University of Southern California Marshall School of Business

GSBA 549

Notes on the Effects of Money on Interest Rates

Mankiw (chapter 11) describes how changes in the money supply affect domestic output and employment in the short run. He does not discuss the effects on interest rates or on international variables such as the exchange rate and the trade balance. These notes fill in the gaps.

Effects on Domestic Interest Rates

The short-run effects of a change in the money supply are different from the long-run effects. Money is neutral in the long run but not in the short run.

Suppose there is a one-time increase of 10 percent in the nominal money supply. If money is neutral, this one-time increase has no effect on real variables such as real output, the real interest rate, and real money balances (M/P). There is a one-time increase of 10 percent in the price level, but no effect on the ongoing inflation rate or the nominal interest rate.

In the short run, a one-time increase in the money supply is non-neutral. A 10 percent increase in the nominal money supply does not lead to an immediate 10 percent increase in the price level. Mankiw discusses several alternative explanations of why the price level might not immediately and fully respond to a change in the money supply. If the price level does not immediately rise in proportion to the increase in the money supply, real output and employment are affected.

Mankiw does not discuss the short-run responses of real money balances and the interest rate. Most economists believe these responses are important in their own right, and they are also important in understanding the short-run effects of the money supply on exchange rates and the trade balance.

If a 10 percent increase in the nominal money supply is not accompanied by an immediate 10 percent increase in the price level, then real money balances (M/P) increase. Remember that the money-market clearing condition is

$$\frac{M}{P} = L(R,Y) = L(r+\pi^e,Y).$$

If the real money supply rises, the money market can clear only if real output rises and/or the nominal interest rate falls. Most economists believe that real output does not respond instantaneously to an increase in the money supply. Thus, the nominal interest rate must fall if the money market is to clear.

Notice that an increase in the nominal money supply causes nominal interest rates to fall, at least temporarily. This response of nominal interest rates is known as the *liquidity effect*, and it is frequently

Copyright © 1998 by Douglas H. Joines

mentioned in discussions of Federal Reserve policy. Most of these discussions assume that the immediate effect of open-market purchases by the Federal Reserve is to drive down nominal interest rates. This liquidity effect would not exist if the price level increased fully and immediately in response to an increase in the nominal money supply.

Many economists believe the liquidity effect plays an important role in the *transmission mechanism* linking changes in the money supply to subsequent changes in real output. An increase in the money supply is unlikely to cause inflationary expectations to fall - if anything, inflationary expectations should rise. Thus, the decline in the nominal interest rate implies that the real interest rate also falls in response to an increase in the money supply. A decline in the real interest rate stimulates both consumption and investment demand. Many economists believe the link running from the money supply through interest rates to aggregate demand is the main channel by which monetary policy affects real output in the short run. Some of the models discussed by Mankiw imply interest-rate effects of monetary policy. For instance, the imperfect-information model implies that the real interest rate declines when the nominal money supply unexpectedly increases. (For those who care to do additional reading, chapter 19 of Barro develops this model in detail.)

Mankiw also analyzes a permanent increase in the <u>growth rate</u> of money, as opposed to a one-time increase in the money supply. A sustained increase in money growth raises the ongoing rate of inflation. As long as inflation is higher than expected, unemployment stays below its natural rate. However, people eventually come to expect the higher inflation, and unemployment returns to its natural rate. The long-run Phillips curve is vertical, meaning that there is no long-run relation between inflation and unemployment. In the long run, a higher rate of money growth leads to higher ongoing inflation with no effect on output or employment.

The effects on interest rates are similar. If the central bank permanently increases the money growth rate, causing higher ongoing inflation, nominal and real interest rates may fall initially. Once the higher inflation is fully expected, however, all real effects wear off. The real interest rate returns to its previous level, while the nominal interest rate rises above its original level because people expect higher inflation. Thus, the central bank has no long-run effect on real interest rates, and a permanent increase in the money growth rate eventually causes higher nominal interest rates by raising inflationary expectations. This positive long-run relation between money growth and interest rates is very different from the negative short-run relation captured by the liquidity effect.