real interest rate. As a result, the Friedman (1960) rule for steady money growth is not feasible. The FOMC's pragmatically derived LAW-with-credibility procedures are a better alternative. Even with stability of money demand, as long as the FOMC follows procedures such that the real funds rate tracks the natural rate, money possesses no predictive power for inflation.

4. MONETARY POLICY IN 2008

What caused the appearance of a deep recession after almost three decades of relatively mild economic fluctuations? The explanation here highlights a monetary policy shock in the form of a failure by the Fed to follow a decline in the natural interest rate with reductions in the funds rate.⁵ Specifically,

⁵ The issue of whether Taylor rules usefully characterize FOMC behavior, discussed in footnote 3, should not be an issue in characterizing monetary policy in the summer of 2008. The assessment here that monetary policy became contractionary in the summer of 2008 should be consistent with Taylor-rule assessments. For the period from early 2004 through the summer of 2008, year-over-year percentage changes in the core PCE had remained steady within a narrow range of 2 percent to somewhat less than 2.5 percent. As recorded in the *Minutes* (Board 2008, 5) at

the absence of a funds rate reduction between April 30, 2008, and October 8, 2008 (or only a quarter-percentage-point reduction between March 18, 2008, and October 8, 2008), despite deterioration in economic activity, represented a contractionary departure from the policy of LAW with credibility.⁶ From mid-March 2008 through mid-September 2008, M2 barely rose while bank credit fell somewhat (Board of Governors 2009a). Moreover, the FOMC effectively tightened monetary policy in June by pushing up the expected path of the federal funds rate through the hawkish statements of its members. In May 2008, federal funds futures had been predicting a basically unchanged funds rate at 2 percent for the remainder of 2008. However, by June 18, futures markets predicted a funds rate of 2.5 percent for November 2008.⁷

The U.S. economy weakened steadily throughout 2008. Positive real GDP growth in 2008:Q2 initially appeared reassuring, but the 2.8 percent annualized real growth that quarter was more than accounted for by an unsustainable increase in net exports, which added 2.9 percentage points to GDP growth (“final” figures available at the end of September 2008). By mid-July, it had become apparent that the temporary fillip to consumer expenditure offered

the August 5, 2008, FOMC meeting, “most participants anticipated that core inflation would edge back down during 2009.” Presumably, that would place inflation at or below what I take to be the FOMC’s 2 percent implicit inflation target. Although inflation remained near target, the negative output gap widened. The August 5, 2008, FOMC *Minutes* noted (Board 2008, 4, 6): “[T]he staff continued to expect that real GDP would rise at less than its potential rate through the first half of next year.... [M]embers agreed that labor markets had softened further, that financial markets remained under considerable stress, and that these factors—in conjunction with still-elevated energy prices and the ongoing housing contraction—would likely weigh on economic growth in coming quarters.”

However, the FOMC, focused on a concern that persistent, high headline inflation would raise the public’s expectation of inflation, kept the funds rate unchanged at 2 percent. The August 5, 2008, FOMC *Minutes* note (Board 2008, 6): “Participants expressed significant concerns about the upside risks to inflation, especially the risk that persistent high headline inflation could result in an unmooring of long-run inflation expectations.... [M]embers generally anticipated that the next policy move would likely be a tightening....”

Taylor-rule estimation results available from *Macroeconomic Advisers* (2009) are striking. The “Backward-Looking Policy Rule” graph shows the funds rate forecast falling to -7.3 percent in 2010:Q3. By 2011:Q1, deflation sets in.

⁶ *Macroeconomic Advisers* (2008b, 1), managed by former Fed governor Laurence Meyer and whose publications discuss monetary policy through the perspective of credit markets rather than money creation, also argued that monetary policy was restrictive: “Over the period that ended in April [2008], the FOMC strategy was to ease aggressively in order to offset the tightening of financial conditions arising from wider credit spreads, more stringent lending standards, and falling equity prices. We said that the FOMC was ‘running to stand still,’ in that those actions did not create accommodative financial conditions but were needed to keep them from becoming significantly tighter. Since the last easing [April 2008], however, the FOMC has abandoned that strategy. Financial conditions have arguably tightened more severely since April than during the earlier period, and yet there has been no policy offset. This pattern has contributed importantly to the severe weakening of the economic outlook in our forecast.”

⁷ The Fed was not alone in encouraging the expectation of higher rates. The *Financial Times* (Giles 2008) in a story with the headline, “BIS Calls for World Interest Rate Rises,” reported: “Malcolm Knight, outgoing general manager, and William White, outgoing chief economist, concluded in the report: ‘It is not fanciful, surely, to suggest that these low levels of interest rates might inadvertently have encouraged imprudent borrowing, as well as the eventual resurgence of inflation.’ ”

by the tax rebate had run its course.⁸ Retail sales for June, with numbers available July 15, increased only .1 percent. In mid-July, *USA Today* (2008) ran a front-page headline, “Signs of a growing crisis: ‘Relentless flow’ of bad economic news suggests there’s no easy way out.” From June 2008 through September 2008, industrial production fell 5.4 percent (not at an annualized rate).

The steady weakening in economic activity appeared in payroll employment, which stopped growing in December 2007 and then turned consistently negative. The unemployment rate rose steadily from 4.7 percent in November 2007 to 6.1 percent in September 2008. *Macroeconomic Advisers* (2008c, 1) forecast below-trend growth for 2008:Q3 from May onward (consistently below 2 percent and near zero starting in October). It forecast less than 1 percent growth for 2008:Q4 starting in August and –1 percent starting in October.⁹ *Macroeconomic Advisers* was among the most optimistic of forecasters. The consensus forecasts reported in *Blue Chip Financial Forecasts* (2008) on July 1, 2008, for 2008:Q3 and 2008:Q4, respectively, were 1.2 percent and .9 percent. On August 1, they were 1 percent and .3 percent.

The recession intensified in 2008:Q3 (annualized real GDP growth of –.5 percent). That fact suggests that, prior to the significant wealth destruction from the sharp fall in equity markets after mid-September 2008, the real funds rate already exceeded the natural rate. The huge wealth destruction after that date must have further depressed the natural interest rate and made monetary policy even more restrictive. It follows that the fundamental reason for the heightened decline in economic activity in 2008:Q4 and 2009:Q1 was inertia in the decline in the funds rate relative to a decline in the natural rate produced by the continued fall in real income from the housing price and inflation shock reinforced by a dramatic quickening in the fall in equity wealth.

In 2008, all the world’s major central banks introduced inertia in their interest rate targets relative to the cyclical decline in output. The European Central Bank (ECB) focused on higher wage settlements in Germany, Italy, and

⁸ Governor Kohn (2008, 1–2) characterized the behavior of the economy during the summer of 2008: “During the summer, it became increasingly clear that a downshifting in the pace of economic activity was in train....[R]eal consumer outlays fell from June through August, putting real consumer spending for the third quarter as a whole on track to decline for the first time since 1991. Business investment also appears to have slowed over the summer. Orders and shipments for nondefense capital goods have weakened, on net, in recent months, pointing to a decline in real outlays for new business equipment. Similarly, outlays for nonresidential construction projects edged lower in July and August after rising at a robust pace over the first half of this year....[C]onditions in housing markets have remained on a downward trajectory.”

⁹ *Macroeconomic Advisers* (2008b) wrote: “By abandoning its ‘offset’ approach [of lowering the funds rate in response to tightening conditions in financial markets], the Federal Reserve has allowed financial conditions to tighten substantially.... Another reason why the Fed abandoned its approach is that it has focused primarily on expanding its liquidity policies in recent months. The FOMC believes that liquidity policies are more effective tools for providing assistance to market functioning.... But even if one accepts (as we do) that liquidity tools are better suited for helping market functioning, monetary policy still has to react to changes in the outlook.”

the Netherlands (*Financial Times* 2008) and in July 2008 raised the interbank rate to 4.25 percent. Although annualized real GDP growth in the Euro area declined in 2008:Q1, 2008:Q2, and 2008:Q3, respectively, from 2.8 percent, to –1 percent, to –1 percent, the ECB began lowering its bank rate only on October 8, 2008. In Great Britain, the Bank of England kept the bank rate at 5 percent through the summer, unchanged after a quarter-point reduction on April 10. From 2007:Q4 through 2008:Q3, annualized real GDP growth rates in Great Britain declined, respectively, from 2.2 percent, to 1.6 percent, to –.1 percent, and then to –2.8 percent. (The Bank of England also lowered its bank rate by 50 basis points on October 8, 2008.) In Japan, for the quarters from 2007:Q4–2008:Q3, annualized real GDP growth declined from 4.0 percent, to 1.4 percent, to –4.5 percent, to –1.4 percent. The Bank of Japan kept its interbank rate at .5 percent, unchanged from February 2007, until October 31, 2008, when it lowered the rate to .3 percent. The fact that the severe contraction in output began in all these countries in 2008:Q2 is more readily explained by a common restrictive monetary policy than by contagion from the then still-mild U.S. recession.

In early fall 2008, the realization emerged that recession would not be confined to the United States but would be worldwide. That realization, as much as the difficulties caused by the Lehman bankruptcy, produced the decrease in equity wealth in the fall of 2008 as evidenced by the fact that broad measures of equity markets fell by the same amount as the value of bank stocks. Between September 19, 2008, and October 27, 2008, the Wilshire 5000 stock index fell 34 percent. Over this period, the KBW bank equity index fell 38 percent.¹⁰ Between 2007:Q3 and 2008:Q4, the net worth of households fell 19.9 percent with a fall of 9 percent in 2008:Q4 alone (Board of Governors 2009b). Significant declines in household wealth have occurred at other times, for example, in 1969–1970, 1974–1975, and 2000–2003. However, during those declines in wealth, consumption has always been considerably more stable, at least since 1955 when the wealth series became available. That fact renders especially striking the sharp decline in the growth rate of real personal consumption expenditures from 1.2 percent in 2008:Q2 to –3.8 percent and –4.3 percent in 2008:Q3 and 2008:Q4. This decline in consumption suggests that the public expected the fall in wealth to be permanent. The sharp rise in the unemployment rate from 5.0 percent in April 2008 to 8.1 percent in February

¹⁰ The failure of Lehman Brothers on September 15, 2008, created uncertainty in financial markets. Hetzel (2009a) argues that the primary shock arose from a discrete increase in risk due to the sudden reversal of the prevailing assumption in financial markets that the debt of large financial institutions was insured against default by the financial safety net. A clear, consistent government policy about the extent of the financial safety net would likely have avoided the uncertainty arising from market counterparties suddenly having to learn which institutions held the debt of investment banks and then having to evaluate the solvency of these institutions. Nevertheless, the turmoil in financial markets and the losses incurred by banks would likely have been manageable without the emergence of worldwide recession.

2009 added to individual pessimism and uncertainty about the future. These factors must have produced a decline in the natural rate.

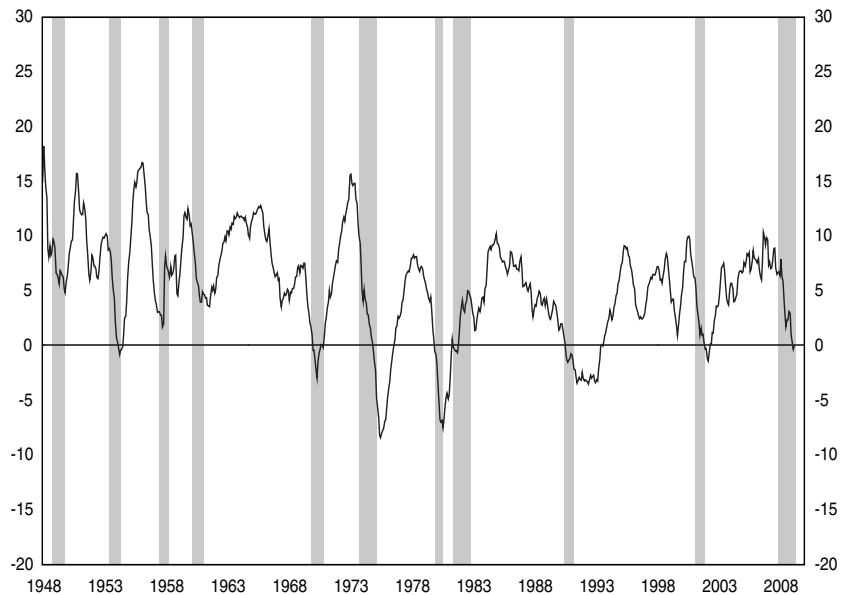
Restrictive monetary policy rather than the deleveraging in financial markets that had begun in August 2007 offers a more direct explanation of the intensification of the recession that began in the summer of 2008. By then, U.S. financial markets were reasonably calm.¹¹ The intensification of the recession began before the financial turmoil that followed the September 15, 2008, Lehman bankruptcy.¹² Although from mid-2007 through mid-December 2008, financial institutions reported losses of \$1 trillion dollars, they also raised \$930 billion in capital—\$346 billion from governments and \$585 billion from the private sector (Institute of International Finance 2008, 2).¹³

In this recession, unlike the other recessions that followed the Depression, commentators have assigned causality to dysfunction in credit markets. For example, *Financial Times* columnist Martin Wolf (2008) wrote about “the origins of the crisis in the collapse of an asset price bubble and consequent disintegration of the credit mechanism...” This view implies a structural break in the cyclical behavior of bank lending: In the current recession, bank lending should have been a leading indicator and should have declined more significantly than in past recessions. However, Figure 1, which shows the behavior of real (inflation-adjusted) bank loans in recessions, reveals that

¹¹ The initial deleveraging appeared in the decline of ABCP (asset-backed commercial paper) from \$1.2 trillion in August 2007 to \$800 billion in December 2007. Thereafter, ABCP outstanding basically remained steady until mid-September 2008 (declining somewhat in May 2008 and then recovering in early September). Both retail and institutional money funds grew between August 2007 and mid-September 2008. In August 2008, nonfinancial commercial paper outstanding had recovered the \$200 billion level it reached in August 2007 and then grew strongly in early September 2008. Financial commercial paper remained steady over the entire period from August 2007 to mid-September 2008. The corporate Aaa rate also remained steady at 5.5 percent over this latter period. Although the KBW index of the stocks of large banks lost half its value from mid-July 2007 through mid-July 2008, it climbed 50 percent from mid-July 2008 through mid-September 2008. The steadiness of the monetary base until mid-September 2008 does not suggest any unusual demand for liquidity from the Fed (Federal Reserve Bank of St. Louis 2009).

¹² The quarterly annualized growth rates for final sales to domestic purchasers (GDP minus the effects of inventories and net exports) weakened in 2008:Q3 (after a modest uptick in 2008:Q2 caused by the tax rebates and fall in net exports). The figures are as follows: 2007:Q4 (−.1 percent), 2008:Q1 (.1 percent), 2008:Q2 (1.3 percent), 2008:Q3 (−2.3 percent), and 2008:Q4 (−5.7 percent). Payroll employment, which is measured in the first week of the month, declined by 284,000 in September 2008 compared to the average decline of around 60,000 from February through August (11/7/08 BLS release). The decline of 240,000 jobs in October 2008 does include two weeks of the financial turmoil in the last half of September, but the lag is too short to have produced significant layoffs. The Dunkelberg and Wade (September 2008) survey of small business owners did not record deterioration in the availability of credit to small businesses between the first and last part of September 2008.

¹³ On May 7, 2009, regulators released the results of “stress tests” for the 19 largest bank holding companies (BHCs), which hold 98 percent of commercial bank assets. According to the accompanying report, “At year-end 2008, capital ratios at all 19 BHCs exceeded minimum regulatory capital standards, in many cases by substantial margins.” Even under the “adverse scenario” these institutions would experience “virtually no shortfall in overall Tier 1 capital” (Board of Governors 2009c).

Figure 1 Commercial Banks: Real Loans and Leases

Notes: Starting in October 2008, the series has been adjusted for the acquisition of a large nonbank institution by a commercial bank. Data are deflated using the overall CPI. Shaded areas indicate the NBER recessions.

Source: Board of Governors 2009a.

bank lending behaved similarly in this recession to other post-war recessions. Moreover, the fact that bank lending rose in the severe 1981–1982 recession and often recovered only after cyclical troughs suggests that bank lending is not a reliable tool for the management of aggregate demand.

Based on the judgment that dysfunction in credit markets was the cause of the intensification of the recession, governments and central banks intervened massively in financial markets. Starting with the term auction facility (TAF) in December 2007, the Fed initiated programs to lower risk premia in particular markets through its assumption of private credit risk. Since September 15, 2008, the Fed has taken an unprecedented amount of private debt onto its balance sheet in an attempt to influence the flow of credit in particular markets. The size of its balance sheet went from about \$800 billion before September 15, 2008, to more than \$2,000 trillion at year-end 2008. It has lent to financial institutions through the discount window (with the primary credit facility to

banks, as well as the primary dealer credit facility and TAF) and to foreign central banks through currency swaps. It has purchased significant amounts of commercial paper through the commercial paper funding facility in an attempt to revive that market.

Government has taken over significant amounts of portfolio risk in large financial institutions, in particular, AIG, Citigroup, and Bank of America. The Treasury has supported the government-sponsored enterprises (GSEs) and the deposits of money market mutual funds. The Federal Deposit Insurance Corporation has guaranteed the debt of large commercial banks and small industrial banks and has extended the coverage of insured deposits. Troubled Asset Relief Program money has added capital to the banking system. Foreign governments have implemented similar programs.

Perhaps the scale of this intervention in credit markets has simply been insufficient to overcome financial market malfunction. Still, the scale of the intervention has been vast. If the problem has not been financial market dysfunction but rather has been misalignment between the real funds rate and the natural rate, then intervention in credit markets will only increase intermediation in the subsidized markets. Those subsidies will not reduce aggregate risk to the point that the overall cost of funds falls enough to stimulate investment by businesses and consumers. Government intervention in credit markets is, then, not a reliable tool for the management of aggregate demand because such interventions do little to reduce the public's uncertainty and pessimism about the future that have depressed the natural rate.

To understand why policymakers are now at a crossroads about how to think about monetary policy, consider the reasons for the widespread unwillingness to lower the funds rate in the summer of 2008. There was a consensus that monetary policy was "accommodative" as evidenced by the low level of the nominal funds rate and realized real funds rate (the nominal rate minus realized inflation). The debate revolved around whether the "low" level of the funds rate was appropriate given slow growth in the economy or whether it would lead to a rise in inflation. There was a shared concern that headline inflation persistently in excess of participants' implicit inflation objectives would raise the public's expectation of inflation above the lower, basically satisfactory, core inflation rate and thereby propagate the higher headline inflation rate into the future.

As evidenced by a *Wall Street Journal* (Evans 2008) headline on the day of the August FOMC meeting ("Price Increases Ramp Up, Sounding Inflation Alarm"), the increase in energy and food prices had significantly increased headline inflation. The numbers available at the meeting showed three-month headline consumer price index (CPI) inflation ending in June 2008 at 7.9 percent with 12-month inflation at 5.0 percent. The corresponding core (ex food and energy) CPI figures were, respectively, 2.5 percent and 2.4 percent. For the PCE (personal consumption expenditures deflator), the three-month number

was 5.7 percent with the 12-month number at 3.8 percent. The corresponding core PCE figures were, respectively, 2.1 percent and 2.3 percent. Earlier, Chairman Bernanke (2008) had signaled concern that inflationary expectations could increase, as well as a concern that the dollar would depreciate:

Another significant upside risk to inflation is that high headline inflation, if sustained, might lead the public to expect higher long-term inflation rates, an expectation that could ultimately become self-confirming. . . . We are attentive to the implications of changes in the value of the dollar for inflation and inflation expectations and will continue to formulate policy to guard against risks to both parts of our dual mandate, including the risk of an erosion in longer-term inflation expectations.

In its regular publication “FOMC Chatter,” *Macroeconomic Advisers* (2008a, 1) reviewed the public statements of FOMC participants made before the June 2008 FOMC meeting:

FOMC members left little doubt about their concerns regarding longer-term inflation expectations. Chairman Bernanke (6/9/08) said that the FOMC “will strongly resist” any increase in expectations, Vice Chairman Kohn (6/11/08) said that keeping expectations anchored is “critical,” and Governor Mishkin (6/10/08) said that it is “absolutely critical.” . . . President Fisher (6/10/08) said that an increase in expectations is “the worst conceivable thing that can happen.” Presidents Plosser (6/12/08), Bullard (6/11/08), and Lacker each emphasized the need to tighten promptly enough to prevent any increase in inflation expectations.¹⁴

What is the crossroads that policymakers face? The view that in the summer of 2008 monetary policy was accommodative combined with the association of financial market disruption with intensification of the recession has led to a revival of the credit-cycle view of cyclical instability. Current debate has recreated much of the sentiment expressed by the Board of Governors in the 1920s that regulatory constraints on credit extension should complement the funds rate as a mechanism for controlling excessive risk-taking by

¹⁴ Statements by FOMC participants before the August 5, 2008, FOMC meeting reported by *Macroeconomic Advisers* (2008b) included the following:

“President Plosser (7/23/08 and 7/22/08): ‘Most of us agree that inflation expectations are OK. I think it’s important that we act before those expectations become unhinged. . . . If we remain overly accommodative in the face of these large relative price shocks to energy and other commodities, we will ensure that they will translate into more broad-based inflation that—once ingrained in expectations—will become very difficult to undo.’

President Hoenig (7/9/08): ‘I think it is important to understand that we are in an accommodative position, and the implications of that [are that] the inflation we have will most likely continue in the future. . . .’

President Yellen (7/7/08): ‘Inflation has become an increasing concern. . . . On balance, I still see inflation expectations as reasonably well anchored. . . . But the risks to inflation are likely not symmetric and they have definitely increased. We cannot and will not allow a wage-price spiral to develop.’ ”

banks. Friedman and Schwartz (1963a, 254) wrote, “[T]he view attributed to the Board [in the 1920s] was that direct pressure was a feasible means of restricting the availability of credit for speculative purposes without unduly restricting its availability for productive purposes, whereas rises in discount rates or open market sales sufficiently severe to curb speculation would be too severe for business in general.” Just as in the Depression with the use of the Reconstruction Finance Corporation to recapitalize banks, the focus of current monetary policy is on encouraging financial intermediation (see Appendix).

The alternative road lies with the extension of the policy changes taken in the Volcker-Greenspan era. In this spirit, the FOMC should be willing to move the funds rate up *and* down to whatever extent necessary to respond to changes in rates of resource utilization. The issue then is credibility. With credibility, in the event of an inflation shock, the FOMC can still move the funds rate down to zero without an increase in inflationary expectations. The absence of an explicit inflation target voted on by the entire FOMC would appear as a weakness in current procedures. An explicit inflation target then raises the issue of how to interpret the Fed mandate for “stable prices” and whether that part of the mandate conflicts with “maximum employment.”¹⁵ Also, as discussed in the next section, the absence of an explicit strategy for dealing with the ZLB problem is a deficiency.

5. MONETARY POLICY AND THE ZERO-LOWER-BOUND PROBLEM

The hypothesis advanced here is that the accelerated loss of wealth in the fall of 2008 pushed the natural interest rate further below the real interest rate. The Fed began again to lower the funds rate on October 10, 2008 (from 2 percent to 1.5 percent), and on October 29 to 1 percent and on December 16, 2008, to a range from 0 percent to .25 percent. At the time of this writing (May 2009), tentative indications of a cyclical trough in 2009:Q2 indicate that these funds

¹⁵ Hetzel (2008a, Ch. 20) argues that the FOMC abandoned price stability for an objective of low inflation in 2003. With the emergence in the summer of 2004 of an inflation shock due to a sustained rise in energy prices, the desired low inflation rate of about 2 percent became a base for markedly higher headline inflation. In the summer of 2008, the persistence of high headline inflation caused credibility concerns among all the world’s major central banks. From this perspective, the FOMC would have been better off to have preserved the price stability that had emerged in 2003. However, price stability gives the FOMC less room to create a negative real funds rate. Board of Governors Vice Chairman Don Kohn and Paul Volcker debated the issues recently at a conference in Nashville, Tenn. (Blackstone 2009): “Mr. Volcker...questioned how the Fed can talk about both 2% inflation and price stability. ‘I don’t get it,’ Mr. Volcker said...By setting 2% as an inflation objective, the Fed is ‘telling people in a generation they’re going to be losing half their purchasing power.’ Mr. Kohn...replied that aiming at 2% inflation gives the Fed ‘a little more room...to react to an adverse shock to the economy’ because it is easier to get its key short-term interest rate below the inflation rate, the usual remedy for recession. ‘Your problem is [2%] becomes three becomes four,’ Mr. Kohn told Mr. Volcker. But other central banks with a roughly 2% target haven’t had that problem, he said.”

rate reductions may have restored monetary neutrality by pushing the real rate in line with the natural interest rate or may have provided monetary stimulus by pushing the real rate below the natural rate. In any event, it is desirable for the FOMC to possess a strategy for providing monetary stimulus with a zero-funds rate that coexists with a real funds rate in excess of the natural interest rate.¹⁶

How should central banks deal with the ZLB problem? To begin, note that a discrete increase in the degree of monetary instability (measured by an increase in the unpredictability of the evolution of the price level precipitated by a departure of the central bank from a stabilizing rule) depresses the natural rate of interest, albeit in a way that does not allow for its systematic manipulation. The reason is that unanticipated monetary restriction causes the price system to convey information about the relative scarcity of resources less efficiently. Because of the unanticipated nature of the monetary shock, there is no way for firms to lower the dollar prices of their products in a coordinated way that preserves relative prices. Because individuals become more pessimistic about the future (expected consumption falls relative to current consumption), the natural rate falls.

With a zero-funds rate, monetary policy is contractionary if the natural rate (NR) lies below the negative value of expected inflation ($-\pi^e$); that is, the real rate (rr) exceeds the natural rate: $rr = (0 - \pi^e) > NR$. Assuming that the central bank cannot manipulate short-term expected inflation, it must resort to money creation to raise the natural rate. Sustained money creation will revive the spending of the public through a portfolio rebalancing effect. The natural rate rises with no increase in expected inflation as the increase in spending restores confidence in the economy.

The proposal here for providing monetary stimulus at the ZLB in recession is for the Fed to engage in significant open market purchases of long-term government securities to boost the monetary aggregate M2 to a level that constitutes a significant fraction of GDP and then to maintain significant growth of M2 until recovery begins. (The ratio of M2 to GDP, the inverse of velocity, has been somewhat in excess of 50 percent in recent years.) The Treasury could issue these securities directly to the Fed and use the proceeds to fund expenditure rather than reduce its debt. With the emergence of a nascent recovery, the Fed would again make the funds rate positive. A positive funds

¹⁶ To understand how excessive pessimism could yield a negative natural rate, consider a hypothetical agrarian economy without money that produces wheat. Rats eat some fraction of stored wheat, say, 3 percent. If individuals are pessimistic enough about future harvests, they will be willing to store wheat despite a real interest rate of -3 percent. (Milton Friedman used this example in a 1967 course taught at the University of Chicago.)

rate would absorb the monetary overhang that will emerge with economic recovery and positive interest rates.¹⁷

The reason for an initial large increase in money is uncertainty over the lag between monetary acceleration and economic recovery. Friedman and Schwartz (1963b) documented a two-to-three-quarter lag between changes in money growth and changes in growth of nominal expenditure. Friedman used this estimate to forecast successfully the behavior of the business cycle in the stop-go period of monetary policy. However, in recessions in the stop-go period, because of the high level of interest rates, the Fed could push the nominal funds rate down until the real funds rate fell below the natural rate. The cyclical trough in GDP during that period occurred after monetary policy became expansionary by this Wicksellian measure. If indeed the real rate exceeds the natural rate at the ZLB, to reach this position, money must first expand by enough to stimulate expenditure sufficiently to raise the natural rate up to and then above the real funds rate.

6. CONCLUDING COMMENT

The companion piece to this paper (Hetzel 2009a) begins with a graph of output per capita from 1970 to the present. The graph displays a dramatic rising trend but also significant departures below trend. The rising trend highlights how free markets create wealth. The departures below trend point to times of widespread misery during recession. Given the insatiability of human wants, macroeconomics must explain why, at times, individuals demand less output than is consistent with full utilization of productive resources. What prevents the price system from adjusting to prevent periodic underutilization of resources?

Hetzel (2008a) answers that central banks have exacerbated cyclical fluctuations through introducing inertia at cyclical peaks into declines in the real interest rate with money destruction (deceleration) and through introducing inertia at cyclical troughs into increases in the real interest rate with money creation (acceleration). Hetzel (2008a) also argues for explicit recognition of LAW with credibility as a rule. In the Volcker-Greenspan era, these procedures allowed market forces to determine the real interest rate while providing a nominal anchor in the form of stable, low expected inflation. At present, there is no consensus about either the desirability of a monetary rule in general or about the particular form of a rule. The Fed should take responsibility for achievement of such a consensus by explaining its behavior in terms of what is

¹⁷ An excess supply of money would lead the public to buy Treasury securities from banks thereby reducing demand deposits and money. As a consequence of maintaining its funds rate target, the Fed would then sell Treasury securities from its portfolio to absorb the accompanying reduction in the demand for reserves by banks.

consistent over time in its behavior and by highlighting in its *Minutes* reasons for departures. Such communication would allow an ongoing debate with the academic community about policy.¹⁸

Knut Wicksell ([1935] 1978, 3) wrote in his *Lectures on Political Economy*:

[W]ith regard to money, everything is determined by human beings themselves, i.e. the statesmen, and (so far as they are consulted) the economists; the choice of a measure of value, of a monetary system, of currency and credit legislation—all are in the hands of society....

Wicksell followed up by noting:

The establishment of a greater, and if possible absolute, stability in the value of money has thus become one of the most important practical objectives of political economy. But, unfortunately, little progress towards the solution of this problem has, so far, been made.

As Wicksell noted, the monetary arrangements of a country are subject to rational design. However, since the founding of the Republic, a weakness in American institutions has been the inability to bring monetary institutions into the general constitutional framework. If the United States is to preserve the ability of free markets to create wealth, economists and policymakers, along with the general public, will have to use the current situation to design monetary arrangements capable of assuring economic stability.

Dialogue between monetary policymakers and the academic community is one of the important means through which such a constructive response can emerge. Central banks have done little in the past to prepare for such a dialogue. William McChesney Martin, FOMC chairman from March 1951 until January 1970, established the practice of moving short-term money market rates of interest (later the funds rate) in response to the behavior of economic activity. Policymakers then talked about monetary policy using the descriptive language of the business economist, that is, in terms of near-term forecasts of the economy. They characterized funds rate changes as chosen optimally period-by-period in the context of the contemporaneous behavior of the economy. This language of discretion implicitly rejects the Lucas ([1976] 1981) critique, which argues for thinking of policy as a consistent strategy or rule.¹⁹

¹⁸ At the same time, the political system needs to avoid destabilizing changes in policy that affect significant sectors of the economy. That means leaving the optimal stock of housing to the operation of market forces rather than attempting to expand it through a panoply of special programs and subsidies. It also means a credible commitment to a limited financial safety net that ends too-big-to-fail (Hetzel 2009a).

¹⁹ The Lucas critique argues for characterizing monetary policy as a consistent procedure (reaction function or rule) for responding to incoming information rather than as a concatenation of individual funds rate changes each of which is chosen as optimal in light of contemporary economic conditions. The central bank should behave in a consistent fashion so that the public can predict

Without the language of economics, which places policy within the framework of the price system and explicit frictions, and without the language of rules, policymakers cannot debate academics over contrasting frameworks for thinking about monetary policy and the consequences of alternative policies (Koopmans 1947).

The credit intermediation of commercial banks and the money creation of central banks have proven difficult to place within institutional frameworks that protect property rights (Hetzel 1997). Debt guarantees, the GSEs, and the financial safety net allow the political system to allocate credit to politically influential constituencies in ways that do not appear on budget. Monetary base creation provides tax revenue in the form of seigniorage that does not require explicit legislation. Central bank independence is a safeguard against the abuse of seigniorage, but that independence still allows for significant competition for control over the objectives of the central bank (Hetzel 1990). In this adversarial environment, central banks do not systematically review their history to evaluate what they did right and especially what they did wrong. Without the learning provided by such review, they cannot contribute to a debate on the optimal design of monetary policy.

The spirit of the critique offered here is that the Federal Reserve needs a new dual mandate. It would charge the Fed with providing for price stability and with allowing the price system to determine unemployment, along with other real variables. Everything about monetary policy is controversial. However, open debate is critical. Monetary arrangements that provide for monetary stability are a prerequisite for the long-term survival of a free market economy.

APPENDIX: LESSONS FROM THE DEPRESSION

This Appendix summarizes Hetzel (2008a, Ch. 3). Until recently, the absence of credit allocation has defined modern central banking. Because of the lack of instances in which central banks used the composition of their balance

its response to shocks and, conversely, so that the central bank can influence the public's behavior in a predictable fashion (Lucas [1976] 1981). Lucas ([1980] 1981, 255) wrote: "[O]ur ability as economists to predict the responses of agents rests, in situations where expectations about the future matter, on our understanding of the stochastic [policy] environment agents believe themselves to be operating in. In practice, this limits the class of policies the consequences of which we can hope to assess in advance to policies generated by fixed, well understood, relatively permanent rules (or functions relating policy actions taken to the state of the economy)...[A]nalysis of policy which utilizes economics in a scientific way necessarily involves choice among alternative stable, predictable policy rules, infrequently changed and then only after extensive professional and general discussion, minimizing (though, of course, never entirely eliminating) the role of discretionary economic management."

sheet to affect the aggregate expenditure of the public by influencing credit flows, there is little historical basis for evaluating the efficacy of credit policy. However, experience in the Depression allows one to evaluate both credit-channel and money-creation policies. Because the government implemented credit policy in the Depression, these two policies followed different paths. (If the Fed had expanded the asset side of its balance sheet to purchase debt in markets it deemed dysfunctional, then, left unsterilized, the associated increase in the monetary base would have confounded the credit and money creation effects.) In the Depression, the government ran policies for intervening in credit markets, for example, by using the Reconstruction Finance Corporation (RFC) to recapitalize banks. The resulting independence of money-creation and credit-channel policies makes the Depression a laboratory for evaluating the usefulness of these different policies for macroeconomic stabilization.

The founders of the Federal Reserve attributed financial panics and recession to the inevitable collapse of asset speculation. As a result, they designed the Federal Reserve Act according to the real-bills doctrine, which prescribed limiting credit extension to the amount required to finance real bills (the self-liquidating IOUs used to finance goods in the process of production). Such limitation, it was hoped, would prevent an excess of credit creation that would spill over into asset markets for land and stocks and create asset bubbles. In 1928, Fed policymakers believed that the increase in the value of stocks on the New York Stock Exchange represented a speculative bubble that required deflating (Friedman and Schwartz 1963a, 254ff, and Meltzer 2003, 224ff).

In 1928, the Fed started raising interest rates in order to bring down the value of the stock market. Even after recession appeared, the Fed kept market rates at a level high enough to prevent a reemergence of the speculation presumed to have initiated a boom-bust credit cycle. It maintained positive discount window-borrowing, which together with a positive discount rate meant keeping interest rates elevated. The resulting monetary contraction that led to the initial recession turned that recession into a depression as a result of a self-reinforcing cycle of monetary contraction, deflation, expected deflation, the transformation of positive nominal rates into high real rates, and then reinforced monetary contraction and so on. (See Figures 3.1 and 3.4 on inflation and money growth and Table 3.1 on nominal and real interest rates in Hetzel [2008a].) Contractionary monetary policy appeared in the decline of the money stock. From 1930:Q1 to 1933:Q2, M1 fell by 25 percent and M2 fell by 32 percent (money growth figures from Friedman and Schwartz [1970, Table 1]). That decline in turn manifested itself in the failure of smaller banks as depositors withdrew their deposits and redeposited them in larger banks, which they considered safer (Walter 2005).

Two events ended the first of the two back-to-back recessions that defined the Great Depression. First, in response to a series of bank failures finishing in the winter of 1932–1933, banks accumulated large amounts of excess

reserves as a source of funds alternative to borrowing from the discount window. From basically frictional levels in early 1932, member bank excess reserves rose steadily through 1935. Borrowed reserves obtained through the Fed's discount window fell steadily after March 1933 until reaching frictional levels in late 1933 or early 1934 (Board of Governors 1943b). When banks had accumulated sufficient excess reserves, they no longer required access to the discount window to meet their marginal reserve needs, and the Fed no longer determined market interest rates. The Fed then withdrew as an active central bank and confined itself to maintaining the size of its government securities holdings at a fixed level. As a result, the Fed gave up control over the monetary base and money creation.

The second event critical to precipitating the initial recovery was Roosevelt's attempt to raise the domestic price level by raising commodity prices through depreciation of the dollar. Gold purchases, along with the prohibition on the export of gold, increased the dollar price of gold and, as a result, the dollar prices of commodities, whose gold prices were determined in international markets. The expectation of inflation that emerged from this policy turned formerly high positive real interest rates into negative rates (see Hetzel [2008a], Table 3.1). Very quickly, economic recovery replaced economic decline. Dollar devaluation in early 1934 combined with political unrest in Europe to create gold inflows that augmented the monetary base and money. From 1933:Q2 to 1936:Q3, M1 grew at an annualized rate of 14.3 percent and M2 at 11.4 percent. Money creation allowed the economy to grow vigorously until 1937.

In the summer of 1936 and the first half of 1937, the Fed acted on its desire to again control market interest rates. Through a series of increases in required reserves (effective August 1936, March 1937, and May 1937), the Fed reduced banks' excess reserves with the intention of forcing banks back into the discount window and thus reviving its control over market rates. At the same time, the Treasury began to sterilize gold inflows. The Fed's intent was to resurrect its pre-1933 operating procedures. When the demand for bank credit revived, banks would therefore have to obtain the additional reserves associated with the increase in loans and deposits from the discount window. Market rates would then rise and prevent a revival of the speculation that had supposedly caused an unsustainable bubble in stock prices in the 1920s.

As banks attempted to offset their loss of excess reserves, the money stock stopped growing. Money growth declined after 1936:Q3. Thereafter the level of money fell moderately from 1937:Q1 through 1937:Q4. The level of money remained basically unchanged in the first half of 1938. Money began to rise when banks restored the pre-reserve-requirement level of excess reserves in 1938:Q2. Money then began to rise steadily, basically coincident with the cyclical trough in June 1938 when recession replaced recovery. A chastened Fed retreated from its attempt to again become an active central bank and

continued to freeze its holdings of government securities. Monetary base and money growth resumed with gold inflows and the end of Treasury sterilization (Friedman and Schwartz 1963a, Chart 40, and Friedman and Schwartz 1970, Table 1). Because inflation (CPI) turned to deflation in 1937:Q4, the trough in real M1 occurred in 1937:Q4. The return of growth after the business cycle trough in June 1938 is consistent with the increase in real M1 stimulating expenditure through portfolio rebalancing, that is, through a stimulative real-balance effect (Patinkin 1948, 1965).

As summarized in the equation of exchange, nominal money (M) times velocity (V), or the rate of turnover of money, equals dollar expenditure. Dollar expenditure equals the price level (P) times real output (y). In algebraic terms, $M \bullet V = P \bullet y$. Without a Fed interest rate peg, short-term interest rates could fall to zero. Furthermore, with money growth powered by gold inflows, a return of expected deflation could not produce a return to the earlier self-reinforcing downward monetary spiral. Because monetary velocity was roughly steady, rapid money growth translated into rapid growth in aggregate dollar spending ($P \bullet y$). With deflation, this growth in nominal spending appeared as growth in real output (y) after the June 1938 trough in the business cycle.

An important lesson emerges from the comparison of the interest-rate targeting followed by the Fed until March 1933 with the succeeding period of exogenous monetary base growth. Discussion in the popular press attributes to deflation a depressing effect of economic activity. When the central bank implements policy with an interest rate target, deflation that creates expected deflation is destabilizing. However, if monetary base growth is exogenous, deflation is stimulative because it increases real money and thereby induces portfolio rebalancing and the associated increase in expenditure.

The experience of the Depression casts doubt on the credit-cycle view, which emphasizes the disruption to real economic activity from the loss of banks and the resulting loss of information specific to particular credit markets. Ex-Fed Governor Frederic Mishkin (2008) expressed this idea:

In late 1930... a rolling series of bank panics began. Investments made by the banks were going bad... Hundreds of banks eventually closed. Once a town's bank shut its doors, all the knowledge accumulated by the bank officers effectively disappeared... Credit dried up... And that's when the economy collapses.

However, the implications of this view conflict with the commencement of vigorous economic recovery after the business cycle trough on March 1933 and the occurrence of widespread bank failures in the winter of 1933 and the additional permanent closing of banks after the Bank Holiday in March 1933. During the Bank Holiday, which lasted from March 6 through March 13–15, the government closed all commercial banks, including the Federal

Reserve Banks. Before the holiday, there were 17,800 commercial banks. Afterward, "... fewer than 12,000 of those were licensed to open and do business" (Friedman and Schwartz 1963a, 425). Friedman and Schwartz (1963a, Table 16, 438) list "Losses to Depositors per \$100 of Deposits Adjusted in All Commercial Banks." In 1930, 1931, and 1932, the numbers are, respectively, .6 percent, 1.0 percent, and .6 percent. For 1933, the year in which cyclical recovery began, the number rose to 2.2 percent.

Likewise, the vigorous recovery that began after 1933:Q1 contrasts with the long period of time required by the banking system to work through its bad debts. The following numbers show "net profits as percentage of total capital accounts" for the indicated years: -1.5 (1931), -5.0 (1932), -9.6 (1933), and -5.2 (1934).²⁰ Despite the protracted difficulties in the banking system evidenced by these numbers, real output grew vigorously after the 1933:Q1 cyclical trough. According to Balke and Gordon (1986, Appendix B, Table 2), real GNP grew at an annualized rate of 10.7 percent from the 1933:Q1 cyclical trough to the 1937:Q2 cyclical peak. Moreover, the implications of the credit-cycle view conflict with the timing of the 1937:Q2 cyclical peak. In 1935, 1936, and 1937, as evidenced by "net profits as percentage of total capital accounts" of 5.1 percent, 10.0 percent, and 7.1 percent, respectively, banks had returned to good health.

The revival of money growth roughly coincident with the two cyclical troughs of March 1933 (1933:Q1) and June 1938 (1938:Q2) is consistent with the end of a restrictive monetary policy that pushed the real interest rate above the natural interest rate. In each case, there was a "snap back" in output. In the four quarters ending with 1933:Q1, real GNP fell 14.1 percent, and in the four succeeding quarters it rose 13.5 percent. Similarly, in the four quarters ending with 1938:Q2, real GNP fell 10 percent, and in the four succeeding quarters, it rose 7.4 percent. This snap-back in output after each trough supports the hypothesis that, in the absence of monetary restriction, the economy is self-equilibrating in that output returns to trend relatively quickly after shocks.

More generally, Friedman ([1964] 1969, 273) found that the magnitude of an economic contraction predicts the magnitude of the subsequent expansion. At the same time, the magnitude of output increases in cyclical expansions fails to forecast the magnitude of subsequent cyclical declines. This latter fact contradicts the implication of credit-cycle explanations of the business cycle that recessions manifest the working out of prior speculative excess. Using data on cyclical expansions and contractions from 1879–1961, Friedman ([1964] 1969, 272) concluded that:

²⁰ These numbers are from *Historical Statistics of the United States, Earliest Times to the Present, Millennial Edition*, vol. 3, Part C, "Economic Structure and Performance" Table Cj238-250, "National banks—number, earnings, and expenses: 1869–1998." Cambridge University Press, 2006.

[T]here appears to be no systematic connection between the size of an expansion and of the succeeding contraction. . . . This phenomenon. . . [casts] grave doubts on those theories that see as the source of a deep depression the excesses of the prior expansion.”

Morley (2009, 3) reconfirmed Friedman’s results using quarterly data from 1947:Q2–2008:Q4: “[E]xpansions imply little or no serial correlation for output growth in the immediate future, while recessions imply negative serial correlation in the near term.”

Because of the depth of the first cyclical decline and because the second cyclical decline followed fairly closely on the first, the unemployment rate remained high throughout the 1930s. Because of the widespread association of “the Depression” with high unemployment, popular lore holds that only the deficit spending of World War II ended the Depression. In fact, the ending of contractionary monetary policy ended both the cyclical downturns. In the Depression, both the view that monetary policy works through financial intermediation and the existence of low money-market interest rates combined to foster the assumption that monetary policy is impotent in Depression conditions that push the zero nominal short-term interest rate to zero. In reply, Friedman and Schwartz (1963a, 300) wrote, “The contraction [Depression] is in fact a tragic testimonial to the importance of monetary forces.”

At the time of the Depression, however, policymakers believed that dysfunction in credit markets propagated an initial shock in the form of a collapse in equity and land prices in 1929. That dysfunction arose from the insolvencies associated with defaults on the excessive issue of debt in the prior speculative boom. As a result, policy focused on the disruption to credit flows rather than the money stock. The Hoover administration created the RFC to recapitalize banks. Bordo (2008, 16) cites Richard Sylla’s figure that the RFC’s recapitalization of 6,000 banks amounted to \$200 billion in today’s dollars. In 1932, Congress created the Federal Home Loan Bank System to encourage housing finance. The Roosevelt administration created numerous additional government entities to revive credit intermediation, for example, Fannie Mae, the Federal Housing Administration, and the Federal Credit Union system. Many states adopted laws preventing foreclosure of homes and farms.

Relevant to current experience is the rapidity with which the economy recovered in the Depression when monetary contraction did not produce a real short-term interest rate in excess of the natural interest rate. The general lesson is the need for a monetary rule that allows the price system to function through the absence of monetary shocks, not the need for the central bank to supersede either the working of the price system or the allocation of credit.

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