

ECON 4100: Monetary Economics
Homework 2
Lastrapes
Fall 2008

1. Use the 'loanable funds' model of the market for credit to predict the effect on real interest rates of the following events. Provide a brief explanation.
 - a. An increase in the perceived risk of financial securities.
 - b. An increase in the marginal product of capital.
 - c. Falling stock prices.
 - d. A decrease in expected inflation.

a. Supply of LF shifts left, interest rate increases.
b. Demand for LF shifts right, interest rate increases.
c. Wealth falls inducing an increase in household saving (reduction in consumption). Supply of LF shifts right, reducing interest rates.
d. Demand for LF shifts left and supply of LF shifts right, so nominal interest rates will fall. However, there will be no change in real interest rates, because nominal rates will tend to fall by the same amount as expected inflation.
2. Suppose that on January 1, 2009 the annualized yield on 3-month t-bills is 1%, and that bond markets expect the 3-month yield on April 1 to be 2%, on July 1 to be 3%, and on October 1 to be 4%.
 - a. If the expectations hypothesis of the term structure of interest rates is valid, what is the yield-to-maturity on January 1, 2009 of 6-month t-bills and of 12-month t-bills? Plot the yield curve as of this date.
 - b. Suppose also that the observed yield-to-maturity on 2-year treasury securities is 4% on January 1, 2009. What does the expectations hypothesis imply about the market's expectation for the yield-to-maturity on one year treasury bills in 2010?
 - a. 6-month: 1.5%; 12-month: 2.5%. (see appendix for graph)*
 - b. Expected ytm in 2010: 5.5%*
3. Suppose that the US, non-bank public holds \$5,000 in currency (Federal Reserve Notes), banks hold \$2,000 in reserves (of which \$500 is on deposit with the Fed), and total checkable deposits in the banking system equal \$50,000. Determine: a) the US monetary base; b) currency held by banks; c) total Federal Reserve Notes outstanding; and d) M1.

a. monetary base = \$7,000; b. vault cash = \$1,500; c. FRN = \$6,500; d. \$55,000.
4. Assume that in aggregate banks act to ensure that their desired reserve ratio (q) is 10%, and that the public's desired currency ratio (k) is 75%. For each of the

events below, determine the effect on the US money stock ($M=C+D$) and on total bank loans (L) as predicted by the multiplier model.

- a. The FOMC directs the trading desk at the N.Y. Fed to sell \$1,000,000 in government securities.
- b. The Federal Reserve Bank of Atlanta makes a discount loan to Bank of America of \$500,000, at the primary credit rate of 2.25%.
- c. The Fed buys UK government bonds worth £500,000 when the exchange rate is \$1.50/£.
- d. U.S. Treasury deposits at the Fed rise by \$1.5 million, and the Fed responds by instructing the trading desk to buy \$1.5 million in treasury securities.
- e. The government's budget deficit rises by \$100 billion.

In each case, the money multiplier is 2.06 and the loan multiplier is 1.06.

- a. *Base falls by 1mill. Money stock falls by \$2,060,000; loans fall by \$1,060,000.*
- b. *Base rises by \$500,000. Money stock rises by \$1,030,000; loans rise by \$530,000.*
- c. *Base rises by \$750,000. Money stock rises by \$1,545,000; loans rise by \$795,000.*
- d. *The increase in Treasury deposits would reduce the monetary base, and the Fed purchase would replenish it. So there is no net change in the base, and therefore no change in the money stock or bank loans.*
- e. *This depends on whether the Fed 'monetizes' the deficit. If it fully monetizes, then the base will rise by \$100 billion, money will rise by \$206 billion, and loans will rise by \$106 billion.*

5. Explain how each of the following would likely affect the nation's money supply, assuming the monetary base remains unchanged.
 - a. An increase in market interest rates on bank loans.
 - b. Marijuana is legalized.
 - c. Bankers perceive an increase in the risk on loans (to businesses and to other banks).
 - d. The government eliminates the FDIC.

If the monetary base doesn't change, then the money stock will only change if the multiplier changes.

- a. *The opportunity cost of holding reserves rises, so q will fall and the multiplier will rise. Thus, the money stock will rise.*
- b. *Currency is less valuable as a means of payment since marijuana transactions are no longer illegal. k will fall, the multiplier will rise and the money stock will rise.*
- c. *q will rise, the multiplier will fall, and the money stock will fall.*
- d. *Bank deposits become riskier making currency more valuable; k rises, multiplier falls, money stock falls.*

6. During the current financial crisis of 2008, what has been the significance of Section 13 (3) of the Federal Reserve Act?

The Fed has used this section of the Act to support the widening of the scope of its lending. It has allowed the Fed to play a wider role as lender of last resort, making loans not only to banks, but to non-bank financial institutions as well as to other agents in the private sector.

7. Your local bank computes that during its most recent reserve computation period it had an average daily balance of \$150 million in checking accounts and \$5 million in cash. Average daily balances of deposits at the Fed during the corresponding maintenance period was \$7 million. Did the bank hold sufficient reserves to satisfy current Fed reserve requirements?

Given that the bank held \$150 million in checking deposits, its required reserves are \$11.648 million. To satisfy this requirement, it must hold average cash (during the computation period) and deposits at the Fed (during the maintenance period) of this amount. Since it holds a total of \$12 million, the bank does satisfy the requirement, and holds some excess reserves.

8. Explain the differences in how the Fed implements its discount lending policies through its primary credit facility and its term auction facility. Which one of these facilities gives the Fed more precise control over the *amount* of lending that takes place, and why?

For primary credit lending, the Fed (through its district banks) sets a discount (borrowing) rate, and banks apply for loans. Thus, banks themselves determine the amount they wish to borrow. Under the new TAF, the Fed determines the amount to lend directly (and exactly), and auctions this amount off to those banks most willing to borrow it. These banks are determined by an anonymous auction, in which banks offer a rate and an amount. The Fed has more control over the amount of loans under the TAF than primary lending, although it is not perfect control if banks don't want to borrow the full amount offered by the Fed.

9. Assume that the FOMC uses the federal funds rate as its day-to-day operating target, there is no discount borrowing, and the Fed pays no interest on bank reserves. What is the appropriate open-market operation (purchase or sale), if any, for the FOMC to maintain its target in the face of the following shocks. Why?
- There is an increase in checking account liabilities in the banking system.
 - The desired reserve ratio of the banking system falls
 - Stability in the economy leads to an increase in the supply of loans in the federal funds market.
 - The public's desired currency ratio rises.

- a. Demand for reserves rises, putting upward pressure on the fed funds rate. The Fed would purchase securities in the open market to increase reserves in the system.
- b. The demand for reserves falls, putting downward pressure on the fed funds rate. Fed would sell securities to reduce aggregate reserves.
- c. An increase in the supply of loanable funds in effect reduces the demand for holding bank reserves. Open market sale would reduce reserves to prevent the fed funds rate from falling.
- d. If the currency ratio rises, the demand for reserves will fall as checking accounts fall, but non-borrowed reserve supply will drain out of the system. The Fed need do nothing to maintain the fed funds rate.

10. Draw a graph of the market for bank reserves assuming the following: a) the Fed's primary credit rate is 2%; b) the interest rate paid by the Fed on bank reserves is 1%; c) non-borrowed reserves (NBR) are \$500 billion; d) borrowed reserves (BR) are zero; and e) the equilibrium (effective) federal funds rate is 1.5%. On the graph, show what would cause borrowed reserves to rise by \$100 billion, and the equilibrium federal funds rate to rise to the primary credit rate of 2%. From this new position, what would happen to borrowed reserves and the federal funds rate if NBR falls.

See appendix for graph. Borrowed reserves will rise if the demand for reserves shifts to the right so that it intersects the elastic supply at 2%. If NBR falls from this point, borrowed reserves increase (so that there will be no change in total reserves) and the fed funds rate will remain at 2%.

11. Assume that the Fed's current federal funds rate target is 3%. The Fed estimates that while output is equal to its target level, the currently observed inflation rate of 3% exceeds its target of 2%. If the real interest rate at full employment is 1%, how should the Fed change its fed funds target if it follows Taylor's Rule as a guide to implementing monetary policy strategy?

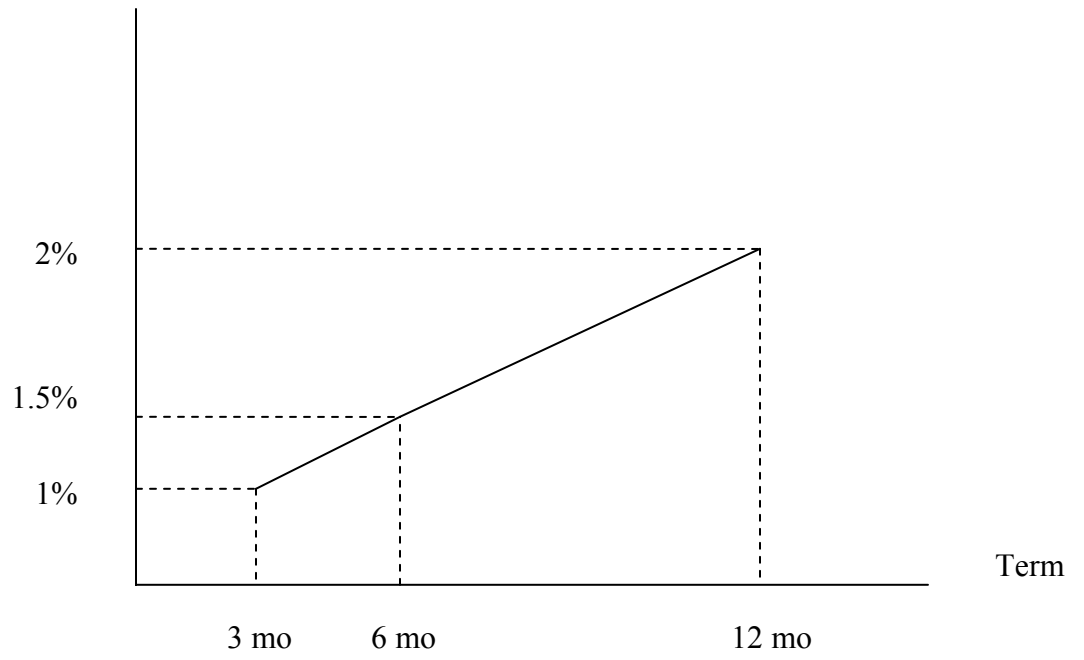
Taylor's rule implies that the fed funds target should be 4.5%. Thus, the fed should act to raise its target to this level from 3% (presumably by selling securities to decrease bank reserves and the money supply).

12. Using the fundamental supply and demand model of exchange rates, predict how the following events would likely affect the equilibrium \$/€ exchange rate (all other things constant).
- a. An increase in the price level in Europe.
 - b. An increase in market interest rates in Europe.
 - c. A proportional increase in the price levels in both the US and Europe.
 - d. An increase in British interest rates.

- a. Demand for Euros would fall, causing the Euro ($S = \$/\epsilon$) to depreciate.
- b. Demand for Euros would rise, causing the Euro to appreciate.

- c. *Both the supply and demand for Euros would increase, leading to no change in the Euro (think of theory of PPP).*
- d. *If everything else is the same, a change in British rates would most likely not affect the Euro/dollar exchange rate.*
13. Distinguish between the concepts of ‘purchasing power parity’ and ‘interest rate parity’ and how they help explain fluctuations in exchange rates over time.
- PPP claims that relative price levels ultimately determine the nominal exchange rate, since the real exchange rate is assumed to be independent of changes in prices. This is generally reasonable in the long-run. Interest rate parity is based on the assumption that assets are perfect substitutes no matter what currency they are denominated in, so that the return of investing in dollars, say, must equal the return of investing in Euros, say; the latter would include the expected appreciation of the Euro. In the short-run, nominal exchange rates are assumed to adjust until this parity condition holds. Thus, fluctuations in nominal exchange rates (in the short run) vary with fluctuations in interest rates.*
14. Until July 2005, China actively pegged its currency, the Renminbi yuan, to the US dollar; thereafter, the yuan floated against the dollar. Suppose that US demand for goods produced in China increased in 2004. What action would the central bank of China (the PBC) have taken to ensure that the yuan would not appreciate relative to the dollar? How has the PBC presumably responded to such a shock since July 2005?
- If US demand for imports from China rose in 2004, the demand for yuan would rise (relative to the dollar), putting upward pressure on the yuan exchange rate. To prevent this rise, the Chinese central bank would buy dollars (by creating yuan), thereby increasing its money supply and reducing interest rates: the supply of yuan would rise and the demand would fall. This would keep the yuan from rising.*
15. According to the ‘quantity theory of money,’ what happens when the growth rate of money increases by 5% under a fiat money system? What are the key assumptions underlying this result? Do the predictions of the theory seem to be supported by the data?
- The price level will rise by 5%. The key assumptions are that velocity and income don’t change when the money supply increases. The data support the theory.*

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