Special Note: Our thoughts and prayers go out to those who suffered as a result of the unspeakable terror that occurred in the country side of Pennsylvania, Washington D.C., and New York City. As a result of this tragedy, a brief class meeting was held on Tuesday, September 11, 2001. The following describes the new schedule associated with the first exam:

September 11/13, 2001 – Problem Set 1a administered
September 18, 2001 – Problem Set 1a due
September 18, 2001 – Problem Set 1b administered
September 25, 2001 – Problem Set 1b due
September 27, 2001 – Exam 1

Please note that the first exam has been rescheduled. Students having schedule conflicts must get in touch with me as soon as possible preferably no later than September 18, 2001. The remainder of the schedule is precisely as the syllabus reads.

Class Outlines
September 11 and 13 2001

September 11, 2001

I. Review, brief coverage of material in chapter 4. (All material covered in chapter 4 was also covered on September 13, 2001).

September 13, 2001

I. Review

II. Graphical description of money demand

a. We plotted money demand against interest rates.
   i. As interest rates increase, money demand decreases. The reason for this is because at higher interest rates, agents choose to hold more of their wealth in interest bearing bonds.
   ii. As income increases, people want to consume more goods and services. Since bonds can not be used for transactions, a higher income is associated with a higher demand for money. This is represented by a shift in the money demand curve to the right. (Following an increase in income, the amount of money demanded is higher at ever interest rate than it had been before).

III. How does theory hold up to the real world?

a. Note, that the money demand relationship from the September 6th lecture can be written as follows:
   i. $M^d/Y=L(i)$.
      1. In other words, the ratio of money demand to income is related to the interest rate. Our theory predicts that this relationship is negative.

b. The evidence suggests the following with respect to the relationship between the ratio of money demand to income and the interest rate using M1 for money demand (a measure of how much money is in the economy), GDP for income, and the average interest rate on government bonds for interest rates.
   i. The ratio of money to income has declined since 1960.
      1. Alternatively, the ratio of income to money has increased since 1960. The ratio of income to money is also known as the *velocity of money*. The velocity of money, loosely speaking, indicates the number of times a dollar is used to buy 1 dollar's worth of output. (Note the same dollar can be used over and over. Think of the number of times you have gotten a dollar with some silly statement written on it).
         a. Why? Among other things, there have been many innovations in financial markets. Since 1960, the payment for many transactions is concentrated to the end of the month and is simplified by credit cards.
   ii. There is a significant negative relationship between the ratio of money demand to income and the interest rate.

IV. Equilibrium in the money market

a. Money Supply
   i. Assumption: Money is supplied exogenously by the Federal Reserve. It is simply a number (e.g. $100,000,000) which we will take as given.

b. Graphically.
   i. We considered equilibrium in the money market by plotting money demand against money supply. The equilibrium interest rate is the single interest rate at which the quantity of money people desire to hold is exactly equal to the amount supplied by the Federal Reserve.
   ii. Change in income
      1. An increase in income results in a higher demand for money. Because the supply of money is assumed fixed,

people can not get more money. To offset the higher demand for money, therefore, interest rates must increase. With a higher income, agents will not be able to hold more money, but the higher interest rates will entice them to hold bonds. Thus as income increases, interest rates increase.

2. A decrease in income results in a lower interest rate, with exactly the same quantity of money being held.

iii. Open market operations.

1. When the Federal Reserve buys government bonds, this causes the supply of money to increase. An increase in the supply of money causes interest rates to decrease.
2. When the Fed sells government bonds (literally think of this as the Fed selling government bonds and taking money out of the economy) the supply of money decreases. This causes interest rates to increase.