

# Interest Rate Rules for Seasonal and Business Cycles

by Charles T. Carlstrom and Timothy S. Fuerst

When the Federal Reserve System was established in 1914, part of its purpose was “to furnish an elastic currency,”<sup>1</sup> that is, a currency that could be quickly expanded or contracted as needed. Today, the Fed fulfills this function by supplying the reserves needed to prevent wide seasonal swings in interest rates. When money demand increases sharply during the holiday season, the Fed steps in and supplies the liquidity necessary to keep interest rates from rising. Monetary base growth is high during the fourth quarter, when output rises, and low during the first quarter, when output falls.

In addition to the elasticity directive, the Federal Reserve Reform Act of 1977 gives the central bank the dual mandate of pursuing stable prices and maximum employment. Although maximum employment may seem a strange goal for an organization that has no long-term effect on employment levels, it is usually interpreted to mean that monetary policy should “lean against the wind.” In other words, some analysts think that the Fed should try to stabilize business cycle fluctuations by increasing the money supply faster when the economy is sluggish and restraining money growth when the economy heats up. In this view, money growth should be countercyclical.

Much has been made of the supposed conflict between stable prices and maximum employment, but almost no attention has been given to the conflict between providing an elastic currency and pursuing countercyclical policy. This is because elasticity of the money stock is usually considered necessary over seasonal cycles, while the countercyclical thrust of monetary policy is regarded as appropriate over business cycles. But why should this be so? If it is appropriate for monetary policy to eliminate seasonal movements in interest rates, why not use it to minimize interest rate variations across the business cycle as well?

After all, recent research suggests that seasonal and business cycles are quite similar, except that the former occur at regular, predetermined intervals, while the latter occur randomly. The similarities between the two types of cycles suggest that a common approach to monetary policy—supplying an elastic currency by pegging the nominal interest rate—could successfully be applied to both.

## ■ Currency Elasticity and the Gold Standard

The idea that an elastic currency is important for more than just seasonal changes in money demand is not new. A principal reason for establishing the Federal Reserve System was to supply

**Empirical research shows that there is a “seasonal business cycle” in the U.S. economy that behaves in much the same way as the conventional business cycle. Yet the Federal Reserve’s current policy calls for increasing the money supply during seasons when output is high and pursuing countercyclical policy during business cycles. In this article, the authors argue that the Fed’s current approach to seasonal cycles—pegging the nominal interest rate—could successfully be applied to the business cycle as well.**

currency “which would fluctuate in amount according to the activity of business, being large when business was active and less in amount when business was small.”<sup>2</sup> This clearly indicates that some of the System’s founders thought money growth should be procyclical. Although it is usually interpreted as referring to seasonal cycles, nothing in this prescription precludes its application across business cycles as well.

There are two notable reasons why this directive was primarily interpreted to mean that the Federal Reserve should supply monetary elasticity on a seasonal basis. First, periodic financial panics largely coincided with the seasonal cycle.<sup>3</sup> Second, the Federal Reserve’s founders assumed that the gold standard would determine long-run movements in the money stock. Hence, elasticity of the domestic gold stock (achieved through international gold flows) would ensure currency elasticity over longer periods and, at least partially, over business cycles as well. In other words, the Federal Reserve System would be “a self-regulating adjunct to a self-regulating gold standard. The Fed was to do at short term what the gold standard did secularly—provide seasonal money commensurate with seasonal production of commodities.”<sup>4</sup>

When the U.S. economy enters a boom, domestic interest rates rise. In the days of the gold standard, if interest rates started climbing in the United States, foreigners seeking higher returns would increase their U.S. investments. To do so, they would exchange gold for dollars. As a result, gold flowed into the country, increasing the domestic money stock. Because interest rates tend to rise during economic expansions, this mechanism helped provide a natural elasticity to the currency. It did not work instantaneously, and thus did not supply perfect elasticity over business cycles. Over longer periods, however, gold inflows and outflows provided a natural elasticity to the domestic money stock.

The demise of the gold standard meant the end of this self-regulating mechanism, imperfect though it was. Should the Federal Reserve consider replacing what elasticity it did provide by allowing money growth to accelerate when economic activity is brisk and to slow when output declines? That is, should central bankers attempt to minimize interest rate changes at both the business cycle and seasonal time horizons? The current policy dichotomy between the two is puzzling, given the evidence that seasonal and business cycles have similar characteristics. Consider the following:

Output declines across broad sectors of the economy, labor productivity falls, and employment slackens. Government spending decreases. Yet, while the money supply declines, prices move little in comparison. Students of the business cycle might call this a portrait of a typical recession, but it actually describes the economy’s behavior in January of every year. As two leading researchers of business and seasonal cycles explain, “there is a ‘seasonal business cycle’ in the U.S. economy, and its characteristics closely mirror those of the conventional business cycle.”<sup>5</sup>

#### ■ An Interest Rate Peg with Sluggish Portfolio Adjustments

Even if we grant that the economic factors causing the seasonal cycle and the business cycle are different, it does not necessarily follow that the thrust of monetary policy should differ across the two cycles. In at least one theoretical framework typically used by economists, an interest rate peg is preferred no matter what type of shock causes the cycle.<sup>6</sup> This framework assumes that households are unwilling or unable to adjust their nominal consumption and savings behavior quickly. Their slow adjustments, termed *portfolio rigidities*, imply that money cannot automatically flow to the sectors where demand for it is relatively high.<sup>7</sup> We use this framework because it is consistent with evidence that monetary surprises increase real output and lower nominal interest rates.

For example, early in the fourth quarter, anticipating holiday sales, retail firms start to increase their borrowing in order to hire more workers and boost investment. In a world without portfolio rigidities, this heightened demand is met by higher household savings, thus moderating any interest rate movements.<sup>8</sup> However, if portfolio rigidities impede these flows, firms’ increased borrowing needs will drive up both the nominal and the real interest rate. Higher rates dampen the seasonal expansion by raising financing costs.

This framework also predicts a pattern of interest rate movements across the business cycle. In the early stages of an expansion, some sectors develop more rapidly than others, so that the demand for money grows unevenly. For example, when we divide the economy into households and firms, there is evidence that firms’ demand for cash rises first. During booms, firms increase their borrowing so that they can hire more workers and expand their existing plants. Without portfolio rigidities, households supply these needs by directing more money into their savings accounts.<sup>9</sup> If cash flows are sluggish, the relative imbalance between the supply and demand for loans pushes interest rates up sharply, since banks do not have extra money on hand to lend. As in the seasonal case, these higher interest rates dampen the economic expansion by increasing firms’ financing costs.

It is easy to see why an interest rate peg may be desirable. With a peg, the Federal Reserve stands ready to supply the reserves the banking sector needs in order to prevent a rise in the nominal interest rate. With sluggish consumption/savings decisions, instead of households supplying banks with extra money in the form of increased savings, the Fed provides the requisite cash flow. In fact, with an interest rate peg, the amount of reserves necessary to keep the nominal interest rate from rising equals the

amount of additional funds that households would have provided if they could have adjusted their savings decisions instantaneously. Therefore, the volume of economic activity with a peg should be identical to what it would have been without portfolio rigidities.

Critics complain that this framework does not specify why nominal portfolios are sluggish in the first place. Although the causes are not fully understood, one possibility is that portfolio decisions are not reconsidered every time an unforeseen event buffets the economy. This has profound implications for the desirability of an interest rate peg across seasonal cycles. Since such cycles are predictable, it may be easier for households to adjust their savings and consumption decisions for seasonal changes than for business cycle changes. Households may take longer to readjust their portfolios to an unforeseen supply shock (like a drop in oil prices) than do firms, which immediately begin increasing their investment and hiring additional workers in order to gain a competitive edge. The asymmetric adjustment could cause interest rates to increase dramatically if the Federal Reserve does not intervene. This implies that it may be even *more* important to minimize interest rate variations over the business cycle than over the seasonal cycle.

### ■ Interest Rate Rules, Prices, and Welfare

Critics of a nominal interest rate peg claim that it may destabilize the long-term price level. Suppose that the real federal funds rate is at 2 percent and inflation expectations are at 1 percent. This makes the nominal funds rate 3 percent—the rate that the monetary authority wishes to peg. Suppose further that the supply of oil rises and the price of oil falls unexpectedly, but that both are expected to revert to their original levels after a few years. This “positive” oil shock induces firms to demand more labor and raw materials for expanding their output. To finance their purchases,

firms demand more money, putting upward pressure on the real—and hence the nominal—interest rate.<sup>10</sup> If household portfolios can adjust only after a lag, the central bank will need to accelerate money growth to peg the nominal rate at 3 percent. Critics contend that this will not only raise the price level, but will increase inflation expectations as well. Higher expectations will exert further upward pressure on the nominal interest rate, necessitating faster money growth; ultimately, this process may lead to hyperinflation.

The problem with this argument is twofold. First, it confuses the monetary policy required in the short term with that appropriate for the long term. Second, it ignores the role of the central bank’s credibility in implementing long-term policy.

In our oil-price example, the positive shock immediately exerts upward pressure on real and nominal rates through excess demand in money and capital markets. With sluggish portfolios, the central bank initially steps up money growth to peg the nominal rate and, in so doing, supplies the additional money that firms demand from banks. Consequently, the price level will rise throughout the economy.<sup>11</sup>

Over time, as their portfolios adjust, households would supply the money needed by banks. Once these adjustments occur, the monetary authority would have to scale back money growth to keep the federal funds rate pegged at 3 percent. This highlights why it is so important that the central bank have the credibility necessary to maintain an interest rate peg. Otherwise, people may believe that the initial increase in money necessary to keep the nominal rate constant will be followed by continued high money growth. Without credibility, the costs of maintaining an interest rate peg may be unacceptably high, since ever-faster money growth would become necessary to maintain such a peg.<sup>12</sup>

Although money—and hence the price level—increases immediately after a positive supply shock, long-term expected inflation will not rise if the central bank’s commitment to the interest rate peg is credible. Once portfolios have adjusted, the only way the monetary authority can influence the nominal interest rate is by changing money growth, which alters expected inflation.<sup>13</sup> Therefore, the initial price increase necessary to maintain the peg would not lead to continued inflation.

How far money growth and inflation must be scaled back depends on whether the supply shock’s upward pressure on real interest rates has abated. To go back to our oil-shock example, once real rates have returned to their pre-shock level of 2 percent, the central bank will need to reestablish money growth at 1 percent. Even after this adjustment, prices would exceed their pre-shock level because of the extra money the central bank initially introduced into the system in order to maintain the peg.

This example illustrates a fundamental difference between smoothing the nominal funds rate over the seasonal cycle and smoothing it over the business cycle. Over the seasonal cycle, everyone knows that year-end increases in the money supply and prices will be offset the following quarter, as bad weather and the end of the holiday season push output below its long-term average. This reverses the process, essentially canceling out increases in money and prices during the holiday period.

Over the business cycle, a positive economic shock will not necessarily be reversed during the next quarter, or even the next year. It could take many years for increases in the money supply and prices during an upturn to completely reverse themselves during a downturn. Over time, however, there will be an equal number of positive economic shocks—when growth is above trend—

and negative economic shocks—when growth is below trend. Although these shocks may cause short-term swings in economic activity, the price level would not systematically deviate from its expected path over the long run.

Thus, an appropriate criticism of using monetary policy to smooth nominal interest rates over the business cycle is that price-level variability would be higher in the short term. A related argument against pegging nominal interest rates is that procyclical money growth would exacerbate business cycle fluctuations. Cyclical swings would be wider than with a lean-against-the-wind policy, or even one in which the Fed did not change money growth across the business cycle. Greater output fluctuations may increase variability in consumption. Some argue that this is undesirable since, holding everything else constant, consumers prefer a steady consumption stream to one that changes continually.

But everything is not held constant. Countercyclical money may smooth output and, potentially, even consumption. However, an elastic currency, by supplying additional liquidity in booms and withdrawing it in recessions, allows investment and employment to respond more quickly and efficiently to the shocks that buffet the economy. Consequently, average consumption would quite likely be higher in a world where the Federal Reserve holds the funds rate constant. Individuals would therefore be better off with an interest rate peg, even though consumption and short-term inflation would both be more variable.<sup>14</sup>

### ■ Price Stickiness and an Elastic Currency

Such an interest rate peg is optimal if we assume that the economy's fundamental rigidity is sluggishness in households' consumption and savings decisions. However, sluggishness in other types of decisions may also be important and could lead to different conclusions about how to conduct monetary policy over the business cycle.

It is commonly argued that if firms find changing their prices time-consuming or costly, the Fed should slow money growth during expansions and accelerate it during recessions to minimize output variations. Even in this sticky-price environment, however, the superiority of a countercyclical monetary policy rule has not been shown. Intuition suggests that if changing prices is costly, and if business cycles are primarily caused by supply shocks, it is important to keep the money supply elastic as the economy expands and contracts. This elasticity would supplement the elasticity of the real money stock that occurs naturally with flexible prices.

For example, if prices are perfectly flexible and there are no portfolio rigidities, a reduction in the real price of oil increases output and decreases the price level. Thus, even without a change in the nominal money stock, the real money supply rises, so that it is naturally elastic with respect to supply shocks. Prices adjust to equilibrate money supply and money demand. Some of this flexibility would be lost when prices are sticky. Under these circumstances, real-money balances can increase to satisfy the greater need for liquidity during a supply shock only if the nominal money supply provides such elasticity by increasing and decreasing along with output.<sup>15</sup>

### ■ Conclusion

We have given two reasons why a similar monetary policy could govern seasonal cycles and ordinary business cycles. First, empirical research shows that the two kinds of cycles behave in much the same way. Second, in the framework considered here, the economy would be well served by pegging the nominal interest rate across the various phases of the business cycle. That is, the current approach to seasonal cycles could be extended to include the business cycle as well.

The illustrative example we have used calls into question the intuitive notion that central banks should minimize output fluctuations. It may actually be beneficial for the monetary authority to increase the money supply during booms, so that output fluctuations become bigger than they would have been if money growth had been held constant over the business cycle.

The optimality of an interest rate peg depends crucially on whether households prefer higher average consumption to increased consumption variability, and on whether the public believes that the monetary authority will actually maintain the targeted rate. Since the Federal Reserve currently lacks this credibility, we cannot state definitively that it should adopt an interest rate peg. Nonetheless, we do believe that there are sound economic reasons why the central bank should let the money supply vary positively with output.

## ■ Footnotes

1. Preamble to the Federal Reserve Act of 1913. In modern parlance, the term *currency* should be replaced by *monetary base*, which includes both currency and bank reserves.
2. See Henry Parker Willis, *The Theory and Practice of Central Banking*, New York: Harder and Brothers Publishers, 1936, p. 82. Willis was an expert consultant to the House Banking and Currency Committee in 1912–13, while the Federal Reserve Act was being written, and was also the founding secretary of the Federal Reserve Board.
3. See Jeffrey A. Miron, "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," *American Economic Review*, vol. 76, no. 1 (March 1986), pp. 125–40.
4. See Richard H. Timberlake, *Monetary Policy in the United States*, Chicago: University of Chicago Press, 1993, p. 255.
5. See Robert Barsky and Jeffrey A. Miron, "The Seasonal Cycle and the Business Cycle," *Journal of Political Economy*, vol. 97, no. 3 (June 1989), pp. 503–34.
6. By an "interest rate peg," we mean that a given federal funds rate is targeted. The actual federal funds rate will always have some slight variation.
7. See, for example, Timothy S. Fuerst, "Liquidity, Loanable Funds, and Real Activity," *Journal of Monetary Economics*, vol. 29 (1992), pp. 3–24; or Lawrence J. Christiano, "Modeling the Liquidity Effect of a Money Shock," Federal Reserve Bank of Minneapolis, *Quarterly Review*, vol. 15, no. 1 (Winter 1991), pp. 3–34.
8. Households also have an increased desire to hold cash in order to purchase holiday gifts. If this increase is relatively smaller than it is for firms, households will hold less nominal cash and save a larger fraction of their income. Prices will adjust so that households' real cash balances will have increased, but by less than firms'.
9. This is not meant to imply that real interest rates will not increase if portfolios are perfectly flexible.
10. Even if portfolio adjustments are instantaneous, the real interest rate will rise. This is because an oil shock makes capital cheaper to use and hence more productive, increasing firms' demand for loans. This pushes interest rates up, which, with flexible portfolios, would induce households to save more. Similarly, with flexible portfolios, the extra output and consumption forthcoming today from the oil shock would induce an increase in the supply of loans, since consumers wish to smooth their consumption over time. With rigid portfolios, the interest rate will have to rise by even more in order to clear the loan market.
11. With constant money growth, the price level would fall with a decline in the price of oil. The price level rises here because the central bank increases the money supply to stabilize the nominal interest rate.
12. The best way of gaining credibility is not clear. One possible approach is to announce that the central bank is going to peg the interest rate at a constant level, and then simply accept the short-run costs of following that policy. The problem with this method is that these short-run costs may be so high that the monetary authority will abandon the interest rate peg. This, paradoxically, would justify the initial expectation that the peg is not credible.
13. For a discussion of this point, see Charles T. Carlstrom, "A Monetary Policy Paradox," Federal Reserve Bank of Cleveland, *Economic Commentary*, August 15, 1995.
14. In an earlier study, we show that average consumption is higher with an interest rate peg, and that despite the increased variability of consumption, individuals are better off. See Charles T. Carlstrom and Timothy S. Fuerst, "Interest Rate Rules vs. Money Growth Rules: A Welfare Comparison in a Cash-in-Advance Economy," *Journal of Monetary Economics*, vol. 36, no. 2 (November 1995), pp. 247–67.
15. See Peter N. Ireland, "The Role of Countercyclical Monetary Policy," *Journal of Political Economy*, vol. 104, no. 4 (August 1996), pp. 704–23.

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