

## Lecture 7: The Impact of Monetary Policy on the Economy

### I. OVERVIEW

- In the first 6 lectures of this course, we developed a simple model of the macro economy and examined the basic structure of the policy decisions faced by the Central Bank. We also looked at the Phillips Curve and examined the role of expectations in making the life of the monetary policy maker harder or easier.
- In the remaining lectures, we will move away from this “big picture” analysis using the AD/IA model and the Phillips Curve and address some issues in greater detail.
- The first topic area looks at the impact of monetary policy decisions on the economy and the manner in which monetary policy actions are transmitted to real variables in the economy.
- There are 4 papers that we will cover under this topic. The first paper, by Romer and Romer, tries to isolate the magnitude and the economic impact of monetary policy decisions on the real economy. The second paper, by Rick Mishkin, examines the different channels through which monetary policy decisions affect the real economy, more ways than the typical interest rate channel described in the IS-LM or AD-IA models. The third paper, by John Campbell presents some important economic theory on the relationship between short-term interest rates and long-term interest rates in the economy. Finally, the paper by Mankiw & Miron introduces some important concepts about the shape of the yield curve: the relationship between short-term interest rates (which are more directly affected by Fed decisions) and long-term interest rates (which govern most economic decisions by consumers and firms) to understand better how the interest rate channel works in the economy at a given point in time.

### II. IDENTIFYING THE EFFECT OF MONETARY POLICY ON THE ECONOMY

- Why is “Does Monetary Policy Matter?” an important question? Well, if it didn’t then Econ 331 will have to pack up and dismantle itself. We believe that monetary policy matters in terms of minimizing economic fluctuations and keeping inflation under control. Establishing empirically that policymakers’ actions do matter, then is vital before we proceed any further.
- In addition, not only must policymakers’ actions matter, they should also work in the direction that the policymaker intends it to work. Suppose a policymaker makes a decision to raise interest rates to slow down the economy and reduce inflation. We hope that the rise in interest rates should not only impact the economy but should also reduce GDP and lower inflation over time, as she intended.
- The main obstacle to the strand of research that examines the impact of monetary policy on the economy is the difficulty of separating the reaction of policy to changes in the economy from the reaction of the economy to policy decisions.

- For instance, we said that a booming economy and rising inflation may cause the Federal Reserve to raise interest rates. So in a crude statistical study, one may find that rising interest rates are associated with a booming economy and higher inflation, whereas theory tells us that higher interest rates should reduce inflation and slow down the economy.
- This may seem like a petty argument, because the problem here was that we ignored the timing. Since the higher inflation and the booming economy preceded the rise in interest rates, it seems clear that higher inflation caused the rise in interest rates instead of vice versa.
- This is just an economic application of the old principle that opening your umbrella when it rains does not mean that the umbrella caused the rain. Given that the rain came first it must have caused the umbrella. Similarly, seeing lots of doctors in a village struck by a cholera epidemic does not mean the doctors caused the epidemic, the epidemic came first.
- However, simply taking into account timing does not help us sort out issues of causation. For example, if one looks at a graph of short-term interest rates in the United States in the post-war period, one would notice that rates seem to rise before recessions and fall afterwards. This does not, however, imply that interest rate increases cause recessions in the economy. On the contrary, if the Fed acts in a very sensible way - raising interest rates during a boom and cutting interest rates in a recession - it will create the misleading impression that rising interest rates are responsible for recessions.
- This is called the “Post hoc ergo propter hoc” fallacy, which is fancy Latin for the “after this, therefore because of this fallacy. In plain English, when we see that movements in variable A preceding movements in variable B, we tend to (incorrectly) think that A causes B.
- Similarly, we may have opened the umbrella when the skies above got dark so the umbrella preceded the rain, yet it was the rain that caused the umbrella to open. The presence of a single case of cholera may have brought a phalanx of medical personnel to a scene in anticipation of the inevitable outbreak. The fact that the doctors preceded the mass outbreak of cholera does not imply anything about causation.
- Economists have come up with very sophisticated econometric techniques to sort out the problem of causation. In particular they use a technique called Vector Auto Regressions. These techniques, while helpful, often create just as many disputes as they resolve. Instead of studying these techniques, we will study the attempt by Romer and Romer to identify the effect of monetary policy in the economy.
- Romer and Romer follow up on the work of Friedman and Schwarz, who came up with an ingenious way of identifying the impact of monetary policy on the economy. Instead of using statistical techniques to sort out the reaction of the economy to policy from the reaction of policy to the economy, they use what they term the “narrative approach”, in which the historical record (descriptions of policy making decisions) are used to identify large shifts in monetary policy that are not driven by changes to the economy. They then examine how the economy did in fact change in response to these policy changes.

### III. THE OUTLINE OF THE ROMER AND ROMER PAPER

- The basic motivation behind the Romer and Romer paper (RR) paper is to examine the impact that monetary policy has had on the U.S. economy. In particular, the authors look at post-war U.S. monetary history and identify six distinct episodes in which the Federal Reserve raised interest rates to reduce inflation and shows that these actions did in fact have a statistically significant impact on the economy.
- Romer and Romer (RR)'s goal is to use the narrative approach to identify the impact of monetary policy on the economy. They pursue this goal in two parts. The first is a reconsideration of the seminal work by Friedman and Schwarz, who also used the narrative approach. Romer and Romer highlight some important pitfalls in using the narrative approach that they believe Friedman and Schwarz fell victim to, pitfalls that they like to avoid in this study.
- After honing the technique they identify the episodes in post-war U.S. history that they believe signify truly exogenous shifts in policy. Then they look at whether the output behaved as expected in response to these changes in policy.

#### Criticisms of Friedman and Schwarz

- RR focus on the inter-war period shocks identified by Friedman and Schwarz (FS). FS identify four such episodes: January-June 1920, October 1931, June 1936-January 1937 and the Great Depression of 1929-31.
- The January-June 1920 decision were tightenings by the Fed motivated by a concern about reserves rather than by the economy. The 1931 decision to raise rates was driven by Britain's decision to leave the gold standard, which led to fears that the U.S. would withdraw as well resulting in an outflow of gold. The June 1936-January 1937 decisions were driven by the Fed's decision to sharply increase required reserves to eliminate the vast quantity of excess reserves that banks had begin to hold since the financial panics of the Great Depression. Finally the large reduction in the money supply during the Great Depression, according to FS, also represents a monetary shock since they argue that prior Fed regimes would not have tolerated this decrease.
- In their seminal work FS identified these 4 events as being responsible for a large part of economic fluctuations in the inter-war era. Furthermore, many of these decisions could be categorized as "policy mistakes", which in turn implies that economic fluctuations in this period were mostly the result of Fed mistakes. This strongly influenced Friedman's subsequent arguments against activist monetary policies and his argument for monetarism, whereby he advocated a constant growth rate of the money supply as the recommended policy that a central bank could take.
- RR examine whether FS selection of episodes was biased. This is the primary danger of the narrative approach. Since there is no statistical criteria for determining what was an exogenous policy change, the danger is that the researcher will identify exogenous policy changes when they are not there and/or fail to identify exogenous policy changes when they are there. RR identify incidences of both types of errors.
- In terms of episodes that should have been included but were not, RR identify two candidates. The first episode is the 1933 decision by Pres. Roosevelt to declare a bank holiday in the presence of bank failures. The similarity between this episode and the 1932 decision included

in FS make it harder to justify why one was included and the other was not. Since the Great Depression ended in 1933, FS decision not to include this contractionary shock (which should have made the depression worse but didn't) biases their results in favor of finding large impacts.

- The second episode is in 1941 when the Fed raised reserve requirements sharply. This is, according to RR, a mere continuation of the increases that began in 1936, which were included in FS. So the reasons for including one and not the other again bias their results.
- In terms of episodes that should not have been included but were, RR identify problems with all four episodes chosen by FS. They find that other economic factors were also contractionary, which makes separating out the impact of the contractionary monetary policy from these other contractionary factors very difficult.
- In 1920, the end of WWI caused government spending to fall sharply. Separating the impact of the contractionary monetary policy from the contractionary fiscal policy is difficult, and ignoring the fiscal policy may bias the results in favor of finding a bigger impact of monetary policy. Similar effects were clouding the 1936 episode and the Great Depression. In 1936, the collection of social security taxes and labor unrest led to lower output. In the Great Depression, a variety of events including a stock market crash and a fall in world trades following the enactment of the Smoot-Hawley tariffs. The 1931 episode is the closest to being a pure monetary disturbance but even then higher trade barriers and a large tax increase in 1932 made for a contraction that, if ignored, can lead us to mistakenly conclude that monetary policy has large effects.

### **Extension of Friedman and Schwarz**

- RR extend FS to the post-war period. Having a better functioning Fed, with an improved documentary record. They also adopt a common criteria - they actively look at events when the Fed was unhappy with the current level of inflation and acted to push the AD curve back so as to bring inflation down.
- By leaving out expansions and contractions driven by responses to change in inflation RR seek to find clean instances of policy changes, with less room for judgment errors. They also argue that these are decisions to change the level of inflation that would prevail even if the economy were at potential output, and hence insulated from being corrupted by inflation changes that are driven by changes in output.
- RR pore over the "Record of Policy Actions" of the FOMC and the minutes of FOMC meetings. Using these sources they identify episodes where the FOMC decides that the current level of inflation was unsatisfactory and takes action to lower inflation by inducing a monetary contraction.
- RR identify six such episodes: October 1947, September 1955, December 1968, April 1974, August 1978 and October 1979.
- In October of 1947, the Fed was becoming concerned about the rate of inflation in the U.S. economy. They were unable to do much about this because of the wartime policy of pegging interest rates, to make it cheaper for the government to borrow. Once the peg was released in July of 1947, the Fed was free to act and raise rates.

- In September of 1955, the Fed became unhappy with the then rate of inflation and concluded that they were willing to reduce inflation even at the cost of higher unemployment.
- In December of 1968, the Fed with frequent references to the presence of inflationary expectations in the economy, agreed to follow tighter monetary policy to try and counter such expectations.
- In April of 1974, following the first oil price shock, the Fed pursued a policy of raising interest rates even though the economy was weak, again referring to the psychology of inflation and the need to counter inflation expectations.
- The last two episodes come from the Paul Volcker era at the Fed. In August 1978, the Fed announced plans to raise interest rates to strengthen the weak dollar and lower inflation. The 1979 rate hike was driven by the Fed's belief that the 1978 actions had not done enough to lower inflation and acted to raise the Federal funds rate by 3.75 percentage points.

### **The Impact of the RR Shocks on the Real Economy**

- RR provide both informal and statistical evidence about the impact of monetary policy decisions on the real economy. The first is a series of graphs that show a downward trend in GDP and an upward trend in unemployment following each of these 6 dates.
- These tests of course do not distinguish between the effects of monetary shocks and the effects of other changes in the economy. They first forecast the path of output and unemployment, and see how the actual series differed from the forecast following the RR shocks. The forecast is done using a simple equation with month dummies to capture seasonal effects and lags to account for the natural cycles of the economy.
- RR provide graphs of the forecast errors (actual value - forecast value) for these equations. We would expect to find that fairly soon after each of the 6 episodes identified here, there should be relatively large negative forecast errors (because the contractionary policy pushes output lower than predicted). They find that similar results hold for unemployment with unemployment rates being about 1.5-2.5 percentage points higher than the forecast following the monetary shocks.
- The pattern holds for all 6 episodes, which is encouraging since otherwise it may be possible that some unmodeled factor affected the variable being forecast instead of the monetary shocks. Even these univariate forecasting tests can be misleading so RR resort to a more formal test described in Equation 1 of page 26. These show that the effect of contractionary monetary shocks is significant and contractionary, as we expect to find. Furthermore, the timing is uncertain, which is also consistent with the story we told in class about lags in the impact of policy.

### **Impulse Response Functions**

- Last but not least, they carry out a simulation by tracing out the "impulse response" of the forecasting equation, which basically consists of setting one of the policy dummy variables to one and tracing out its effect over time. This shows a maximum impact over 33 months, with the initial effects beginning around a 6 month lag. These results are true for unemployment as well as for industrial production.

- A more detailed explanation of an impulse response function is given below. Suppose we use the regression equation given by Romer and Romer (ignoring the monthly dummies).

$$u_t = a_0 + \sum_{j=1}^{24} b_j u_{t-j} + \sum_{k=0}^{36} c_k D_{t-k}$$

- This can also be written without the summation signs as

$$u_t = a_0 + b_1 u_{t-1} + b_2 u_{t-2} + \dots + b_{24} u_{t-24} + c_0 D_t + c_1 D_{t-1} + \dots + c_{36} D_{t-36}$$

- We would first estimate the  $a$ ,  $b$  and  $c$  parameters. Then to calculate the impulse response function, we would isolate the impact of monetary policy by considering how a monetary shock affects the path of unemployment.
- We begin by setting  $u_{t-1} = u_{t-2} \dots = u_{t-24} = 0$  and  $D_t = D_{t-1} = D_{t-2} \dots = D_{t-36} = 0$ . Then not only will  $u_t = 0$  but all subsequent unemployment rates will also be zero. In other words we have set up a baseline (counterfactual) path of zero. Its easiest to set the constant to zero as well.
- Now we tweak the model by setting  $D_t$  to 1, i.e. we institute a monetary policy change this period. Then you can see that  $u_t = c_0$ , since  $D_0$  is the only non-zero variable around. What happens in the following period? From the above, we can write the following expression for  $u_{t+1}$

$$u_{t+1} = a_0 + b_1 u_t + b_2 u_{t-1} + \dots + b_{24} u_{t-23} + c_0 D_{t+1} + c_1 D_t + \dots + c_{36} D_{t-35}$$

- When we include only non-zero terms, this collapses to

$$u_{t+1} = b_1 u_t + c_1 D_t = b_1 c_0 + c_1$$

- Repeating for period  $t+2$  we get

$$u_{t+2} = a_0 + b_1 u_{t+1} + b_2 u_t + \dots + b_{24} u_{t-22} + c_0 D_{t+2} + c_1 D_{t+1} + \dots + c_{36} D_{t-34}$$

- When we include only non-zero terms, this collapses to

$$u_{t+2} = b_1 u_{t+1} + b_2 u_t + c_2 D_t = b_2 c_0 + b_1 [b_1 c_0 + c_1] + c_2$$

- They also find that decisions by the Fed to induce a recession can explain about a fifth of all economic fluctuations in the economy.
- Finally, for robustness' sake, they examine whether or not other factors - supply shocks, fiscal policy or higher inflation itself could be responsible for the downturns instead of monetary policy changes. They do this by adding a measure of supply shocks to the regressions (which doesn't change anything) by adding the change in the government's budget position (budget balance/GDP) and finally by adding the change in the producer price index to the regression. None of these changes affect the results much leading RR to confirm their hypothesis.