



The Demand for Money

Chapter #16

Introduction

- *What is money? Why does anyone want it?*
- In economics, money = medium of exchange
 - Whatever is accepted in exchange
 - In U.S., M1 (currency and checkable deposits) comes closest to defining means of payment
 - At the end of 2005, M1 = \$4,596 per person
 - Debate whether broader measure, M2, might better meet the definition of money in a modern payment system
- Demand for money refers to the stock of assets held as cash, checking accounts, and closely related assets, specifically not generic wealth or income

Components of the Money Stock

- Two main monetary aggregates in U.S.: M1 and M2
 - M1 comprises those claims that can be used *directly, instantly, and without restrictions* → LIQUID
 - M2 includes M1, plus some less liquid assets (ex. savings accounts and money market funds)
- As liquidity of an asset decreases, the interest yield increases
 - A typical economic tradeoff: in order to get more liquidity, asset holders have to sacrifice yield

The Functions of Money

- There are four traditional functions of money:
 1. Medium of exchange
 - Money is used to pay for goods and services
 - Eliminates the need for a “double coincidence of wants”
 2. Store of value
 - An asset that maintains value
 3. Unit of account
 - The unit in which prices are quoted
 4. Standard of deferred payment
 - Money units are used in long term transactions (ex. loans)

The Demand for Money: Theory

- The demand for money is the demand for real money balances → people hold money for its purchasing power
 - Two implications:
 1. Real money demand is unchanged when the price level increases, and all real variables, such as the interest rate, real income, and real wealth, remain unchanged
 2. Equivalently, nominal money demand increases in proportion to the increase in the price level, given the real variables just specified

The Demand for Money: Theory

- The theories covered here correspond to Keynes's famous three motives for holding money:
 - The *transactions motive*, which is the demand for money arising from the use of money in making regular payments
 - The *precautionary motive*, which is the demand for money to meet unforeseen contingencies
 - The *speculative motive*, which arises from uncertainties about the money value of other assets that an individual can hold

Transaction and precautionary motives → mainly discussing M1
Speculative motive → M2, as well as non-money assets

Transaction Demand

- The transaction demand for money arises from the lack of synchronization of receipts and disbursements
 - Keep money on hand to make purchases between pay periods
- Tradeoff between amount of interest an individual forgoes by holding money and costs of holding a small amount of money
 - Benefits of keeping small amounts of money on hand is interest earned on money left in the bank
 - Cost of keeping small amounts of money is the cost and inconvenience of making trips to the bank to withdraw more

Transaction Demand

- Suppose the following:
 - $Y = \$1800/\text{month}$
 - Person spends the Y evenly over the month, at a rate of $\$60/\text{day}$
- Alternative 1:
 - Person could keep the entire $\$1800$ in cash and spend $\$60/\text{day}$
 - Cash balances falls smoothly from $\$1800$ to $\$0$ at the end of the month
 - Average balance of
$$\frac{(\$1800 - \$0)}{2} = \$900$$
 - Forgone interest of $i \times \$900$

Transaction Demand

- Suppose the following:
 - $Y = \$1800/\text{month}$
 - Person spends the Y evenly over the month, at a rate of $\$60/\text{day}$
- Alternative #2:
 - Person could deposit entire amount, and each day take the needed $\$60$ out of the bank
 - Earn interest on money left in the bank over the course of the month
 - Cash balances fall from $\$1800/30$ to zero every day
 - Average balance of

$$\begin{aligned}
 & \text{Forgone interest of } \frac{(\$1800/30 - \$0)}{2} = \$30 \\
 & \qquad \qquad \qquad i \times \$30
 \end{aligned}$$

Transaction Demand

In general:

- Starting income of Y
- n trips to the bank
- *The average cash balance is $\frac{Y}{2n}$*
- Each trips costs tc
- *The combined cost of trips plus forgone interest is:*

$$(n \times tc) + i \times \left(\frac{Y}{2n} \right)$$

- Choose n to minimize costs and compute the average money holdings → Baumol-Tobin formula for the demand for money:

$$\frac{M}{P} = \sqrt{\frac{tc \times Y}{2i}} \quad (1)$$

The Precautionary Motive

- The Baumol-Tobin model ignored uncertainty
 - People uncertain about the payments they might want or have to make → there is demand for money for these uncertain events
- The more money a person holds, the less likely he or she is to incur the costs of illiquidity
 - The more money a person holds, the more interest he/she will give up → similar tradeoff encountered with transactions demand for money
- Technology and the structure of the financial system are important determinants of precautionary demand

Speculative Demand for Money

- Speculative demand for money focuses on the store-of-value function of money → concentrates on role of money in the investment portfolio of an individual
- Wealth held in specific assets → *portfolio*
 - Due to uncertainty, unwise to hold entire portfolio in a single risky asset → diversify asset holdings
- Money is a safe asset
 - Demand for money depends upon the expected yields and riskiness of the yields on other assets (James Tobin)
 - *Increased opportunity costs of holding money lowers money demand*
 - *Increased riskiness of returns on other assets increases money demand*

Empirical Estimates

- Four essential properties of money demand:
 - Demand for money balances responds negatively to the rate of interest.
 - Demand for money increases with the level of real income.
 - Short-run responsiveness of money demand to changes in interest rates and income is considerably less than the long-run response. (the long-run responses are estimated to be about 5 times the size of the short-run responses)
 - Demand for nominal money balance is proportional to the price level. There is no money illusion; in other words, the demand for money is a demand for real balances.

The Income Velocity

- The income velocity of money: the number of times the stock of money is turned over per year in financing the annual flow of income.

- Equal to the ratio of nominal GDP to the nominal money stock, or:

$$V \equiv \frac{P \times Y}{M} = \frac{Y}{M/P} \quad (2)$$

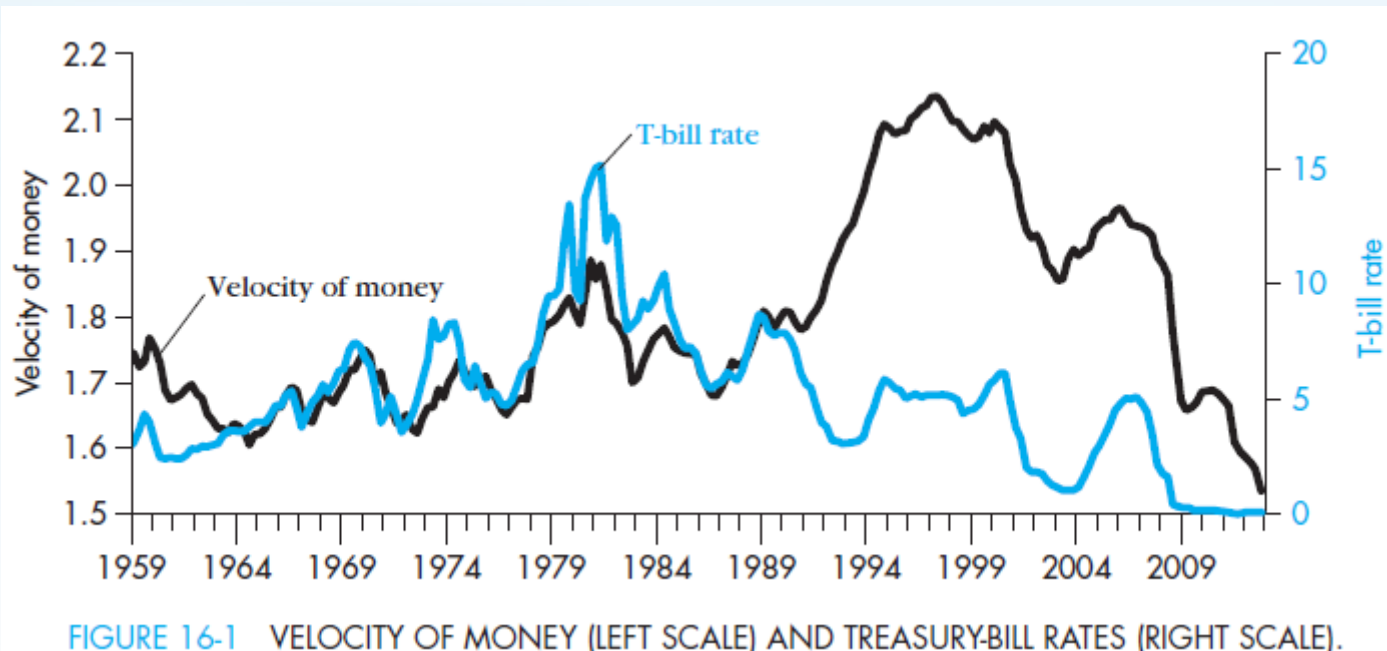
- Can also be interpreted as the ratio of nominal income to nominal money stock OR the ratio of real income to real balances

The Income Velocity

- Concept of velocity is important largely because it is a convenient way of talking about money demand
 - Demand for real balances is: $M/P = L(i, Y)$
 - Substituting into equation (2), velocity can be written as: $V = Y/L(i, Y)$
 - Money demand can be written as: $L(i, Y) = Y \times l(i)$
 - Velocity of money is: $V = 1/l(i)$

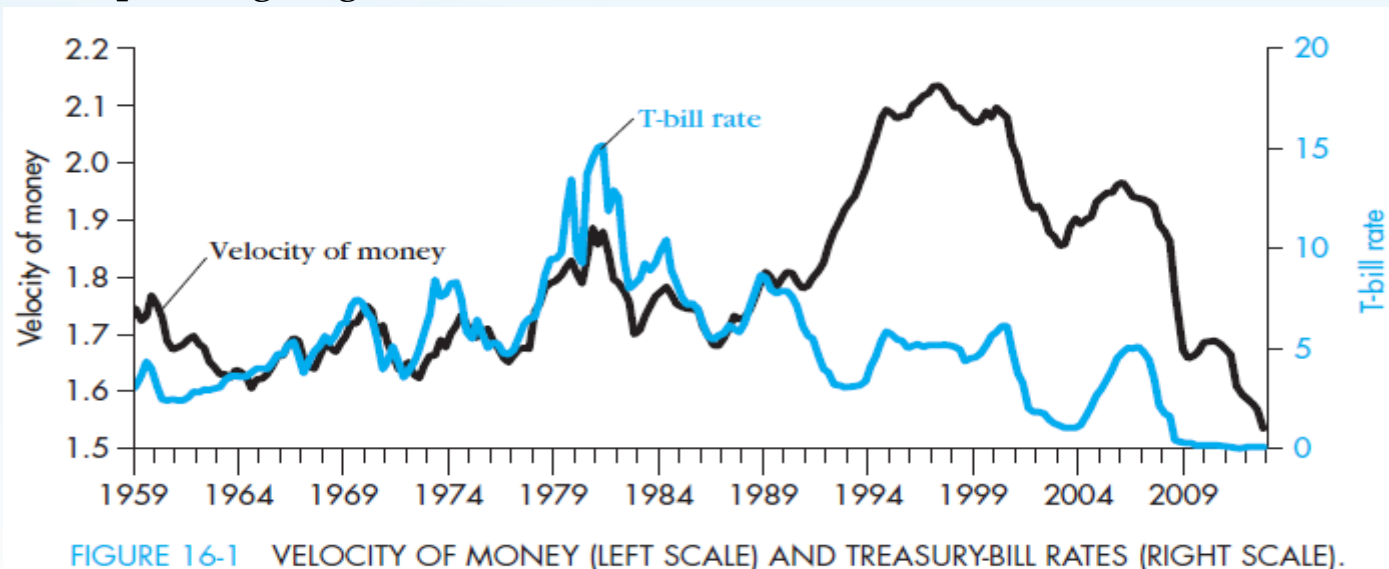
The Income Velocity

- Figure 16-1 shows M2 velocity (left scale) and the Treasury bill interest rate (right scale)
 - M2 is relatively stable
 - Velocity has a strong tendency to rise and fall with market interest rates



The Income Velocity

- Figure 16-1 shows M2 velocity (left scale) and the Treasury bill interest rate (right scale)
 - M2 velocity has become much less stable
 - When monetary aggregates relatively unstable, monetary authority should use the interest rate rather than money supply as the direct operating target



The Quantity Theory

- The *quantity theory of money* provides simple way to think about the relation between money, prices, and output:

$$M \times V = P \times Y$$

(3)

- Equation (3) is the famous *quantity equation*, linking the price level and the level of output to the money stock
- The quantity equation became the *classical quantity theory* of money with it was argued that both V and Y were fixed
 - If both V and Y are fixed, it follows that the price level is proportional to the money stock

The Quantity Theory

- The classical quantity theory = theory of inflation
 - The price level is proportional to the money stock:

$$P = \frac{V \times M}{Y} \quad (3a)$$

- If V is constant, changes in the money supply translate into proportional changes in *nominal GDP*
 - With the classical case (vertical) supply function, Y is fixed, and changes in money translate into changes in the overall price level, P