The Economics of Money Banking

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Chapter one

Nonmonetary or Barter Systems

Chapter1

Nonmonetary or Barter Systems

The overriding goal of this chapter is to understand

– what is meaning of barter

- **what is defect of a barter exchange system**

- **what are the implications emerge when a system of monetary exchange has been established in place a barter system.**

Chapter one

Nonmonetary or Barter Systems

The invention and use of money permit a widening of the area of production, trade, exchange, and economic activity. In the absence of money, where goods exchange directly for goods, production, of course, will still occur. But the production and exchange system that would exist in such a case and the manner in which superior economic arrangement can be realized by the use of money, call for brief examination.

Defect of a Barter Exchange System

Let us imagine a pure exchange economy. We suppose, for example, that production has taken place and the possessors of commodities come to a market place in the village square to exchange their surplus produce for other commodities they desire. We might imagine that there are in all 100 commodities offered in the exchange system. In the trading that ensues, we may observe at least four prominent defects or deficiencies of the procedure. these can be identified as 1 the difficulty of establishing the necessary double coincidence of wants (2) the need to establish a large number of independent price ratios of exchanges; (3) the difficulty of establishing mutually consistent cross-rates of exchange; and (4) the absence of a universally acceptable store of value.

Double Coincidence of Wants:

The difficulty of establishing a double coincidence of wants appears in the following example. Suppose a consumer came to the exchange market with horse and wanted to obtain shoes, he immediately confronts three problems. First, he has to discover another individual in the market at the same time who wishes to obtain horse. But second he needs more than that. He needs to find another trader who not only wants horse but also has shoes; he wants to give up in exchange for horse. That considerably intensifies our horse farmer's difficulty. But that still is not the end of the matter. For third, he is then confronted with the difficulty of agreeing on the number of shoes that should be exchanged for a horse. That, perhaps, could be resolved by haggling and bargaining.

But two residual difficulties would still exist.

In the first place, neither a horse nor a shoe is divisible. There would not be much sense in bargaining in factions of shoes or horse. and further, both the horse farmer and the shoe maker would need to be sure that the rate of exchange they established between horse and shoes was consistent with what they could establish independently between, say, horse and bananas on the one hand, and bananas and shoes on the other. This illustrates the need for what was referred to in our summer as consistent cross-rates of exchange.

Large Number of Independent

Price Rations:

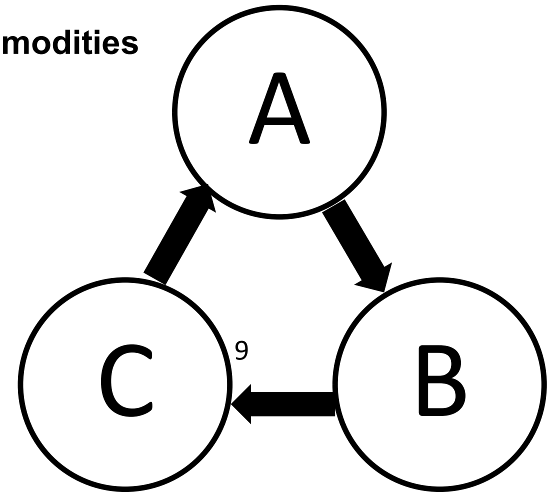
In the potential exchange transaction, it might not be possible for the horse farmer to obtain what he wants by direct exchange at all. He may have to exchange his horses for, say, and then exchange the horses for cheese, and so on. Only after a long series of exchanges might he end up with the shoes he came to the market to acquire. In all of this a heavy expenditure of time and effort is involved. Valuable resources, which might be put to better use in production, are being absorbed in circuitous trading transaction. At the same time, heavy transaction costs will conceivable be involved.

But even if all transactions were effected to everyone's satisfaction, a large number of price rations of exchange would have been established in the process. This fact provides us with a view of what is meant by a commodity price. Let us stay with the point for a moment.

To anticipate what lies ahead, this same interpretation of price as a ratio of exchange carries over to monetary exchange system. For suppose it were possible to acquire on dozen apples for six dollars. The dollar price of apples would be one half in more familiar language we would say simply that the price of an apple is fifty cents. What we mean by the price of a commodity is, in our developed monetary system, the dollar price. it is a way of stating the established rate of exchange between dollars and the commodity. Furthermore, just as we speak of the dollar price of apples we can also refer to the apple price of dollars. This is no doubt a less –familiar way of speaking of things, but the terminology does have specific application in some branches of our subject. It arises especially in the market for foreign currencies.

Now consider a system of exchange containing three commodities. We are interested in the number of independent price ratios of exchange that would have to be established. Let us refer to the commodities as A, B, and C, in the outcome A would potentially exchange for band C, B would exchange for A and C; and C would exchange for A and B. it appears that six price ratios would therefore be established. That is correct, but only three of these would be in the sense in which the term was used above, independent ratios of exchange. Three of them would be reciprocals of the other three. The A price of B would be the reciprocal of the B of A, and so on.

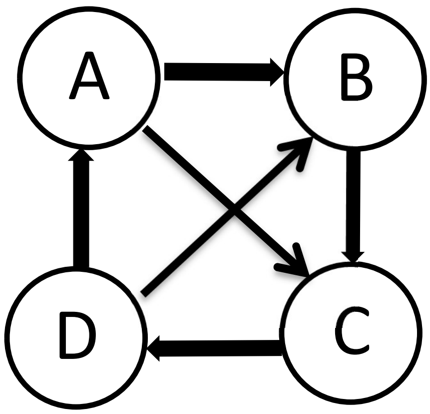
See the following diagrams in the case of three commodities



In the case of three commodities, we want to know how many combinations of items taken two at a time can be obtained from the set three commodities. First, A and B are a pair, second A and C are a pair, and third, Band C are pair. There are three pairs. There are accordingly three independent ratios of exchange. Assume that three are six commodities in the exchange system. In this case three will be fifteen pairs of commodities and therefore fifteen independent ratios of exchange.

We may imagine however, that in a system of 100 commodities one of the commodities is assumed to be exchangeable for each of the others. In that case, that one commodity will be performing one of the functions of money. We shall consider later how it might have been chosen. But instead of having to establish 4,950 independent price ratios in the 100 commodity system as before, it would be necessary to establish only 99. The commodity that has now become the money commodity will establish a ratio of exchange with each of the 99 other. This gets to the heart of one of the principal issues of the economy and efficiency introduced to exchange arrangements when a monetary system replaces a barter system

In the case of four commodities



Mutually consistent cross- rates of exchange

This third defect of barter exchange arrangements can be exhibited by taking another simple case. Suppose there is again a three-commodity exchange system. Now the individual holding commodity A can obtain commodity C in either of two ways. First, he can exchange his A directly for C. second, he can first exchange A for B, and then exchange the B he thus obtained for the amount he wanted of C. we shall refer to the first possible exchange route as direct exchange, and the latter as indirect exchange. What now determines which of the two exchange routes the holder of A will take? it will depend on the most efficient or economical way of proceeding. But this, in turn, will depend on the rates of exchange involved. the direct route gives a rate of exchange described by A/C. the indirect route will give an effective exchange rate described by the product of the two separate rates, A/B and B /C. the individual holding A will be indifferent between the direct and the indirect routes of exchange when the direct ratio, A/C, is precisely equal to the product of A/B and B/C. when that condition occurs we have mutually consistent cross-rates of exchange. in a pure barter system of exchange, it would be difficult to be sure that such mutually consistent rates could be easily and permanently established.

Store of Value

A final difficulty of a barter system of exchange arrangements is that no one commodity may be universally acceptable as a store of value. if it were, it would by that reason have become a "money" commodity, and the full barter characteristics of the system would have been modified. On the other hand, when money enters the scheme of things its functioning as a store of value is of paramount importance.

Other Considerations of Barter Arrangements

The foregoing discussion drew attention to the costs as well as the difficulties involved in effecting exchanges in a pure barter system. The economic costs would actually be threefold. First there is the direct cost of making the actual exchanges when the possibility of achieving them is finally established. Second, there is the cost of search time in ferreting out the exchange possibilities. And third, there is the economic opportunity cost of allocating resources to establishing these rounds about exchange processes, when those resources could conceivably be employed in alternative avenues of direct production.

Let us for the moment suppose that a system of monetary exchange has been established in place of a barter system. Deeper implications emerge, not only for the exchange arrangements but also for the production arrangements in the economy.

First, the prospect of being able to exchange surplus production for a money commodity (leaving a side for the moment the question of pure noncommodity money) will make it possible for producers to concentrate their energies and resources on that line of production in which they have superior skills.

Second, they will be able, to put it in familiar economic terms to exploit, their comparative advantages in resource availability and production potential.

Third, specialization of production will be encouraged and facilitated by widened exchange opportunities. This will lead to higher levels of overall production in the economy.

Fourth, the total income of the economy will thereby be increased, with benefits of increased well-being or economic welfare.

In this way the emergence of money accomplishes a widening of the area of exchange, a widening of the potential for economic production, and a general widening of the scope and structure of economic activity.

Exercises

Chapter one

Nonmonetary or barter Systems

Part A: True –False Question

Circle whether the following statements are true (T) or false (F).

1- The invention and use of money permit a widening of the area of production, trade, exchange, and economic activity.

2- In barter system the person would obtain what he wants by direct exchange at all

3- The money is considered commodity and its functioning as a store of value is of Paramount importance.

4- In the barter system, the people focus on both exchange arrangements and production arrangements as a same.

Part B: Multiple –choice question

Circle the appropriate answer

1- ………………..Is considered of the defects the barter system.

a- the need to establish a small number of independent price ratios of exchange

b- The easy of establishing the necessary double coincidence of wants.

c- The absence of universally acceptance store of value.

d- The easy of establishing mutually consistent cross-rates of exchange

2- Is considered economic cost of the barter system

a- the direct cost. b- the indirect cost.

c- the search time cost. d- all of the above

3- Suppose that there 7 commodities determine the number of independent price ratios of exchange

a- 49. b- 42. c- 21. d- 9

4- Suppose that there 6 commodities, determine the number of price ratios that must be established

a- 36. b- 30. c- 15. d- 18

5- When a consumer wants to compare the price of one product with another, money is being used primarily for which function?

a- store of value. b- unit of account

c- checkable deposit. d- medium of exchange.

6- Which of the following is the most important advantage of the medium of exchange function of

a- money tansfers purchasing power from the present to the future

b- money measures the relative worth of products.

c- money reduces the complications of barter

d- money allows people use credits instead of currency

7- What is not a reason for the replacement of barter with the use of money?

a- money is easily divisible

b- money can never be destroyed

c- money eliminates the need for a coincidence of wants.

d- money allows for greater economic specialization

8- When a consumer wants to compare the price of one product with money is being used primarily for which function?

a- store of value. b- Unit of account.

c- checkable deposit. d- Medium of exchange

9- Which of following is the most important advantage of the medium of exchange function of money?

a- money transfers purchasing power from the present to the future

b- money measures the relative worth of products

c- money reduces the complications of barter.

d- money allows people use credit cards instead of currency

10- What is not a reason for the replacement of barter with the use of money?

a- money is easily divisible

b- money can never be destroyed.

c- money eliminates the need for a coincidence of wants.

d- money allows for greater economic specialization

11- Which of following about a barter economy is correct?

a- without money, there is no way to store wealth.

b- buying and selling cannot be separated

c- the scope of exchange and specialization is restricted.

d- a and b

12- Which of the following can exist in a barter economy?

a- common measure of value

b- price competition

c- lending and borrowing

d- non of the above

13- In a barter economy goods lack a common measure of value this problem could be solved if.

a- goods are homogenous.

b- goods be divided into smaller unit for transactions of small amounts

c- goods are easily portable.

d- a and b

Problem

Problem 1

Suppose that the person has good (X) he want to exchange (X) against (y), assume that exchange rate is:
1× =19Y

Required

1- Applying the conditions for completing this barter assume that this person want to give up 10X

2- Suppose that there another good (Z), 1 × = 100 Z, determine how two persons could be sure that the rate of exchange they established between X and Y was consistent with what they establish independently.

3- Determine the number of independent price ratios of exchange and number of price ratios that would be estimated.

4- Suppose that the holder of X good want to obtain on the Z good determine the possible exchange routes and determine of which two exchange routes the holder of X take.

5- Draw the diagrams in case existing three good X, Y, Z

6- Suppose that there 10 commodities, determine the number of independent price ratios of exchange and the number of price ratios that must be established.

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Chapter two

The Functions of Money

Chapter two

The functions of money

The overriding goal of this chapter is to understand the following topics

Money as a unit of account

- **Money as a unit of account enables us to consider relative economic values**
- **The unit of account provides an important source of information**

Money as a medium of exchange

- **Money has become generalized purchasing power**
- **The principle forms that the commodity selected for use as money should possess.**

Money as a store of value

- **The stability in the value of money**

- **The capitalization rate**
- **The difference between liquidity and marketability**
- **The concept of velocity of circulation of money**
- **Money as a standard for deferred payments**

Chapter two

The functions of money

In the preceding chapter it was argued that the functions of money are necessarily prior to the possible forms of money. Anything will be acceptable as money provided it performs the functions of money efficiently. Much is wrapped up in the notion of efficiency. Certain forms of money may perform one or more functions of money more efficiently and effectively than others. This will influence the shape of the developed monetary system that emerges as the economy and its money-using potential expands.

The deficiencies of barter arrangements point to four essential functions that money can be expected to perform. Money functions as (1) a unit of account, (2) a medium of exchange, (3) a store of value, and (4) a standard for deferred payments.

Money as a Unit of Account

In the unit of account function money acts as a generally recognized measure of value. Suppose, for the want of a name, that the unit of account is called a dollar. Whether, at this stage, the dollar is a commodity or a thing is not important. Our sole concern is with the fact that the value of whatever is produced and available for exchange can now be measured in dollars. This concept of a unit of account or a measure of value function does, however, raise a number of questions.

Our focus, rather, is on the values that commodities appear to have or assume in relation to each other in the markets of the economy.

First, then, money as a unit of account enables us to consider relative economic values. This is consistent with the earlier notion of a commodity price as a rate of exchange. For purposes of market analysis, we are interested in the rates of exchange between commodities. The price of a commodity is its relative value measured in money terms. If to take our earlier example, a horse has a market price or value of one hundred dollars and a pair of shoes has a price of ten dollars, then a relative price ratio is immediately established between them. The horse farmer knows that if he sells his horse for its market price, he will be able to acquire two pairs of shoes.

Second the unit of – account function is significant in that it provides an important source of information. The information content of this money function means that producers are able to know where potential trading opportunities exist in the economy. This will affect their decisions regarding the allocation of resources to the production of commodities. The same significance of the unit of account applies to value measurements wherever they occur– in the measurement of the values of assets and liabilities, the computation of incomes, expenditures, and saving, and the measurement of indebtedness between individuals.

Third, the money unit being used in the economy will perform efficiently as a measure of value only so long as its own value is constant. A foot or a yard is a measure of length. But such a measure would not perform its function efficiently if the length of a foot or a yard were to vary. No consistency could be achieved in the comparison of relative lengths at different times and places. Similarly, it is desirable that the unit of money measurement should itself be stable in value.

What this important concept refers to can best be described as general purchasing power of money. The concept itself is admittedly elusive. But ideally, we want to be able to say that at all time and places the unit of money has a constant purchasing power command over commodities in general. Its command over specific commodities may change as the market prices of those commodities vary. But we would like to be able to be sure that on the average, measured over the range of commodities available for exchange in the market system as a whole the purchasing power of money was constant.

If this is not the case, if prices in general are rising and the purchasing power of money is decreasing the usefulness of the unit of money as a measure of value at different times will be diminished. Let us take a simple example.

We may suppose that the total value of the nation's production measured in money terms during 1984 was $3,000 billion, and in the following year the value in money terms was $4,000 billion. It might see on the face of it that during 1985 the nation's production increased by one-third. That would be a remarkable, achievement. But if, during the same time, the general level of prices or the purchasing power of money had changed significantly, the relative economic performance between 1984 and 1985 would appear in a very different light. Suppose the general price level, measured for example by the gross national product deflator (an index of the prices of all commodities included in the national product), has increased during 1985 by 25 percent.

This information can be used to reduce the money value of the 1985 output to what it would have been, in terms of the unit of measurement, if the price level had not changed. To do this we deflate the 1985 values by dividing them by 125 percent. in that case the 1985 production is said to be measured on the same scale as the one used to measure the 1984 production. In more technical terms, the 1985 production would in that case be measured in constant dollars. Adopting this measurement-adjustment procedure, the 1985 production will then be registered not as $4,000 billion (its current nominal value) but as $3,200 billion, or its current value of $4,000 billion divided by 125. In that case the national production, measured in 1984 or constant dollars, increased by $200 billion from $3,000 billion to $3,200 billion, or by 6 $^{2}/3$ percent.

Money as a medium of exchange

Money functions as a medium of exchange in the sense observed at the beginning of this chapter. When money has been invented, goods, no longer, exchange directly for goods. Goods now exchange for money, and money exchange for goods, considerable economies and conveniences of arrangement are introduced to exchange system as a result. There will be a greater readiness on the part of producers to produce in excess of their own requirements and to offer commodities for exchange. The area of economic activity is expanded. The nation's income and well-being are correspondingly increased.

Money, in performing this medium of exchange function, has become generalized purchasing power. The possession of money gives the holders a purchasing power command over goods and services which they may exercise at any time or place them choose. The holding of money permits the transference of purchasing power over time and space. Of course the efficiency with which money performs its basic medium of exchange function will depend on the form it takes. For this reason, attention was given in the early stages of the development of monetary systems to the desirable properties that the commodity selected for use as money should possess.

The money commodity had to be (1) durable so that it would not be easily destroyed or diminished in value by continued use or natural decay. The money commodity would need to (2) divisible, and to have a value in relation to its bulk that permitted it to be divided into units or pieces of a size convenient for making transactions. It would need to be (3) portable, or again have a value in relation to size that made it possible to carry an amount adequate for the usual level of transactions contemplated. Finally, it would need to be (4) easily recognizable or identifiable, to guard against counterfeiting and false representation. For these reason, one of the principle forms of money that appeared at earlier stages of its development was precious metals, principally gold and silver.

Two problems arise, however, ill connection with this medium of exchange function of money.

First, it is subject to difficulties that stem from possible changes in the value of money and in particular, from the public's expectations regarding possible changes in that value in the future. if, in conditions of extreme economic dislocation, for example, the public should have reason to fear that the value of money would diminish sharply in the period ahead (in conditions, that is of expectations of rapid inflation), a generally diminished willingness to accept money may develop. This happened during the fantastically rapid German inflation earlier.

In this century, in such a case money will have lost its acceptability. It can no longer perform its medium of exchange function. Individuals cannot have confidence that if they accept it they will be able to pass it on again to another transactor at a value comparable to that at which they had acquired it. For this reason, we stated earlier that the thing that makes money. Money is its acceptability.

Second, particular problems may arise when the material used as money has a dual value. In addition to its value as money, it may have a value as a commodity usable for nonmonetary purposes. The question will then continually arise to whether its value as a commodity, in the ordinary commodity markets of the economy, is greater or less than its value as money. This problem gave rise to considerable disturbances in the early nineteenth century monetary system in the United States. At that time attempts were made to maintain both gold and silver in circulation as money, though they then simultaneously had obvious commodity values.

Money as a Store of Value

There are two respects each with very different implications for monetary analysis, in which money may function as a store of value. The first relates to the fact that money is functioning as a temporary store of value when it is used as a means of transporting generalized purchasing power over time and space. We considered that question in the preceding section. The efficiency with which money function as a store of value in this sense depends on the prospective stability in the value of money.

More generally, money may function as a store of value when it is used as one of the assets in which individuals decide to hold a part of their wealth. In this sense money competes with other assets as a wealth holding from. The attractiveness of it for this purpose depends on certain characteristics it possesses in comparison with those other alternative assets. Such wealth assets, or portfolio assets, will possess to greater or lesser degrees the following four properties.

First, they may incur storage costs. Storage costs of money will be minimal, apart, perhaps, from fees paid to banks or other custodians for safekeeping. In the case of real assets, however, storage costs could be significant. If that were the case, such assets need to possess some of setting characteristics, such as the prospect of an increase in their market value, to make them attractive as a wealth–holding from. Moreover, real assets would not perform efficiently as a store of value unless there was reason to believe that a market existed in which they could readily be sold for money at any time, in order to realize their value and obtain liquidity in the future.

Second assets may provide the holder with a rate of return, or a, rate of interest, earned by holding them. Such assets as shares of stock in industrial corporations or government securities promise the holder a rate of return. That return will be fixed in money terms in the case of government securities and will be variable in the case of corporate common stocks. money, however, will not provide the holder with a rate of return (though this general statement is subject to exceptions at the present time when, as a result of recent government legislation, certain kinds of interest – bearing savings accounts in banks and other depository institutions can effectively be used as money).

Third, assets have a certain amount of risk associated with holding them. In particular, there are risks associated with the possible income streams to which we have just referred. There is no effective risk that the fixed annual interest on government securities will not be paid when it is due. The government possesses general taxing powers and money creating power to ensure that the interest due on its debt obligations will always be met. But this is not the case with the securities of industrial corporations. the income paid on many of them, corporate bonds and common stocks for example, depends on the ability of the firm to generate an income stream large enough to pay the interest or dividends after all necessary production costs have been met.

Moreover, there is a risk of a different kind associated with all marketable and income –earning assets, including government securities. We shall see more clearly in a later chapter that the market value of marketable securities varies inversely with the market rate of interest. Suppose a security promises to pay a perpetual income of $50 per annum in interest, and that the level of the rate of interest available on assets of the same class of risk is 5 percent. Then the market value of that asset will be the amount that individual investors would be prepared to pay for it and be able to expect that they would get a rate of return of 5 percent on their investment, this amount would clearly be $1,000. For by paying $ 1,000 for the asset the holders would ensure themselves of an annual income of $ 50, or 5 percent of their investment. Market values of such assets, therefore, are easily obtained by dividing the dollar amount of interest promised to the holder by the rate of return the investor requires in technical terminology, the market value is the capitalized value of the expected income. This is exactly what is meant by dividing the expected interest by the desired rate of return. This method of determining market values is said to be capitalizing the interest expectation. The required rate of return is referred to as the capitalization rate.

in the case in hand, imagine that the general level of interest rates, and therefore the investor's required rate of return, rose from 5 percent to 6.25 percent. Then the market value of the asset, the capitalized value of the expected income, would be the $50 divided by 6.25 percent. This equals $800. The rise in the interest rate from 5 percent to 6.25 percent has caused the market value of the asset to fall from $1,000 to $ 800. The risk that this might occur while an asset is being held in an individual's asset portfolio is referred to as the interest rate risk, or market value risk.

Assets in general, then, are subject to a range of risks to which money, to the extent that it is held as asset, is not subject. Money has a zero or minimal storage cost, a zero or minimal rate of return, but also a minimal risk. That however, is not the end of the matter. For one generally perverse risk to which the holding of money is subject still requires consideration. That is the risk that during the period for which money is held the general value or the purchasing power of money may diminish. This refers again to the matter of inflationary changes in the value of money.

Fourth, it is necessary to consider, when the choice between different kinds of wealth portfolio assets is being made, the liquidity of the assets. Liquidity is closely related to marketability, or the likelihood that the asset can be sold or turned into money at any time it is necessary or desirable to do so, but liquidity differs from pure marketability. For liquidity refers not simple to the possibility that the asset could be sold for money at any time. it refers also to the possibility that could be done without realizing a loss on the value of the asset. In this sense. Money possesses perfect liquidity. Other assets possess varying degrees of both marketability and liquidity. it would be possible to order assets on a scale describing the extent to which they possess liquidity. Money, by definition, would, be at the top of the scale. Those assets that ranked close to money would be given the special name or description of "near money". In fact, in the complex economy, we lie in at the present time near–moneyless" is an important asset characteristic. Such near–money as savings accounts, money market mutual fund shares, short term government securities, and certain kinds of very short term or overnight loans perform highly significant function in the money and financial asset markets.

Fifth point of considerable analytical significance emerges from the discussion of money as a store of value. This refers to the fact that people keep by them an amount of money that bears some relation to the volume of their income or expenditures during a given period, say a year. If, now, the total level of annual expenditures in the economy were divided by the amount of money held in this way, we would have a measure of the rate of turnover of this money stock. It would be a measure of the number of times that, on the average, the stock of money turned over, or passed from one income earner or market transactor to another. In the course of consummating the annual market expenditures. This rate of turnover measure has acquired a special name – in monetary economics. It is referred to as the velocity of circulation of money.

The significance of this velocity of circulation concept rests in the fact that an increased desire on the part of the public to hold money will be reflected in a decline in the velocity of circulation of money. It is necessary, therefore to investigate possible causes of variations in this velocity magnitude. The rate of interest, among other things, is very relevant. For the higher the rate of interest that can be earned on lending money rather than holding it, the higher will be the income foregone by holding money for the sake of the liquidity it provides. This income sacrificed describes the opportunity cost of holding money. For our present purposes it is sufficient to observe that anything that cause a change in the velocity of circulation of money also causes a change in the overall rate of money expenditure. it is short step of analysis, then to observe that whatever causes a change in the level of monetary expenditure in the economy will have effects on the level of production, incomes, and employment.

Money as a Standard for Deferred Payments

The function of money as a standard for deferred payments is already implicit in the analysis to this point. It means that money provides the measure in which future dated obligations are stated, indebtedness performs a very important in our complex economic arrangement, and a method of stating the amounts due for payments between individuals at future dates is vitally necessary. One of the principal features of our enterprise economy is that large numbers of economic relations are conducted on the basis of clearly stated and legally enforceable contracts. Money as a standard for deferred payments enters this nexus of relations by providing the measurement unit in which contractual obligations are defined.

Money as a standard for deferred payments functions with complete efficiency, of course, only to the extent that the value or purchasing power of money is constant. if, during the course of outstanding debt, the value of money should decline or the general level of prices should rise, this could confer an economic benefit, commonly referred to as a windfall gain, on debtors. This occurs because they would then be able to repay their debts as they become due in dollars that had a lower purchasing power than the dollars they had borrowed at the time of the initial loan contract. Similarly, increases in the purchasing power of money would confer windfall gains on creditors.

Money as a standard for deferred payments has significance for a wide range of such contracts of indebtedness. In our enterprise system many contracts for the payment of current expenses are also extremely significant. Prominent examples are contracts for the payments of wages where trade union may settle wage arrangement for a period of, say. Three years into the future, and contracts for the payment of rents

Exercises

Chapter two

Economists define (1)…………………… as anything that is generally accepted in payment for goods and services or in the repayment of debts. This usually means currency to most people but to economists this definition is far too narrow. Economists include checking account deposits and travelers checks with currency to come up with a narrow definition of the (2) …………………… called M1.

Before discussing the significance of money. It is important that one distinguish money from income. Money is a stock: that is, it represents a measure at a point in time. For example, the money stock, M1, was $1058.9 billion on June 9, 1997. Income is a (3) …………………… of earnings per unit of time. Money serves a purpose, or in economists jargon it is productive. if money was not productive, we would abandon its use. Money's productivity results largely from its ability to reduce transaction costs and encourage (4) …………………… and the division of labor.

Money has three primary functions: it is a medium of exchange, unit of account, and (5) …………………… which all act the reduce transaction costs and encourage specialization. Generally regarded its most important function, money's ability to serve as a medium of exchange is what distinguishes it from other assets both financial and physical. Without money, exchanges would be strictly (6) ……………………transactions. And while barter can be an efficient system for small groups of people, transaction costs rise significantly as the population grows because people find it increasingly difficult to satisfy a double coincidence of wants. Money reduces the high search costs that are characteristic of barter exchanges.

Money also lowers information and exchange costs by serving as a unit of account. Comparison shopping is extremely time consuming and costly when goods are not priced in a common unit, whether the units are dollars, cigarettes, or beaver pelts

.

Finally, money serves as a store of value. This function of money facilitates the exchange of goods over (7) …………………… Although money is not unique as a store of value, it is the most (8) …………………… of all assets, and thus it tends to be the preferred store of value for most people most of the time. To illustrate just how this tendency is, consider that people did not completely abandon the use of German currency even during the hyperinflationary 1920s. Though barter did become much more prevalent.

Money's evolution over time has been driven by efforts designed to reduce transaction costs further. The introduction and subsequent acceptance of (9) …………………… and checks greatly reduced transportation costs and the loss from theft, respectively. More recently, there has been progression toward a checkless society. Although concerns about fraud have slowed development of an (10) ……………………

(EFTS), one continues to observe movements in this direction.

Unfortunately, it is much easier to identify the virtues of money than it is to identify which assets actually function as money. In general, economists take two approaches to obtain a precise definition of money: the (11)……………………approach and the (12)……………… ……approach.

The theoretical approach suggests that assets that act as a (13) …………………… should be summed to calculate the money supply. The theoretical definition, however, is inherently ambiguous since many assets have money like qualities. For example, in a discussion among Federal Reserve Board members several years ago, someone commented that money market mutual funds should not be included within the narrow money definition because most funds required a $500 minimum on all their checks. Then chairman Paul Volker's response was to the effect that the minimum requirement had not often prevented his wife from spending from their account, Volcker's comment, though lighthearted, illustrates one problem of the theoretical approach to measuring money.

The empirical approach suggests using that measure which does the best job of predicting the (14) …………………… and inflation. To date, the results of his approach have proved mixed, with measures providing little consistency from one-time period to the next.

Because of such confusion, the Fed monitors closely the movements of several (15) …………………… most important are the two narrowest definitions. M1 and M2. If both measures moved together and exhibited a high degree of correlation with economic activity, the Fed's job would be much easier. Such is not the case, however, and there seems little optimism among economists that a solution will be found soon to the measurement problem.

Further complicating matters is the unreliability of (16) …………………… money statistics. Given all these problems, it is no wonder that some commentators refer to monetary policymaking as an art rather than a science. At the same time, it is this kind of controversy and uncertainly that makes the study of money and banking so interesting.

Exercises

Exercise 1: medium of exchange

Assume that there are three students on campus–named Allen (A), Barbi (B), and Clyde (C). they live in the same dorm and know each other well. allen owns a CD by the Ramones (R). Barbi owns a Rod Stewart (S) CD, and Clyde has a CD by Travis, Tritt (T). further assume thatAllen prefers the Rod Stewart CD to the one by the Ramones and that he prefers the Ramones CD to the one by Travis Tritt. Barbi prefers the Travis Tritt CD to her Rod Stewart CD, but likes the Ramones the least. Clyde prefers the Ramones CD to his Travis Tritt CD, likin the Rod Stewart CD the least. if we rank each student's preferences for the CDs, representing preference with the ">" symbol, we get the following table:

individual	preferences	Initial CD
A	S > R >T	R

B	**T > S >R**	**S**
C	**R > T >S**	**T**

Now assume an economy with no money, so that all trades are barter transactions. Note that when Allen (because he likes Rod Stewart better than the Ramones) approaches Barbi about trading CDs, Barbi will be unwilling to trade since she will be worse off (she prefers Rod Stewart to the Ramones) the same happens when any two individuals try to trade directly. Allen will be unwilling to give the Ramones for Travis Tritt in a trade with Clyde, and Clyde will be unwilling to trade away. Travis Tritt in an exchange with Barbi.

Thus we see from in this example that barter between any two individuals – because there is not a double coincidence of wants– prevents the three individuals from getting their most preferred musical artist.

However, if we assume that Barbi is aware of Clyde's willingness to trade his Travis Tritt for the Ramones CD, then Barbi will be willing to accept the Ramones CD in exchange for her Rod Stewart since she knows that she will be able exchange with Clyde at a later date.

Finish filling in the table below showing the movement of the CDs among Allen, Barbi, and Clyde.

individual	Initial CD	intermediate	Final CD
A	R	----------	----------
B	S	----------	----------
C	T	----------	----------

What the Ramones CD functioned as?........................

Exercise 2: the functions of money

Money has three primary functions: it is a medium of exchange, a store of value, and a unit of account. The statements below provide examples of these three functions. Indicate which of the three primary functions of money is illustrated by each statement let M = medium of exchange, S = store of value, and U = unit of account.

1- Erin purchases tickets to the pearl Jam concert by writing a check.

2- Christopher drops the change from his pocket into the wine bottle bank on his study desk.

3- So that they might avoid calculating relative prices of goods in terms of all other goods, the traders at the trading post agreed to value their wares in terms of beaver pelts.

4- Everyone understood, including nonsmokers that the prices of commodities traded in the prisoner of war camp were to be stated in terms of cigarettes.

5- Although he loved to smoke, Andrew saved cigarettes for he would be able to purchase chocolate bars on more favorable term as the supply of cigarettes dwindled in the POW camp.

6- Anthony calculated that the opportunity cost of his time was $10.00 per hour.

7- Meghan purchases for $29.95 the videotape she plans to give to her parents for Christmas.

8- This function of money is important if people are to specialized at what they do best.

9- Function of money that reduces transaction costs in an economy by reducing the number of prices that need to be considered.

10- The role of money that would not be provided if bananas were to serve as money.

Exercise3: function of money - unit of account

The price of one good in terms of another is referred to as the barter price or exchange rate. The benefits of using money are best appreciated by thinking of a barter economy. Between any two goods there is one barter price or exchange rate. But as the number of goods increases, the number of barter prices or exchange rates grows more rapidly. Complete the following table which dramatically illustrates the virtues of a unit of account.

Number of prices in barter versus a money economy

Number of Goods	Number of Prices in a Barter Economy	Number of Prices in a Money Economy
5	----------	5
25	----------	25

50	----------	----------
500	**124.750**	----------
5000	----------	----------

Exercise 4: measuring money - the Federal Reserve's Monetary Aggregates

After each asset, indicate in the space provided which monetary aggregate M1, M2, M3, or L includes the asset. As an aid the first one has already been completed.

1- Currency M1, M2, M3, L

2- Savings bonds

3- Overnight repurchase agreements

4- Checkable deposits

5- Short-term Treasury securities

6- Small denomination time deposits

7- Money market deposit accounts

8- Money market mutual fund balances (institutional(

9- Savings deposits

Self-test

Part A: true or false questions

Circle whether the following statements are true (T) or False (F)

1- Since checks are accepted as payment for purchases of goods and services, economists consider checking account deposits as money.

2- Of its three functions, it is as a unit of account that distinguishes money from other assets.

3- Money is a unique store of value, since physical goods depreciate over time.

4- Money can be traded for other goods quickly and easily compared to all other assets. Thus money is said to be liquid.

5- Money proves to be a good store of value during inflationary episodes since the value of money is positively related to the price level.

6- Paper currency evolved because it is less costly to transport than is commodity money.

7- Inflation may reduce economic efficiency if it induces people to resort to barter.

8- The major impetus behind the move to expand the EFTS is the relatively high cost of transporting and processing checks.

9- In times past when only currency functioned as money defining money would have been conceptually much easier.

10- The past behavior of M1 and M2 indicates that using only one monetary aggregate to guide policy is sufficient since they move together very closely.

Part B: Multiplier - choice questions

Circle the appropriate answer

1- When an economist talks about the impossibility of barter he or she really is not saying that barter is impossible. Rather, he or she means to imply that

a- barter transactions are relatively costly b- barter has no useful place in today's world

c- it is impossible for barter transactions to leave the parties to an exchange better off

d- each of the above is true

2- The resources expended trying to find potential buyers or sellers and negotiating over price and terms are called

a- barter costs. b- transaction costs

c- information costs d- enforcement costs

3- If cigarettes serve as a medium of exchange, a unit of account. And a store of wealth, cigarettes are said to function as

a- bank deposits b- reserves

c- money d- loanable funds

4- Because money reduces both the time it takes to make exchanges and the necessity of a double coincidence of wants, people will find that they can more easily pursue their individual comparative advantages. Thus money.

a- encourages nonproductive pursuits.

b- encourages specialization.

c- forces people to become too specialized.

d- cause a waste of resources due to the duplication of many activities

5- The narrowest definition of money, called M1,consists of a- currency

b- currency, checking account deposits, and money market mutual funds

c- currency, checking account deposits, and money market deposit account funds.

d- currency checking account deposits and traveler's checks.

6- As the transaction costs of selling an asset rise, the asset is said to become.

a- more valuable b- more liquid

c- less liquid d- more money like

7- Which of the following are problems with a payments system based largely on checks?

a- checks are costly to process

b- checks are costly to transport.

c- Checks take time to move through the check-clearing system

d- all of the above

e- only (a) and (B) of the above

8- which of the following approaches to money definitions have economist considered?

a- the theoretical approach b- the empirical approach

c- Weighted average approach d- all of the above

e- only (a) and (b) of the above

9- Which of the following is not included in the money aggregate M2?

a- currency

b- money market deposit accounts

c- overnight repurchase agreements

d- Savings bonds

10- Which of the following best describes the behavior of the money aggregates M1 and M2?

a- while both M1 and M2 tend to rise and fall together, they often grow at very different rates.

b- M1 tends to grow at a much rate than M2

c- while both M1 and M2 tend to move closely together over periods as short as a year, in the long run they tend to move in opposite directions.

d- while both M1 and M2 tend to move closely together over periods as short as a year, in the long run they growth ratio are vastly different.

11- The conversion of a barter economy to one that uses money

a- increase efficiency by reducing the need to exchange good

b- increase efficiency by reducing transaction costs.

c- has no effect on economic efficiency since efficiency is production concept, not an exchange concept.

d- decreases efficiency by reducing the need to specialize

12- Which of following are true about the evolution of the payments system?

a- the evolution of the payments system from barter to precious metals, then to fiat money, then to checks can best be understood as a consequence of innovations that allowed traders to more easily escape oppressive taxes on exchange

b- Precious metals had the advantage of being widely accepted being divisible into relatively small units, and being durable but had the disadvantage of being difficult to carry transport from one place to another.

c- paper money has the advantage of being easy to transport but has the disadvantage of being less accepted than checks

d- only (a) and (b) of the above are true.

13- Generally, the problem of defining money becomes troublesome as the pace of financial innovation

a- less; quickens

b- more; quickens

c- more: slows

d- more; stops

14- If an individual " cashes in a US. Savings bond for currency.

a- M1 increases and M2 stays the same

b- M1 stays the same and M2 increases

c- M1 stays the same and M2 stays the same

d- M1 increases and M2 increases.

16- Generally speaking, the initial data on the monetary aggregates reported by the Fed are

a- not a reliable guide to the short - run behavior of the money supply

b- a reliable guide to the long - run behavior of the money supply

c- a reliable guide to the short - run behavior of the money supply

d- both (a) and (b) of the above

e- both (b) and (c) of the above

Chapter two

Part A: True –False Question

Circle whether the following statements are true (T) or false (F).

1- The relative economic values characteristics of a unit of account function of money enable the producer know where potential training opportunities exist in the economy

2- The importance source of information characteristic affect the producer decision regarding the allocation of resources to the production of commodities.

3- The money unit is used as a measure of value only so long as its own value is to vary.

4- The money as a measure of value must be stable in value to perform its function efficiently

5- Money as a standard for deferred payment mean that good exchange for money and money exchange for good

6- The market value of marketable securities varies directly with the market rate of interest.

7- Assets in general are subject to a range of risk to which money, to the extent that it is held as an asset is not subject.

8- Both money and assets face perverse risk.

9- The efficiency with which money performs its basic medium of exchange function will depend on the form it takes.

10- The efficiency with which money function as a store of value depend on the prospective stability in the value of money.

11- The efficiency with which money function as a temporary store of depend on the prospective stability in the value of money.

12- Liquidity is closely related to pure marketability.

13- The money possesses perfect liquidity while other assets possess varying degrees of both marketability and liquidity.

14- Near money refer to those assets that ranked close to money

15- The measure of the rate of turnover would be a measure of number of times that. On average, the stock of money turned over or passed from one income earner or market transactor to another.

Part B: Multiple –choice question

Circle the appropriate answer

1) …………………Is /are a function of money that money can be expected to perform

a) a unit of account b) a medium of exchange

c) a store of value d) all of the above

2) In function money act as a generally recognized measure of value

a) a unit of account

b) a medium of exchange

c) a store of value

d) a standard for deferred payments.

3) Is considered of the characteristic money function as a unit of account

a) relative economic values

b) importance source of information

c) a measure of value

d) all of the above

4) is considered of the characteristic money function as a store of value

a) relative economic values

b) importance source of information

c) a measure of value

d) none of above

5) For achieving the function of money as a medium of exchange the money commodity had to be

a) durable b) divisible

c) portable d) all of the above

6) in case the function of money as a store of value any of the following, the holder prefers the money more than

assets.

a) storage costs b) rate of return

c) a and b d) none of the above

7) in case the function of money as a store of value any of the following. the holder prefers the assets more than money

a) storage cost b) rate of return

c) a and b d) none of the above

8) In case the function of money as a store of value any of the following, the holder prefer the money more than assets

a) storage costs b) rate of return

c) risk d) all of the above

problems

problem 1

Suppose that the total value of the nation's production measured in money terms during the year

2007 was 2000 billion and in the following year (2008) the value in money terms was 3000 and the general price level increase by

1) 20% 2) 50% 3) price double 4) 60%

required

determine if the national production increased or decreased and by how much

Part A true – false questions

Circle whether the following statements are true (T) or false (F)

1) The interest is very relevant with the velocity of circulation of money

2) There negative relation between the velocity of circulation of money and the interest rate

3) In the unit of account function money acts as a generally recognized measure of value

4) There negative relation between the investment and interest rate

5) There positive relation between income and interest rate.

6) The interest rate thought to have the most important impact on aggregate demand is the short-term interest

rate

Part B: multiple choice questions

Circle the appropriate answer

1) …………………is / are considered problem/s of money as a medium of exchange function

a) portable value. b) dual value

c) value changes d) b and c

2) suppose that the value of security is $2000 that promise to pay perpetual income of $100 per annum in interest, if the level of the interest rate available on assets of the same class of risk decreased by 20% how many the value of security now

a) 1500 b) 2000

c) 2500 d) none of the above

3) Suppose that the value of security is $500 that promise to pay perpetual income of $20 per annum in interest, if the level of the interest rate available on assets of the same class of risk increased by %25, how many the value of security now.

a) 500 b) 400

c) 600 d) none of the above

4) When there are excess supply of good, this result in

a) decrease in unplanned inventory

b) increase in unplanned inventory

c) increase in interest rate

d) decrease in interest rate

5) when there are excess demand of money, this result in

a) decrease in unplanned inventory

b) increase in unplanned inventory

c) increase in interest rate

d) decrease in interest rate

6) Suppose that there excess supply of money, any of the following is correct

a) r decrease, M_d decrease, and Q decrease

b) r decrease, M_d decrease, and Q increase

c) r decrease, M_d increase, and Q increase

d) r increase, M_d increase, and Q increase

7) Suppose that there excess demand of good, any of the following is correct

a) r decrease, M_d decrease, and Q decrease

b) r decrease, M_d decrease, and Q increase

c) r decrease, M_d increase, and Q increase

d)r increase, M_d increase , and Q increase

8) A rise in short term interest rates that is believed only to be temporary

a) is likely to have a significant effect on long term interest rates

b) will have a bigger impact on long term interest rates than if the rise in short term rates had been permanent

c) is likely to have only a small impact on long – term interest rates

d) cannot possibly affect long – term interest rates

9) At negative nominal interest rates, which one of the following statements is the most accurate?

a) people would find money strictly preferable to bonds

b) people would find money strictly preferable to bonds and bonds therefore would be in excess supply

c) people would find money strictly preferable to bonds and bonds therefore would be in excess demand.

d) people would find money strictly preferable to bonds and bonds market would be in equilibrium

problems

problem1

suppose that there bond provide return $400 and the value of this bond is $2000

required

according to both Keynes and Friedman

1) determine if the individual prefer holding money or bond today
2) determine if the individual prefer holding money or bonds if interest rate changed in the future as a follow

*if r = 25%   *if r = 40%   *if r = 10%

problem 2:

you invest $1,000 in an account for five years. earning simple interest of 5% per annum in the following formulae

P denotes the principal amount invested of $1,000

r denotes the interest rate of 5%

n denote the number of years for which the cash is invested ie five years

required

1) every year the amount of interest earned

2) the total interest earned over the five years

3) the total value of the investment at the end of the five-year period

<u>problem 3</u>

You invest $1,000 in an account for five years. earning compound interest of 5% per annum in the following formulae

P denotes the principal amount invested of $1,000

r denotes the interest rate of 5%

n denote the number of years for which the cash is invested ie five years

required

1) every year the amount of interest earned

2) the total interest earned over the five years

3) the total value of the investment at the end of the five-

year period

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Chapter Three

The Demand Money

Chapter 3.

The Demand Money

The main goal of this chapter is to understand the following topics:

- quantity theory and money demand

- is velocity a constants or fluctuates

- The liquidity preference theory

- Modern quantity theory of money

Chapter Three

The Demand Money[1]

Quantity theory of money

Developed by the classical economists in the nineteenth early twentieth centuries, the quantity theory of money is a theory of how the nominal value of aggregate income is determination because it also tells us how much money is held for a given amount of aggregate income, it is a theory of the demand money. The most important feature of this theory is that suggests that interest rates have no effect on the demand money.

1- Frederic S. Mishkin, The Economics of Money, Banking and financial Markets, Eight edition, Boston, U.S.A, 2007,PP.493 - 510.

Velocity of Money and Equation of Exchanges the clearest exposition of the classical quantity the approach is found in the work of the American economist Irving Fisher, in his influential book the purchasing power of more published in 1911. Fisher wanted to examine the link between the total quantity of money M (the money supply) and the total amount of spending on final goods and services produced in the economy P × Y, where P is the price level and Y is aggregate output (income). (Total spending P × Y is also thought of as aggregate nominal income for the economy or as nominal GDP. The concept that provides the link between M and P × Y is called the velocity of money (often reduced to velocity), the average number of times per year (turnover) that a dollar is spent in buying the total amount of goods and services produced in the economy .Velocity V is defined more precisely as total spending P × Y divided by the quantity of money M:

$$V = \frac{P \times Y}{M} \qquad (1)$$

If , for example ,nominal GDP (P × Y) in a year is $5 trillion and the quantity of money is 1$ trillion, velocity is 5, meaning that the average dollar bill is spent five times in purchasing final goods and services in the economy.

By multiplying both sides of this definition by M, we obtain the equation of exchange, which relates nominal income to the quantity of money and velocity:

$$\mathbf{M \times V = P \times Y} \qquad \textbf{(2)}$$

The equation of exchange thus states that the quantity of money multiplied by the number of times that this money is spent in a given year must equal nominal income (the total nominal amount spent on goods and services in that year)[2].

As it stands, Equation 2 is nothing more than an identity a relationship that is true by definition. It does not

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[2] - Fisher actually first formulated the equation of exchange, In terms of me nominal value of transaction in the economy PT

$$MV_T = PT$$

Where P = average price per transaction

T = number of transactions conducted in a year

VT = PTIM = transaction velocity of money

Because the nominal value of transactions T is difficult to measure, the quantity theory has been formulated in terms of aggregate output Y as follows T is assumed to proportional to Y so T = vY, where v is a constant of proportionality, substituting vY for T in Fishers equation of exchange Yields $MV_T = vPY$, which can be written as Equation 2 in the text, in which $V = V_T/v$.

tell us, for instance that when the money supply M changes, nominal income ($P \times Y$) changes in the same direction; a rise in M, for example, could be offset by a fall in V that leaves $M \times V$ (and therefore $P \times Y$) unchanged. To convert the equation of exchange (an identity) into a theory of how nominal income is determined requires an understanding of the factors that determine velocity.

Irving Fisher reasoned that velocity is determined by the institutions in an economy that affect the way individuals conduct their transactions. If people use charge accounts and credit cards to conduct their transactions, as they can today, and consequently use money less often when making purchases, less money is required to conduct the transactions generated by nominal income (M falls relative to $P \times Y$), and velocity $(P \times Y)/M$ will increase. Conversely, if it is more convenient for purchases to be paid for with cash or checks (both of which are money), more money is used to conduct the transactions generated by the same level of nominal income and velocity will fall. Fisher took the view that the institutional and technological features of the economy would affect velocity only slowly over time, so velocity would normally be reasonably constant in the short run.

Quantity theory

Fisher's view that velocity is fairly constant in the short run transforms the equation of exchange into the quantity theory of money, which states that nominal income is determined solely by movements in the quantity of money: when the quantity of money M doubles $M \times V$ doubles and so must $P \times Y$, the value of nominal income. To see how this works, let's assume that velocity is 5, nominal income (GDP) is initially \$5 trillion, and the money supply is \$1 trillion. If the money supply doubles to \$2 trillion, the quantity theory of money tells us that nominal income will double to \$10 million (= $5 \times \$2$ trillion)

Because the classical economists (including Fisher) thought that wages and prices were completely flexible, they believed that the level of aggregate output Y produced in the economy during normal times would remain at the full – employment level, so Yin the equation of exchange could also be treated as reasonably constant in the short run. The quantity theory of money then implies that if M doubles, P must also double in the short run, because V and Y are constant. In our example, if aggregate output is $5 trillion, the velocity of 5 and a money supply of $1 trillion indicate that the price level equals 1 because 1 times $5 trillion equals the nominal income of $5 trillion. When the money supply doubles to $2 trillion, the price level must also double to 2 because 2 times $5 trillion equals the nominal income of $10 trillion. For the classical economists, the quantity theory of money provided an explanation of movements in the price level: movement in the price level result solely from changes in tile quantity of money.

Quantity Theory of Money Demand

Because the quantity theory of money tells us how much money is held for a given amount of aggregate income, it is, fact, a theory of the demand for money, we can see this by dividing both sides of the equation of exchange by V, thus rewriting it as

$$\mathbf{M} = \frac{\mathbf{1}}{\boldsymbol{V}} \times \mathbf{PY}$$

Where nominal income $P \times Y$ written as PY. When the money market is in equilibrium the quantity of money. M that people hold equals the quantity of money demanded M^d, so we can replace M in the equation by M^d Using K to represent the quantity $1/V$ (a constant, because V is a constant), we can rewrite the equation as

$$\mathbf{M^d = K \times PY} \qquad \mathbf{(3)}$$

Equation 3 tells us that because is a constant, the level of transactions generated by a fixed level of nominal income PY determines the quantity of money M^d that people demand. Therefore, fisher's quantity theory of money suggests that the demand for money is purely a function of income, and interest rates have no effect on the demand for money.[3]

Fisher came to this conclusion because he believed the people hold money only to conduct transactions and

[3] - While Fisher was developing his quantity theory approach to the demand for money, a group of classical economists in Cambridge, England led by Alfred Marshall and A. C pigou, came to similar conclusions, although with slightly different reasoning. They derived Equation 3 recognizing mat two properties of money motivate people to hold it: utility as a medium of exchange and as a store of wealth.

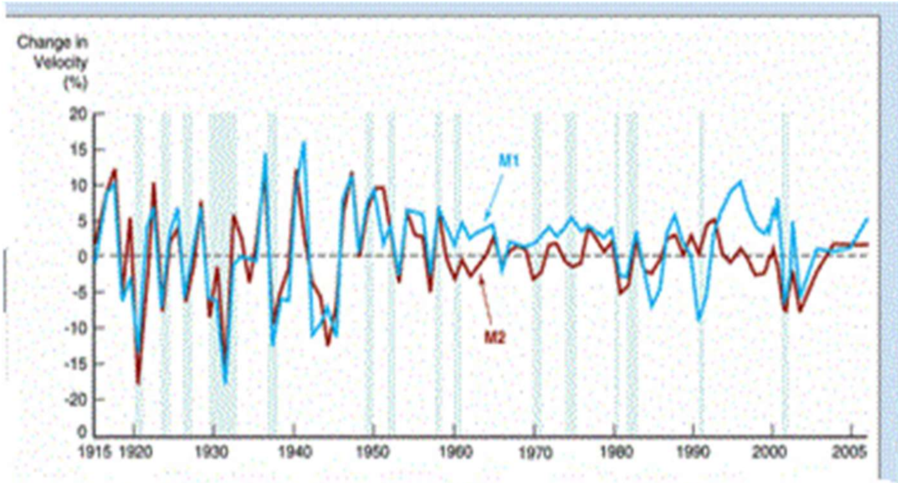
have no freedom of action in terms of the amount they want to hold the demand for money is determined (1) by the level of transactions generated by the level of nominal income PY and (2) by the institutions in the economy that affect the way people conduct transactions and thus determine velocity and hence K.

Is Velocity A Constant?

The classical economist's conclusion that nominal income determined by movements in the money supply rested on their belief that velocity PYIM could be treated as reasonable constant.[4] Is it reasonable to assume that velocity is constant? To answer this, let's look at Figure 1, which shows the year− to− year changes in velocity from 1915 to 2005 (nominal income it represented by nominal GDP and the money supply by M1 and M2)

[4] - Actually the classical conclusion still holds if velocity grows at so uniform rate over time that reflects changes in transaction technology. Hence, the concept of a constant velocity should more accurately thought of here as a lack of upward and downward fluctuations is velocity.

What we see in figure 1 is that even in the short run velocity fluctuates 100 much to be viewed as a constant prior to 1950, velocity exhibited large swings 3 and down. This may reflect the substantial instability of the economy in this period, which included two world wars and the



Figure(1) change in the Velocity of M1 and M2 from Year to Year. 1915- 2005
shaded area indicates recessions Velocities are calculated using nominal GNP before 1959 and nominal CDP there after.

Great Depression. (Velocity actually falls, or at least its rate of growth declines, in year where recessions are taking place). After 1950, velocity appears to have more moderate fluctuations, yet there are large differences in the growth rate of velocity from year to year. The percentage change in MI velocity (GDP/MI) from 1981 to 1982, for example, was 2.5% whereas from 1980 to 1981 velocity grew at a rate of 4.29. This difference of 6.7%

means that nominal GDP was 6.7% low than it would have been if velocity had kept growing at the same rate as in 1980-1981.[5] The drop is enough to account for the severe recession that took place in 1981 – 1982. After 1982, M1 velocity appears to have because even more volatile, a fact that has puzzled researchers when they examine the empirical evidence on the demand for money (discussed later in this chapter) M2 velocity remained more stable than M1 velocity after 1982, with the result that the Federal Reserve dropped its M1 targets m 1987 and began to focus more on M2 targets. However, instability of M2 velocity in the early 1990s resulted in the Fed's announcement in July 1993 that it no that it no longer felt that any of the monetary aggregates, including M2, was a reliable guide for monetary policy.

Until the Great Depression, economists did not recognize that velocity declines sharply during severe

[5] - We reach a similar conclusion if we use MI velocity. The percentage change in M2 velocity (GDP/M2) from 1981 to 1982 was -50% whereas from 1980 to 1981 it was + 2.3%. This difference of 7.3% means that normal GOP was 7.3% lower than it would have been if M2 velocity had kept growing at the same rate as in 1980 - 1981.

economic contractions. Why did the classical economists not recognize this fact when it is easy to see in the pre-Depression period in figure 1 unfortunately, accurate data on GDP and the money supply did not exist before World WarΠ. (Only after the war did the government starts to collect these data.) Economists had no way of knowing that their view of velocity as a constant was demonstrably false. The decline in velocity during the great Depression year was so great; however, that even the crude data available to economists at that time suggested that velocity was not constant. This explain why after the Great Depression economists began to s arch for other factors influencing the demand for money that might help explain the large fluctuations in velocity.

Let us now examine the theories of money demand that arose from this search for a better explanation of the behavior of velocity.

Keynes's Liquidity Preference Theory

In his famous 1936 book the General theory of employment interest, and money, John Maynard Keynes abandoned the classical view that velocity was a constant and developed a theory of money demand that emphasized the importance of interest rates. His theory of the demand for money which he called the liquidity preference theory, asked the question: why do individuals hold money? He postulated that there are three motives behind the demand for money: the transactions motive the precautionary motive, and the speculative motive.

Transaction Motive

In the classical approach, individual are assumed to hold money because it is a medium of exchange that can be used to carry out everyday transactions. Following the classical tradition, Keynes emphasized that this component of the demand for money is determined primarily by the level of people's transactions. Because he believed that these transactions were proportional to income, like the classical economists, he took the transactions component of the demand for money to be proportional to income

Precautionary Motive

Keynes went beyond the classical analysis by recognizing that in addition to holding money to carry out current transactions, people hold money as a cushion against an unexpected need. Suppose that you've been thinking about buying a fancy stereo; you walk by a store that is having a 50% – off sale on the one you want. If you are holding money as a precaution for just such an occurrence, you can purchase the stereo right away; if you are not holding precautionary money balances, you cannot take advantage of the sale. Precautionary money a balances also come in handy if you are hit with an unexpected bill–say, for car repair or hospitalization.

Keynes believed that the precautionary money balances people want to hold are determined primarily by the level of transactions that they expect to make in the future and that these transactions are proportional to income. Therefore, he postulated the demand for precautionary money balances is proportional to income.

Speculative Motive:

If Keynes had ended has theory with the transactions and precautionary motives. Income would be the only important determinant of the demand for money, and he would not have added much to the classical approach. However, Keynes took the view that people also hold money as a store of wealth. He called this reason for holding money the speculative motive. Because he believed that wealth is tied closely to income, the speculative component of money demand would be related to income. However, Keynes looked more carefully at other factors that influence the decisions regarding how much money to hold as a store of wealth, especially interest rates.

Keynes divided the assets that can be used to store wealth into two categories: money and bonds. He then asked the following question: why would individuals decide to hold their wealth in the form of money rather than bonds?

Thinking back to the discussion of the theory of asset demand you would want to hold money if its expected return was greater than the expected return from holding bonds. Keynes assumed that the expected return on money was zero because in his time, unlike today, most checkable deposits did not earn interest for bonds, there are two components of the expected return: the interest payment and the expected rate of capital gains.

You learned that when interest rates raise, the price of a bond falls if you expect interest rates to rise, you expect the price of the bond to fall and therefore suffer a negative capital gain that is, a capital loss. If you expect the rise in interest rates to be substantial enough the capital loss might outweigh the interest payment and your expected return on the bond would be negative. In this case you would want to store your wealth as money because its expected return is higher; us zero return exceeds the negative return on the bond.

Keynes assumed that individuals believe that interest rates gravitate to some normal value (an assumption less plausible in today's world). If interest rates are below this normal value individuals expect the interest rate on bonds to rise in the future and so expect to suffer capital losses on them. As a result individuals will be more likely to hold their wealth as money rather than bonds and the demand for money will be high.

What would you expect to happen to the demand for money when interest rates above the normal value? In general people will expect interest rates to fall, bond prices to rise, and capital gains to be realized. At higher interest rates they are more likely to expect the return from holding a bond to be positive, thus exceeding the expected return from holding money. They will be more likely to hold bonds than money, and the demand for money will be quite low. From Keynes reasoning, we can conclude that as interest rates rise, the demand for money falls, and therefore money demand is negatively related to the level of interest rates.

Putting the Three Motives Together

In putting the three motives for holding money balances together into a demand for money equation, Keynes was careful to distinguish between nominal quantities and real quantities. Money is valued in terms of what it can buy if for example, all prices in the economy double (the price level doubles), the same nominal quantity of money will be able to buy only half as many goods. Keynes thus reasoned that people want to hold a certain amount of real money balances (the quantity of money in real terms) an amount that their motives indicated would be related to real income Y and to interest rates i. Keynes wrote down the following demand for money equation, known as the liquidity preference function, which says that the demand for real money balances M^d/P is a function of (related to) I and y:[6]

$$\frac{M^d}{P} = \underset{-\ \ +}{\mathbf{f}\ (I.Y)} \qquad \textbf{(4)}$$

The minus sign below I in the liquidity preference function means that the demand for real money balances is negatively related to the interest rate I, and the plus sign below Y means that the demand for real money

[6] - The classical economists' money demand equation can also be written in terms of real money balances by dividing both sides of Equation 3 by the price level P to obtain: $M^D = k \times Y$

balances and real income Y are positively related. This money demand function is the same one used in our analysis of money demand in Keynes's conclusion that the demand for money is related not only to income but also to interest rates is a major departure from Fisher's view of money demand, in which interest rates have no effect on the demand for money.

By deriving the liquidity preference function for velocity PY/M, we can see that Keynes's theory of the demand for money implies that velocity is not constant, but instead fluctuates with movements in interest rates. The liquidity preference equation can be rewritten as

$$\frac{P}{M^d} = \frac{1}{f(i, Y)}$$

Multiplying both sides of this equation by Y and recognizing that M^d can be replaced by M because they must be equal in money market equilibrium, we solve for velocity:

$$V = \frac{PY}{M} = \frac{Y}{f(i, Y)} \qquad (5)$$

We know that the demand for money is negatively related to interest rates; when I goes up, f (I,Y) declines , and therefore velocity rises. In other words, a rise in interest rates encourages people to hold lower real money balances for a given level of income; therefore, the rate at which money turns over (velocity) must be higher. This reasoning implies that because interest rates have substantial fluctuations, the liquidity preference theory of the demand for money indicates that velocity has substantial fluctuations as well.

An interesting feature of Equation 5 is that it explains some of the velocity movements in Figure 1, in which we noted that when recessions occur, velocity falls or its rate of growth declines what fact regarding the cyclical behavior of interest rates might help us explain this phenomenon You might recall that interest rates are procyclical, rising in expansions and falling recessions, the liquidity preference theory indicates that a rise in interest rates will cause velocity to rise also. The procyclical movements of interest rates should induce procyclical movements in velocity, and that is exactly what we see in Figure1.

Keyness model of the speculative demand for money provides another reason why velocity might show substantial fluctuations. What would happen to the demand for money if the view of the normal level to which interest rates & gravitate changes? For example, what if people expect the future normal interest rate to be higher than the current normal interest rate? Because interest rates are then expected to be higher in the future, more people will expect the prices of bonds to fall and will anticipate capital losses. The expected returns from holding bonds will decline, and money will become more attractive relative to bonds. As a result, the demand for money will increase. This means that f (I, Y) will increase and so velocity will fall velocity will change as expectations about future normal levels of interest rates change, and unstable expectations about future movements in normal interest rates can lead to instability of velocity. This is one more reason why Keynes rejected the view that velocity could be treated as a constant

Further Developments in the Keynesian Approach

After world war *II* economists began to take the Keynesian approach to the demand for money even further by developing more precise theories to explain the three Keynesian motives for holding money. Because interest rates were viewed as a crucial element in monetary theory, a Key focus of this research was to understand better the role of interest rates in the demand for money.

Transactions Demand

William Baumol and James Tobin independently developed similar demand for money models, which demonstrated that even money balances held for transactions purposes are sensitive to the level of interest rates.[7] In developing their models, they considered a

[7] - William J Baumol, The Transactions Demand for Cash: An inventory. Theoretic Approach, Quarterly Journal of Economics 66 (1952): 545 - 556; James Tobin, The interest Elasticity of the Transactions Demand for Cash, Review of Economics and statistics 38 (1956): 241 - 247.

hypothetical individual who receives a payment once a period and spends it over the course of this period. In their model, money, which earns zero interest, is held only because it can be used to carry out transactions.

To refine this analysis, let's say that Grant smith receives $1,000 at the beginning of the month and spends it on transaction that occur at a constant rate during the course of the month. If Grant Keeps the $ 1,000 in cash to carry out his transactions, his money balances follow the saw tooth pattern displayed in panel (a) of Figure 2. At the beginning of the month he has $1,000, and by the end of the month he has no cash left because he has spent it all. Over the course of the month, his holdings of money will on average be $500 (his holdings at the beginning of the month, $1,000, plus his holdings at the end of the month, $0, divided by 2).

At the beginning of the next month, grant receives another $1,000 payment, which he holds as cash, and the same decline in money balances begins again. This process repeats monthly, and his average money balance during the course of the year is $500 since his yearly nominal income is \$ 12,000 and his holdings of money average \$500, the velocity of money (V = PY/M) is \$ 12. 000/\$500 = 24.

Suppose that as a result of taking money and banking course, Gram realizes that he can improve his situation by not always holding cash. In January, then, he decides to hold part of his \$1,000 in cash and puts part of it into an income earning security such as bonds. At the beginning of each month, Grant Keeps \$500 in cash and uses the other \$500 to a Treasury bond. As you can see in panel (b), he starts out each month with \$500 of cash, and by the middle of the month; his cash balance has run down to zero. Because bonds cannot be used directly to carry out transactions, Grant must sell them and turn them into cash so that he can carry out the rest of the months' transactions. At the middle of the month, then Grants cash balance rises back up to \$500. By the end of the month, the cash is gone. When he again receives his next \$1,000 monthly payment, he again divides it into \$500 of cash and \$500 of bonds, and the process continues. The net result of this process is that average cash balance held during the month is $\$500/2 = \$250$– just half of what it was before velocity has doubled to $\$12{,}000/\$250 = 48$.

FIGURE 2 Cash Balances in the Baumol-Tobin Model

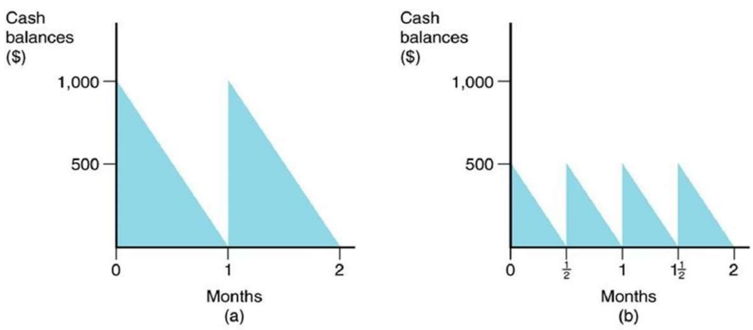


Figure 2 Cash Balances in the Baumol - Tobin Model
in pabel (a) , the $1,000 payment at the beginning of the month is held entirely in cash and is spent at a constant rate unit it is exhausted by the end of the month . in panel (b), half of the monthly payment is put into cash and the other half into bonds. At thre middle of the month, cash balances reach zero and bonds must be sold to bring balances up to $500. by the end of the month, cash balance again dw indie to zero

What has Grant Smith gained from his new strategy? He has earned interest on $\$500$ of bonds that he held for half the month. If the interest rate is 1% per month, he has earned an additional $\$2.50 \ (= {}^{1}/_{2} \ \times \$500 \times 1\%) \ per \ month$

Sounds like a pretty good deal, doesn't it? In fact, if he had kept $\$333.33$ in cash at the beginning of the month, he would have been able to hold $\$666.67$ in bonds for the first third of the month. Then he could have sold $\$333.33$ of bonds and held on to $\$333.34$ of bonds for the next third of the month. Finally, two –thirds of the way through the month, he would have had to sell the remaining bonds to raise cash. The net result of this is that Grant would have earned $\$3.33$ per month [= $1/3 \times \$666.67 \times 1\%$) + ($1/3 \times \$333.34 \times 1\%$)]. This is an even better deal. His average cash holdings in this case would be $\$333.33/2$ = $\$166.67$. Clearly, the lower his average cash balance, the more interest he will earn.

As you might expect, there is a catch to all this. In buying bonds, Grant incurs transaction costs of two types. First, he must pay a straight brokerage fee for the buying and selling of the bonds these fees increase when average cash balances are lower because Grant will be buying and selling bonds more often. Second, by holding less cash, he will have to take time to sell the bonds to get the cash. Because time is money, this must also be counted as part of the transaction costs.

Grant faces a trade-off if he holds very little cash, he can earn a lot of interest on bonds, but he will incur greater transaction costs. If the interest rate is high, the benefits of holding bonds will be high relative to the transaction costs, and he will hold more bonds and less cash. Conversely, if interest rates are low, the transaction costs involved in holding a lot of bonds may outweigh the interest payments, and Grant would then be better off holding more cash and fewer bonds.

The conclusion of the Baumol-Tobin analysis may be staled as follows: As interest rates increase, the amount of cash held for transaction purposes will decline, which in turn means that velocity will increase as interest rates increase.[8] Put another way, the transactions component of

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[8] - Similar reasoning leads to the conclusion that as brokerage fees increase, the demand for transactions money balances increases as well. When these fees rise, the benefits from holding transactions money balances increase because by holding these balances, an individual will not have to sell bonds as often thereby avoiding these higher brokerage costs. The greater benefits to holding

the demand for money is negatively related to the level of interest rates.

The basic idea in the Baumol–Tobin analysis 15 that there is an opportunity cost of holding money – the interest that can be earned on other assets. There is also a benefit to holding money – s– the avoidance of transaction costs. When interest rates increase, people will try to economize on their holdings of money for transactions purposes, because the opportunity cost of holding money has increased. By using Simple models, Baumol and Tobin revealed something that we might not otherwise have seen: that the transactions demand for money, and not just the speculative demand, will be sensitive to interest rates. The Baumol– Tobin analysis presents a nice demonstration of the value of economic modeling.[9]

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money balances relative to the opportunity cost of interest forgone, then, lead to a higher demand for transactions balances.

[9] - The mathematics behind the Baumol - Tobin model can be found in an appendix to this chapter on this books web site at www.Myeconlab.com/mishkin

Precautionary Demand

Models that explore the precautionary motive of the demand for money have been developed along limes similar to the Baumel- Tobin framework, so we will not go into great detail about them here. We have already discussed the benefits of holding precautionary money balances, but weighed against these benefits must be the opportunity cost of the interest forgone by holding money. We therefore have a trade-off similar to the one for transactions balances. As interest rates rise, the opportunity cost of holding precautionary balances rises, so the holdings of these money balances fall. We then have a result similar to the one found for the Baumol-Tobin analysis.[10] The precautionary demand for money is negatively related to interest rates.

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[10]- These models of the precautionary demand for money also reveal that as uncertainty about the level of future transactions grows the precautionary demand for money increase. This is so because grows uncertainty means that individuals are more likely to incur transaction costs if they are not holding precautionary balances. The benefits holding such balances then increases relative to the opportunity forgone interest, and so the demand for them rises.

Speculative demand Keyness analysis of the speculative demand for money will open to several serious criticisms. it indicated that an individual hold only money as a store of wealth when the expected return bonds is less than the expected return on money and holds o bonds when the expected return on bonds is greater than expected return on money. Only when people have expected returns on bonds and money that are exactly equal (a r instance) would they hold both. Keynes's analysis therefore implies that practically no one holds a diversified portfolio bonds and money simultaneously as a store of wealth. Because diversification is apparently a sensible strategy for choosing which assets to hold, the fact that it rarely occurs in Keynes's analysis a serious shortcoming of this theory of the speculative demand money.

Tobin developed a model of the speculative demand money that attempted to avoid this criticism of Keynes analysis.[11] His basic idea was that not do people care about the expected return on one asset versus another

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[11] - James Tobin, liquidity Preference as Behavior Towards Risk, of Economic studies 25 (1958): 65 - 86.

when they decide what to hold in their portfolio, but they also care about riskiness of the returns from each asset. Specifically, to assumed that most people are risk averse that they would willing to hold an asset with a lower expected return if it is risky. An important characteristic of money is that its return certain; Tobin assumed it to be zero. Bonds, by contrast, can h substantial fluctuations in price, and their returns can be q risky and sometimes negative. So even if the expected returns bonds exceed the expected return on money, people might: want to hold money as a store of wealth because it has less risk associated with its return than bonds do.

The Tobin analysis also shows that people can reduce the total amount of risk in a portfolio by diversifying- that is, by holding both bonds and money. The model suggests that individuals will hold bonds and money simultaneously as stores of wealth. Because this is probably a more realistic description of people's behavior than Keynes's Tobin's rationale for the speculative demand for money seems to rest on more solid ground.

Tobin's attempt to improve on Keynes's rationale for the speculative demand for money was only partly successful, however. It is still not clear that the speculative demand even exists. What if there are assets that have no risk–like money–but earn a higher return will there be any speculative demand for money No, because an individual will always be better off holding such an asset rather than money. The resulting portfolio will enjoy a higher expected return yet has no higher risk. Do such assets exist in the American economy the answer is yes. U.S. treasury bills and other assets that have no default risk provide certain returns that are greater than those available on money. Therefore, why would anyone want to hold money balances as a store of wealth (ignoring for the moment transactions and precautionary reasons)?

Although Tobin's analysis did not explain why money is held as a store of wealth, it was an important development in our understanding of how people should choose among assets. Indeed, his analysis was an important step in the development of the academic field of finance, which examines asset pricing and portfolio choice (the decision to buy one asset over another).

To sum up, further developments of the Keynesian approach have attempted to give a more precise explanation for that transactions, precautionary, and speculative demand for money. The attempt to improve Keynes's rationale for the speculative demand for money has been only partly successful: it is still not clear that this demand even exists. However, the model of the transactions and precautionary demand for money indicate that these components of money demand are negatively related to interest rates. Hence Keynes's proposition that the demand for money is sensitive to interest rates suggesting that velocity is not constant and that nominal income might be affected by factor other than the quantity of money – is still supported.

Friedman's Modern Quantity Theory of Money

In 1956 Milton Friedman developed a theory of the demand for money in a famous article, " The quantity theory of money: A restatement"[12] Although Friedman frequently refer to Irving Fisher and the quantity theory, his analysis of the demand for money is actually closer to that of Keynes.

Like his predecessors, Friedman pursued the question of why people choose to hold money. Instead of analyzing the specific motives for holding money, as Keynes did Friedman simply stated that the demand for money must be influenced by the same factors that influence the demand for any assets Friedman then applied the theory of asset demand to money

The theory of asset demand indicates that the demand for money should be a function of the resources available to individuals (their wealth) and the expected returns on other assets relative to the expected return on money. Like Keynes, Friedman recognized that people want to hold a certain amount of real money balances (the quantity of money in real terms) from the reasoning

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[12] - Milton Friedman, the Quantity, theory of money: A restatement, studies in the Quantity Theory of money, ed, Milton Friedman (Chicago university of Chicago press, 1956), pp. 3- 21.

Friedman expressed his formulation of demand for money as follows:

$$\frac{M^d}{P} = f\left(\underset{+}{Y_p}, \overset{-}{r_b - r_m}, \overset{-}{r_e - r_m}, \overset{-}{\pi^e - r_m}\right) \quad (6)$$

Where M^d/P = demand for real money balances

Y_P = Friedman's measure of wealth, known as permanent income (technically, the present discounted value of all expected future income, but more easily described as expected average long – run income)

r_m = expected return on money

r_b =expected return on bonds

r_e = expected return on equity (common stocks)

π^e =expected inflation rate

The signs underneath the equation indicate whether the demand for money is positively (+) related or negatively (−) related to the terms that are immediately above them.[13]

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[13] - Friedman also added to his formulation a term h that represented the ratio of human to nonhuman wealth. He reasoned that if people had more permanent income coming from labor income and thus from their human

Let us look in more detail at the variables in Friedman's money demand function and what they imply for the demand for money.

Because the demand for an asset is positively related to wealth, money demand is positively related to Friedman's wealth concept, permanent income (indicated by the plus sign beneath it). Unlike our usual concept of income, permanent income (which can be thought of as expected average long – run income) has much smaller short– run fluctuation, because many movement of income are transitory (short– lived), for example, in a business cycle expansion, income increases rapidly, but because some of this increase is temporary, average long–run income does not change very much. Hence in a boom, permanent income rises much less than income. During a recession, much of the income decline is transitory, and average long–run income (hence permanent income) falls

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capital, they would be less liquid than if they were receiving income from financial assets. In this case, they might want to hold more money because it is a more liquid asset than the alternatives. The term h plays no essential role in Friedman 's theory and has no important implications for monetary theory. That is why we ignore it in the money demand function.

less than income. One implication of Friedman's use of the concept of permanent income as a determinant of the demand for money is that the demand for money will not fluctuate much with business cycle movements.

An individual can hold wealth in several forms besides money. Friedman categorized them into three types of assets: bonds equity (common stocks, an goods. e incentives for holding these assets rather than money are represented by the expected return on each of these assets relative to the expected return on money, the last three terms in the money demand function. The minus sign beneath each indicates that as each term rises, the demand for money will fall.

The expected return on money r_m, which appears in all three terms, is influenced by two factors:

(1) The services provided by banks on deposits included in the money supply, such as provision of receipts in the form of canceled checks or the automatic paying of bills. When these services are increased, the expected return from holding money rises.

(2) The interest payments on money balance. Now accounts and other deposits that are included in the money supply currently pay interest. As these interest payments rise, the expected return on money rises

The terms $r_b - r_m$ and $r_e - r_m$ represent the expected return on bonds and equity relative to money; as they rise, the relative expected return on goods relative to money. The expected return from holding goods is the expected rate of capital gains that occurs when their prices rise and hence is equal to the expected inflation rate π^e . if the expected inflation rate is 10%, for example, then goods prices are expected to rise at a 10% rate, and their expected return is 10%. When $\pi^e - r_m$ rises, the expected return on goods relative to money rises, and the demand for money falls.

Distinguishing Between the Friedman and Keynesian Theories

There are several differences between Friedman's theory. One is that by including many assets as alternatives to money, Friedman recognized that more than one interest rate is important to the operation of the aggregate economy. Keynes, for his part, lumped financial assets other than money into one big category bands because he felt that their returns generally move together. If this is so, the expected return on bonds will be a good indicator of the expected return on other financial assets, and there will be no need to include them separately in the money demand function.

Also in contrast to Keynes, Friedman viewed money and goods as substitutes, that is, people choose between them when deciding how much money to hold. That is why Friedman included the expected return on goods relative to money as a term in his money demand function. The assumption that money and good are substitutes indicates that changes in the quantity of money may have a direct effect on aggregate spending

In addition, Friedman stressed two issues in discussing his demand for money function that distinguish it from Keyness liquidity preference theory. First Friedman did not take the expected return on money to be a constant, as Keynes did. When interest rates rise in the economy, banks make more profits on their loans, and they want to attract more deposits to increase the volume of their now more profitable loans. If there are no restrictions on interest payments on deposits, banks attract more deposits by higher interest rates on them. Because the industry is competitive, the expected return on money held as bank deposits then rises with the higher interest rates on bonds and loans. The banks compete to get deposits until there are no excess profits, and in doing so they close the gap between interest earned on loans and interest paid on deposits, the net result of this competition in the banking industry is that $r_b - r_m$ stays relatively constant when the interest rate I rises.[14]

What if there are restrictions on the amount of interest that banks can pay on their deposits? Will the expected return on money be a constant. As interest rates rise, will $r_b - r_m$ rise as well Friedman thought not. He argued that although banks might be restricted from making pecuniary

[14] - Friedman does suggest that there is some increase in r_b - r_m when i r because pan of the money supply (especially currency) is held in form that cannot pay interest in a pecuniary or non-pecuniary from. See example, Milton Friedman, Why a Surge of inflation is likely years, Wall Street Journal, September 1, 1983, P. 24.

payments on their deposits, they can still compete on the quality dimension. For example, they can provide more services to depositors by hiring more tellers paying bills automatically, or making more cash machines available at accessible locations. The result of these improvements in money services is that the expected return from holding deposits will rise. So despite the restrictions on pecuniary interest payments, we might still find that a rise in market interest rates will raise the expected return on money sufficiently so that $r_b - r_m$ will remain relatively constant. Unlike Keynes's theory, which indicates that interest rates are an important determinant of the demand for money, Friedman's theory suggests that changes in interest rates should have little effect on the demand for money.

Therefore, Friedman's money demand function is essentially one in which permanent income is the primary determinant of money demand, and his money demand equation can be approximated by

$$\frac{M^d}{P} = f(Y_p)$$

In Friedman's view, the demand for money is insensitive to interest rates –s– not because he viewed the demand for money as insensitive to changes in the incentives for holding other assets relative to money, but rather because changes in interest rates should have little effect on these incentive terms in the money demand function. The incentive terms remain relatively constant, because any rise in the expected returns on other assets as a result of the rise in interest rates would be matched by a rise in the expected return on money,

The second issue Friedman stressed is the stability of the demand for money function. In contrast to Keynes Friedman suggested that random fluctuations in the demand for money are small and that the demand for money can be predicted accurately by the money demand function. When combined with his view that the demand for money is insensitive to changes in interest rates, this means that velocity is highly predictable. We can see this by writing down the velocity that is implied by the money demand equation (Equation 7)

Because the relationship between Y and Y_p is usually quite predictable, a stable money demand function (one that does not undergo pronounced shifts, so that it predicts the demand for money accurately) implies that velocity is predictable as well. If we can predict what velocity will be to the next period, a change in the quantity of money will produce a predictable change in aggregate spending. Even though velocity is no longer assumed to be constant, the money supply continues to be the primary determinant of nominal income as in the quantity theory of money. Therefore, Friedman's theory of money demand is to indeed a restatement of the quantity theory, because it leads to the same conclusion about the importance of money to aggregate spending.

You may recall that. We said that the Keynesian liquidly preference function (in which interest rates are an import determinant of the demand for money) is able to explain the procyclical movements of velocity that we find in the data. Friedman's money demand formulation explains this procyclical velocity phenomenon as well?

The key clue to answering this question is the presence permanent income rather than measured income in the money demand function. What happens to permanent income in business cycle expansion? Because much of the increase income will be transitory, permanent income rises much less thee income, Friedman's money demand function then indicates that the demand for money rises only a small amount relative to the rise in measured income, and Equation 8 indicates, velocity rises. Similarly, in a recession, the demand for money falls less than income, because the decline in permanent income is small relative to income, and velocity falls. In this way, we have the procyclical movement in velocity

To summarize, Friedman's theory of the demand for money used a similar approach to that of Keyness but did not go into detail about the motives for holding money. Instead, Friedman made use of the theory of asset demand to indicate that demand money will be a function of permanent income and the expect returns on alternative assets relative to the expected return money. There are two major differences between Friedman's theory and

Keynes's, Friedman believed that changes in interest rates have little effect on the expected returns on other assets relative to money. Thus in contrast to Keynes, he viewed the demand for money as insensitive to interest rates. In addition, he differed from Keynes in stressing that the money demand function does not undergo substantial shifts and is, therefore stable. These two differences also indicate that velocity is predictable; yielding a quantity theory conclusion that money is the primary determinant of aggregate spending.

Empirical evidence on the demand for money

As we have seen, the alternative theories of the demand for money can have very different implications for our view of the role of money in the economy which of these theories is an accurate description of the real world is an important question, and it is the reason why evidence on the demand for money has been at the center of many debates on the effects of monetary policy on aggregate economic activity here we examine the empirical evidence on the two primary issues that distinguish the different theories of money demand and affect their conclusions about whether the quantity of money is the primary determinant of aggregate spending: is the demand for money sensitive to changes in interest rates, and is the demand for money function stable over time?[15]

Interest rates and money demand

Earlier in the chapter, we saw that if interest rates do not affect the demand for money, velocity is more likely to be a constant –s– or at least predictable– so that the quantity theory view that aggregate spending is determined by the quantity of money is more likely to be true. However, the more sensitive the demand for money is to interest rates, the more unpredictable velocity will be, and the less clear the link between the money supply and aggregate spending will be. Indeed, there is an extreme case of ultra–sensitivity of the demand for money to interest rates, called the liquidity trap, in which monetary policy has no direct effect on aggregate spending,

[15] - If you are interested in a more detailed discussion of the empirical research on the demand for money, you can find it in an appendix to this chapter on this book's web sue at www.myeconlab.com/ mishkin

because a change in the money supply has no effect on interest rates. (If the demand for money is ultra–sensitive to interest rates, a tiny change in interest rates produces a very large change in the quantity of money demanded. Hence, in this case, the demand for money is completely flat in the supply and demand, therefore, a change in the money supply that shifts the money supply curve to the right or left results in it intersecting that flat money demand curve at the same unchanged interest rate).

The evidence on the interest sensitivity of the demand for money found by different researchers is remarkably consisted. Neither extreme case is supported by the data: in situations which nominal interest rates have not hit a floor of zero, the demand for money is sensitive to interest rates, and there is evidence that a liquidity trap has ever existed. They can to lower. In this situation, a liquidity trap has occurred because the demand for money is now completely flat. Indeed, Japan has been experiencing a liquidity trap of this type in recent years, which one reason why it has been difficult for Japanese monetary authorities to stimulate the economy.

Stability of money demand

If the money demand function, like Equation 4 or 6, unstable and undergoes substantial unpredictable shifts, as Keynes thought, then velocity is unpredictable, and the quantity of money may not be tightly linked LO aggregate spending, as it is in the modern quantity theory. The stability of the money demand function is also crucial to whether the Federal Reserve should target interest rates or the money supply. Thus it is important look at the question of whether the money demand function stable, because it has important implications for how monetary policy should be conducted.

By the early 1970s, evidence strongly supported stability of the money demand function. However, after 1973, rapid pace of financial innovation, which changed which item could be used as money, led to substantial instability in estimate money demand functions. The recent instability of the money demand function calls into question whether our theories empirical analyses are adequate. It also has important implication for the way monetary policy should be conducted, because it is doubt on the usefulness of the money demand function as a provide guidance to policy makers. In particular, because the money demand function has become unstable, velocity is now harder to predict, setting rigid money supply targets to control aggregate spending in the economy may not be an effective way to conduct monetary policy.

Exercises

The earliest treatment of the demand for money was offered by the classical economists. The classical economists – most notably Irving Fisher – argued that the demand for money was a function of nominal aggregate income. The followed from their assumption regarding (1)……………………… the average number of times per year that a dollar is spent on final goods and services produced in the economy) and the equation of exchange.

The classical economists argued that the speed with which money is spent is a function of the institutional features of the economy. Although these features certainly change over time (due to improvements in technology, for example), velocity could be regarded as fixed in the short run.

Nothing more than an identity, the equation of (2) ……………………… states that the quantity of money time's velocity must equal nominal income. But when combined with Irving Fisher's assumption regarding the fixity of velocity, the equation of exchange is transformed into the quantity theory of (3) ……………………… . Given the assumption of constant velocity, the quantity theory of money implies that changes in nominal income are determined solely by changes in the quantity of money. The classical economists also assumed that prices and wages were completely (4) ……………………… meaning that the economy would always remain at full employment. This last assumption meant that changes in the money supply had no effect on aggregate output and could therefore affect only the (5) ………………………

Dividing both sides of the equation of exchange by the constant velocity makes clear that the quantity of money people hold is a constant fraction of nominal income. Thus, the classical economists regarded the demand for money as a demand for a medium of exchange.

The Cambridge economists criticized the quantity theory of money as too mechanistic. Instead, they focused on the factors influencing how much money individuals would want to hold. Like Fisher. They regarded the level of income as the most significant factor influencing people's holdings of money. But they also believed that changes in (6) ………………………could affect individuals' decisions about using money as a store of wealth.

John Maynard Keynes believed that a decline in velocity in part explained the Great Depression, and his efforts to explain this decline in velocity led to his theory of money demand, which he called (7) ……………………… theory. Keynes contended that there were three separate and distinct motives for holding money: the transactions motive, the precautionary motive, and the (8) ……………………motive.

It was the speculative motive that distinguished Keynes's theory from the other theories. Keynes argued that interest rates played an important role in determining the amount of wealth people desire to hold in the form of money. Though bonds pay interest, a rise in interest rates causes bond values to (9) …………………… subjecting their holders to capital losses and even negative returns if bond values fall significantly. thus at low rates of interest, people reduce their holdings of bonds and hold more money as they expect interest rates to rise, returning to their normal levels. Therefore, Keynes concluded that the demand for money was (10) ………………………… related to the level of interest rates

Since Keynes's early attempt, economists have improved on his analysis providing a better rational for the (11) …………………… relationship between interest rates and velocity. the works of Baumol and Tobin indicate that the transaction component (and, by extension, the precautionary component) of the demand for money is negatively related to the level of interest rates.

Milton Friedman has offered an alternative explanation for the (12) ……………………behavior of velocity. Rather than rely on the procyclical behavior of interest rates, Friedman argues that since changes in actual income exceed changes in permanent income, velocity will tend to move procyclically.

Friedman–noting that the interest rate paid on checking deposits tends to move with market rates so that the differential between market interest rates and the interest rate paid on money remains relatively constant – believes that changes in interest rates will have little effect on the demand for money. This result does not require the absence of deposit rate ceilings, as banks pay implicit interest on deposits by providing "free" services such as branch offices, more tellers, or "free" checking. Friedman's modern quantity theory of money is consistent with the procyclical behavior of velocity, as are the other modern money demand stories. We see that the anticipated effectiveness of fiscal [policy depends upon one's view of money demand

Research on demand for money indicates that while the demand for money is sensitive to interest rates, there is little evidence that the liquidity trap has ever existed. also, because of the rapid pace of financial innovation , since 1973, the demand for money has been quite unstable.

Exercises

Exercise1: The Keynesian approach to money demand

a- What are the three motives behind the demand for money postulated by Keynes?

1-……………………………………………………..

2-……………………………………………………..

3-………………………………………………………

B- What motive did Keynes believe was a function of the interest rate?

1-………………………………………………………..

C- Tobin's model of the speculative demand for money shows that people hold money as a store of wealth as a way of reducing.

1-………………………………………………………

Exercise 2: velocity and the quantity theory of money

Complete the following table

	M	V	P	Y
	200	5	1	1000
1	200	6	2	
2	300	5	1.5	
3	400	6		1200
4	400		1	1600

5		5	2	2000

Exercise3: The Demand for Money

indicate whether the following statements are associated with Fisher's quantity theory of money (Q), the Cambridge approach to money demand (C), Keynes's liquidity preference theory (K) or with Friedman's modern quantity theory of money (F) place the appropriate letter in the blank: to the left of the statement

1- Interest rates have no effect on the demand for money.

2- Money has two properties explaining why people want to hold it: money functions as a medium of exchange and as a store of wealth.

3- The demand for money is proportional to income, but the effect of interest rates on the demand for money cannot be completely ignored.

4- There are three distinct motives for holding money: (a) a transactions motive where money balances are held if there is imperfect synchronization between receipts and expenditures; (b) a precautionary motive. Where money is held because of uncertainty of future expenditures; and (c) a speculative motive, where money is held if bonds are expected to fall in value.

5-Permanent income is the primary determinant of money demand, and changes in interest rates should have little effect on the demand for money

6-The demand for money is insensitive to interest rates, not because the demand for money is insensitive to changes in the opportunity cost of holding money, but because changes in interest rates actually have little effect on the opportunity cost of holding money.

7-More recent developments in this approach suggest that interest rates are important to the transactions and precautionary components of money demand, as well as to the speculative component.

8-The transactions and precautionary components of the demand for money are proportional to income, while the speculative component is negatively related to the level of interest rates.

9-Movements in the price level result solely from changes in the quantity of money

10-The demand for money is purely a function of income; interest rates have no effect on the demand for money.

11-Theory that offered an explanation for the decline in velocity during the Great Depression.

12-The demand for money is a function of both permanents income and the opportunity cost of holding money.

Self -Test

Part A: true - false questions

Circle whether the following statements are true (T) or false (F)

1- The equation of exchange states that product of the quantity of money and the average number of times that a dollar is spent on final goods and services in a given period must equal nominal income

2- Irving Fisher argued that velocity would be relatively constant in the short run, since institutional feature of the economy. Such as the speed at which checks were cleared, were likely to change only slowly over time.

3- The classical economist's contention that velocity could be regarded as a constant transformed the equation of exchange (an identity) into the quantity theory of money.

4- The Cambridge economists argued that the demand for money was unaffected by changes in interest rates.

5- at relatively low interest rates people might be reluctant to hold money due to a concern about capital losses should interest rates rise.

6- Keynes's liquidity preference theory offered an explanation for why velocity had fallen during the Great Depression.

7- The demand for money approach developed by Keynes is consistent with the procyclical movements in velocity observed in the United States.

8- Studies by economists in the 1950s found evidence that even the transactions motive for holding money was sensitive to the level of interest rates.

9- James Tobin suggested that people might prefer to hold money to bonds as a store of wealth as an effort to reduce risk.

10-The permanent income argument in Friedman's demand for money formulation suggests that velocity will fluctuate with business cycle movements.

Part B: Multiple- choice questions

Circle the appropriate answer.

1- The quantity theory of money suggests that cutting the money supply by one- third will lead to

a- a sharp decline in output by one-third in the short run and a decline in the price level by one-third in the long run.

b- a decline in output by one- third

c- decline in output by one sixth and a decline in the price level by one sixth.

d- a decline in the price level by one-third.

e- none of the above.

2- The classical economists believed that velocity could be regarded as constant in the short run, since

a- institutional factors, such as the speed with which checks were cleared though the banking system, changed slowly over time.

b- The opportunity cost of holding money was close to zero.

c- financial innovation tended to offset changes in interest rates.

d- none of the above are true.

3- Empirical evidence supports the contention that

a-velocity tends to be procyclical; that is, velocity declines (increases) when economic activity contracts (expands).

b-velocity tends to be countercyclical; that is, velocity declines (increases) when economic activity contracts (expands).

c-velocity tends to be countercyclical; that is, velocity increases (declines) when economic activity contracts (expands).

d- velocity is essentially a constant.

4- Keynes's liquidity preference theory explains why velocity can be expected to rise when.

a- income increases

b- wealth increases

c- brokerage commissions increase

d- interest rates increase

5- Keynes argued that people were more likely to increase their money holdings if they believed that

a- interest rates were about to fall

b- bond prices were about to rise

c- bond prices were about to fall

d- none of the above was true.

6- The Baumol- Tobin analysis suggests that

a- velocity is relatively constant.

b-the transactions component of money demand is negatively related to the level of interest rates.

c- the speculative motive for money is nonexistent

d- both (a) and (c) of the above are true

e- both (b) and (c) of the above are true.

7- One possible implication of the elimination of deposit rate ceiling is that the implicit interest rate on money will more closely approach bond rates. This suggests that changes in interest rates will

a- have a greater impact on money demand

b- have less effect on the demand for money

c- no longer affect the speculative demand for money

d- cause velocity to become more volatile.

8- Milton Friedman argues that the demand for money is relatively insensitive to interest rates because

a- the demand for money is insensitive to changes in the opportunity cost of holding money

b- competition among banks keeps the opportunity cost of holding money relatively constant.

c- people base their investment decisions on expected profits not interest rates.

d- transactions are not subject to scale economics as wealth increases.

9- Friedman's belief regarding the interest insensitivity of the demand for money implies that

a- the quantity of money is the primary determinant of aggregate spending.

b- velocity is countercyclical

c- both (a) and (b) of the above are correct

d- neither (a) nor (b) of the above are correct

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10- In Friedman's view, because income tends to decline relative to permanent income during business cycle contractions, the demand for money with respect to actual income will increase causing velocity to

a- rise

b- decline

c- remain unchanged, since velocity is only sensitive to changes in interest rates.

d- decline, provided that interest rates increase when the economy contracts.

chapter three

the demand money

Part A True - false questions

Circle whether the following statements are true (T) or false (F)

1) the equation of exchange relates nominal income to the

quantity of money and velocity

2) according to classical, the velocity would normally be reasonable constant in the long run

3) according to classical, there negative relation between the velocity and quantity of money

4) according to classical, there negative relation between the velocity and the nominal GDP

Part B multiple - Choice questions

Circle the appropriate answer

1) is a theory of how the nominal value of aggregate income is determined

a) liquidity theory
b) modern quantity theory of money
c) classic quantity theory of money
d) none of the above

2) the velocity is calculated by formula

a) $V = P.Y/M$*** b) $V = P.M/Y$

c) $V = M.P/Y$ d) $V = Y.M / P$

3) According to fisher the demand for money is determined by

a) the level of transactions generated by the level of nominal income PY

b) the institutions in the economy that affect the way people conduct transactions

c) a and b

d) none of the above

4) According to Keynes's the motive behind the demand for money

a) the transactions motive   b) precautionary

c) speculative motive   d) all of the above

5) According to Keynes, the motive for transactions that individuals expect to make in the future and that these transactions are proportional to income

a) the transactions motive   b) precautionary motive

c) speculative motive   d) all of the above

6) according to Friedman indicates that demand for money should a function of the resources available to individuals

a) the asset demand theory   b) modern quantity theory

c) classical quantity theory   d) the liquidity theory

7) The quantity theory of money is a theory of

a) how the money supply is determined

b) how interest rates are determined

c) how the nominal value of aggregate income is determined

d) all of the above

8) Because the quantity theory of money tells us how much money is held for a given amount of aggregate income. it is also a theory of

a) interest –rate determination

b) the demand for money

c) exchange rate determination

d) none of the above

9) The average number of times that a dollar is spent in buying the total amount of final goods and services produced during a given time period is known as

a) gross national product   b) the spending multiplier

c) the money multiplier   d) velocity

10) the velocity of money is

a) the average number of times that a dollar is spent in buying the total amount of final goods and services

b) the ratio of the money stock to high – powered money

c) the ratio of the money stock to interest rates

d) none of the above

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Chapter four

Determination of the Money Supply

Chapter Four

Determinants of the money supply

The main objectives of this chapter is to study and understand the following topics

- **deriving the money multiplier by the algebraic approach**

– **Factors that determine the money multiplier**

Chapter Four

Determinants of the money supply[16]

In deriving a model of the money supply process, we foci here on a simple definition of money 9currency plus checkable deposits), which corresponds to MI. Although

[16] - Frederic S. Mishkin Op. cit, pp. 351 - 368.

broader definition of money– particularly, M2– are frequently used in policymaking, we conduct the analysis with an M1 definition because it is le complicated and yet provides a basic understanding of the money supply process. Furthermore, all analyses and results using the M definition apply equally well to the M2 definition. A somewhere more complicated money supply model for the M2 definition developed in an append to this chapter.

The money supply model and the money multiplier

Because as we saw. The fed can control the monetary base better than it can control reserves, it makes– sense to link the money supply M to the monetary base MB through a relationship such as the following:

$$M = m \times MB \quad (1)$$

The variable m is the money multiplier, which tells us how much the money supply changes for a given change in the monetary base MB. This multiplier tells us what multiple of the monetary base is transformed into the money supply. Because the money multiplier is larger than 1, the alternative name for the monetary base, high–

powered money, is logical; a $1 change in the monetary base leads to more than a $1 change in the money supply.

The money multiplier reflects the effect on the money supply of other factors besides the monetary base, and the following model will explain the factors that determine the size of the money multiplier. Depositors' decisions about their holdings of currency and checkable deposits are one set of factors affecting the money multiplier. The reserve requirements imposed by the fed on the banking system also affect the size of the multiplier, as do banks' decisions about excess reserves.

Deriving the money multiplier

In our model of multiple deposit creation, we ignored the effects on deposits creation of changes in the public s holdings of currency and banks' holdings of excess reserves. Now we incorporate these changes into our model of the money supply process by assuming that the desired level of currency C and excess reserves ER grows proportionally with checkable deposits D; in other words, we assume that the ratios of these items to checkable deposits are constants in equilibrium, as the braces in the following expressions indicate:

$$c = \{C/D\} = \text{currency ratio}$$

$$e = \{ER/D\} = \text{excess reserves ratio}$$

we will now derive a formula that describes how the currency ratio desired by depositors, the excess reserves ratio desired by banks, and the required reserve ratio set by the Fed affect the multiplier m. we begin the derivation of the model of the money supply with the following equation:

$$R = RR + ER$$

This states that the total amount of reserves in the banking system R equals the sum of required reserves RR and excess reserves ER. (Note that this equation corresponds to the equilibrium condition RR = R, where excess reserves were assumed to be zero.)

The total amount of required reserves equals the required reserve ratio R times the amount of checkable deposits D:

$$RR = r \times D$$

Substituting $r \times D$ for RR in the first equation yields an equation that links reserves in the banking system to the amount of checkable deposits and excess reserves they can support:

$$R = (r \times D) + ER$$

A key point here is that the Fed sets the required reserve ratio to less than 1. Thus $1 of reserves can support more than $1 of deposits, and the multiple expansion of deposits can occur.

Let's see how this works in practice. If excess reserves are held at zero ($ER = 0$), the required reserve ratio is set at $r = 0.10$ and the level of checkable deposits in the banking system is $ 800 billion, then the amount of reserves needed to support these deposits is $ 80 billion (= 0.10 × $800 billion). The $80 billion of reserves can support ten times this amount in checkable deposits, because multiple deposit creation will occur.

Because the monetary base MB equals currency C Plus reserves R, we can generate an equation that links the amount of the monetary base to the levels of checkable deposits and currency by adding currency to both sides of the equation:

$$\mathbf{MB} = \mathbf{R} + \mathbf{C} = (\mathbf{r} \times \mathbf{D}) + \mathbf{ER} + \mathbf{C}$$

Another way of thinking about this equation is to recognize that it reveals the amount of the monetary base needed to support the existing amounts of checkable deposits, currency and excess reserves.

An important feature of this equation is that an additional dollar of MB that arises from an additional dollar of currency does not support any additional deposits. This occurs because such an increase leads to an identical increase in the right-hand side of the equation with no change occurring in D. the currency component of MB does not lead to multiple deposit creation as the reserves component does. Put another way, an increase in the monetary base that goes into currency is not multiplied, whereas an increase that goes into supporting deposits is multiplied.

Another important feature of this equation is that an additional dollar of MB that goes into excess reserves ER does not support any additional deposits or currency the reason for this is that when a bank decides to hold excess reserves, it does not make additional loans, so these excess reserves do not lead to the creation of deposits. Therefore, if the Fed injects reserves into the banking system and they are held as excess reserves, there will be no effect on deposits or currency and hence no effect on the money supply. In other words, you can think of excess reserves as an idle component of reserves that are not being used to support any deposits. This means that for a given level of reserves, a higher amount of excess reserves implies that the banking system, in effect, has fewer reserves to support deposits.

To derive the money multiplier formula in terms of the currency ratio c = {C/D} and the excess reserves ratio e =

{ER/D}, we rewrite the last equation, specifying C as c $\times$ D and ER as e $\times$ D:

$$MB = (R \times D) + (e \times D) + (c \times D) = (r + e + c) \times D$$

We next divide both sides of the equation by the term inside the parentheses to get an expression linking checkable deposits D to the monetary base MB:

$$\mathbf{D} = \frac{\mathbf{1}}{\boldsymbol{r+e+c}} \times \mathbf{MB} \qquad \mathbf{(2)}$$

Using the definition of the money supply currency plus checkable deposits (M = D + C) and again specifying C as c D,

$$\mathbf{M = D + (c \times D) = (1 + c) \times D}$$

Substituting in this equation the expression for D from Equation 2, we have

$$M = \frac{\boldsymbol{1+c}}{\boldsymbol{r+e+c}} \times MB \qquad (3)$$

Final, we have achieved our objective of deriving an expression in the form of our earlier Equation 1. As you can see the ratio that multiplies MB IS the money multiplier that tells how much the money supply changes in response to a given change in the monetary base (high-powered money). The money multiplier.

$$m = \frac{1+c}{r+e+c} \times MB \qquad (4)$$

It is a function of the currency ratio set by depositors c, the excess reserves ratio set by banks e, and the required reserve ratio set by the Fed r.

Although the algebraic derivation we have just completed shows you how the money multiplier is constructed, you need to understand the basic intuition behind it to understand and apply the money multiplier concept without having to memorize it.

Intuition behind the money multiplier

To get a feel for what the money multiplier means, let us again construct a numerical example with realistic numbers for the following variables:

R = required reserve ratio = 0.10

C = currency in circulation = $400 billion

D = checkable deposits = $800 billion

ER = excess reserves = $0.8 billion

M = money supply (MI) = C + D = $1,200 billion

From: these numbers we can calculate the values for the currency ratio C and the excess reserves ratio e:

$$C = \frac{\$400\ billion}{\$800\ billion} = 0.5$$

$$e = \frac{\$0.8\ billion}{\$800\ billion} = 0.001$$

The resulting value of the money multiplier is

$$m = \frac{1+0.5}{0.1+0.001+0.5} = \frac{1.5}{0.601} = 2.5$$

The money multiplier of 2.5 tells us that, given the required reserve ratio of 10% on checkable deposits and the behavior of depositors as represented by c = 0.5 and banks as represented by e = 0.001, a $1 increase in the monetary base leads to a $2.50 increase in the money supply (MI).

An important characteristic of the money multiplier is that it is less than the simple deposit multiplier of 10. The Key to understanding this result of our money supply model to realize that although there is multiple expansion of deposits. There is no such expansion for currency. Thus, if some portion of the increase in high- powered money finds its way into currency, this portion does not undergo multiple deposit expansion in our analysis, we did not allow for this possibility, and so the increase in reserves led to the maximum amount of multiple deposit creation. However, in our current model of the money multiplier, the level of currency does increase when the monetary base MB and checkable deposits D increase because c is greater than zero. As previously stated, any increase in MB that goes into an increase in currency is not multiplied, so only part of the increase in MB is available to support checkable deposits that undergo multiple expansions. The overall level of multiple deposit expansion must be lower meaning that the increase in M, given an increase in MB, is smaller than the simple model indicated.[17]

Factors that determine the money multiplier

To develop our intuition of the money multiplier e further, let us look at how this multiplier changes in responsible changes in the variables in our model c, e, and r. the game are playing is a familiar in economics: we ask what happens w one of these variables changes, leaving all other variables same (ceter is paribus).

Changes in the required reserve ratio

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[17] - Another reason the money multiplier is smaller is that e is a constant fraction greater than zero, indicating that an increase in MB and D leads to higher excess reserves. The resulting higher amount of excess reserve means that the amount of reserves used to support checkable deposits not increase as much as it otherwise would. Hence the increase checkable deposits and the money supply will be lower, and the money multiplier will be smaller. However, because e is currently so tiny- around 0.001 the impact of this ratio on the money multiplier is now quite but there has been period when e has been much larger and so has more important role in lowering the money multiplier.

This result can be demonstrated from the Equation 4 formula as follows when r increase, the denominator of the money multiplier increases, therefore the money multiplier must decrease.

If the required reserve ratio on checkable deposits increases reserves cannot support as large an amount of checkable deposits, more reserves are needed because required reserves for these checkable deposits have increased. The resulting deficiency in reserves then means that banks must contract their loans causing a decline in deposits and hence in the money supply the reduced money supply relative to the level of MB, which has remained unchanged, indicates that the money multiplier has declined as well. Another way to see this is to realize that when r is higher less multiple expansion of checkable deposits occurs. With less multiple deposit expansion, the money multiplier must decrease

We can verify that the foregoing analysis is correct by seeing what happens to the value of the money multiplier in our numerical example when r increases from 10% to 15% (leaving all the other variables unchanged) money multiplier becomes

$$m = \frac{\mathbf{1+0.5}}{\mathbf{0.15+0.001+0.5}} = \frac{\mathbf{1.5}}{\mathbf{0.651}} = 2.3$$

Which as we would expect, is less than 2.5

The analysis just conducted can also be applied to the cause in which the required reserve ratio falls. In this case, there will be more multiple expansions for checkable deposits because the same level of reserves can now support more checkable deposits, and the money multiplier will increase. For example, if r falls from 10% to 5%, plugging this value into our money multiplier formula (leaving all the other variables unchanged) yields a money multiplier of

$$m = \frac{\mathbf{1+0.5}}{\mathbf{0.05+0.001+0.5}} = \frac{\mathbf{1.5}}{\mathbf{0.551}} = 2.72$$

Which is above the initial value of 2.5

We can now state the following result: the money multiplier and the money supply are negatively related to the required reserve ratio r. in the past, the Fed sometimes used reserve requirements to affect the size of the money supply. In recent years, however, reserve requirements have become a less important factor in the determination of the money multiplier and the money supply (see the FYI box)

FYI the declining importance of reserve requirements

Two developments in recent years have led to the decreasing importance of reserve requirements in determining the money multiplier and the money supply.

We discussed how financial innovation led to the development of sweep accounts, in which any balances above a certain amount in a checking account at the end of a business day are "swept out" of the account and invested in overnight securities that pay interest and then redeposited the next morning. The resulting reduction in checking account balances has led to a substantial reduction in the amount of required reserves in recent years.

At the same time, banks have found that they need to put more cash in their ATMs to satisfy customer needs, particularly on the weekends and holidays when banks are closed. This cash is classified as vault cash, so it is counted as reserves. The fed also allows banks to classify some of the reserves they hold as deposits at the federal reserve banks as contractual clearing balances, which earn credits that can be used to pay for Federal reserve services such as check clearing and the use of Fed wire to transfer funds. The result is that approximately 70% of banks voluntarily have contractual clearing balances and vault cash that exceed the amount of their required reserves.[18] We describe this situation by saying that reserve requirement are not binding, in other words, higher reserve requirements would not change the banks holdings of reserves because they already want to hold more than the required amount of reserves as vault cash in their ATMs and as contractual clearing balances.

A change in reserve requirement would have no effect on the banks behavior for a bank for which reserve requirements are not binding: A change in reserve requirements would not cause the bank to change the amount of its reserves, which already exceed. The reserve requirements. For the 70% of banks for which reserve requirements are not binding, a change in reserve requirements would have no effect on the amount of deposits and the money supply. It is only for the minority

[18] - See Paul Bennett and standard Peristiani are reserve requirement Binding? Federal Reserve Bank of New York, Economic policy review (May 2002)

of banks for which reserve requirements are binding that change in reserve requirements matter. Because reserve requirements have a much smaller effect on the money multiplier and, the money supply than they did in the past, the Federal Reserve no longer views reserve requirements as a useful tool for controlling the money supply

Changes in the currency ratio c

Next, what happens to the money multiplier when depositor behavior causes the currency ratio c to increase with all other variables unchanged? An increase in c means that depositors are converting some of their checkable deposits into currency. As shown before, checkable deposits undergo multiple expansion while currency does not. Hence, when checkable deposits are converted into currency, there is a switch from a component of the money supply that undergoes multiple expansion to one that does not. The overall level of multiple expansion declines, and so must the multiplier.[19]

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[19] - As long as r + e is less than 1 (as is the case using the realistic numbers we have used), an increase in c raises the denominator of the money multiplier proportionally by more than it raises the numerator. The increase in e cause the multiplier to fall. If you would like to know more about what explains

This reasoning is confirmed by our numerical example, where c rises from 0.50 to 0.75. The money multiplier then falls from 2.5 to

$$\mathbf{m} = \frac{\mathbf{1+0.75}}{\mathbf{0.1+0.001+0.75}} = \frac{\mathbf{1.75}}{\mathbf{0.851}} = \mathbf{2.06}$$

We have now demonstrated another result: the money multiplier and the money supply are negatively related to the currency ratio c.

Changes in the excess reserves ratio e

When banks increase their holdings of excess reserves relative to checkable deposits, the banking system, in effect, has fewer reserves to support checkable deposits. This means that given the same level of MB, banks will contract their loans, causing a decline in the

movements in the currency ratio c, take a look at an appendix to this chapter on this topic, which can be found on this book's web site at www.myeconlab.com/mishkin. The appendix at the end of this chapter discusses how the Money multiplier for M2 is determined.

level of checkable deposits and a decline in the money supply, and the money multiplier will decrease.[20]

This reasoning is supported in our numerical example when e rises from 0.001 to 0.005 the money multiplier declines from 2.5 to

$$m = \frac{\mathbf{1+0.5}}{\mathbf{0.1+0.005+0.5}} = \frac{\mathbf{1.5}}{\mathbf{0.605}} = 2.48$$

Note that although the excess reserves ratio has risen fivefold there has been only a small decline in the money multiplier. This decline is small, because in recent years e has been extremely small, so changes in it have only a small impact on the money multiplier. However, there have been times, particularly during the Great depression, when this ratio was far higher, and its movements had a substantial effect on the money supply and the money multiplier thus our final result is still an important one: the money multiplier and the money supply are negatively related to the excess reserves ratio e.

[20] - This result can be demonstrated from the Equation 4 formula as follow when e rises, the denominator of the money multiplier rises, and so money multiplier must fall.

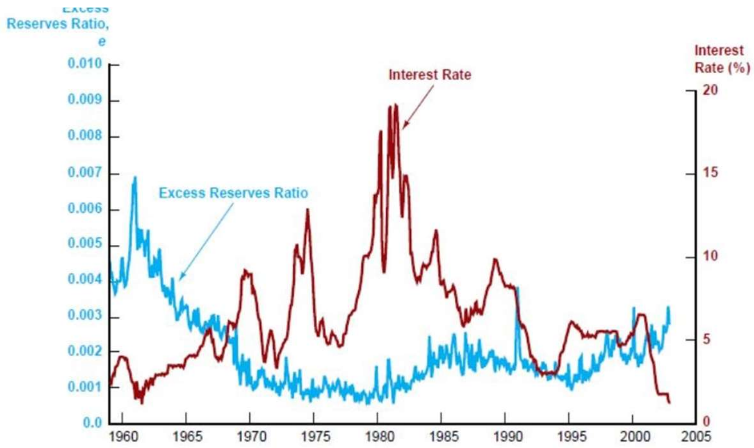
To understand the factors that determine the level of e in the banking system, we must look at the costs and benefits to banks of holding excess reserves. When the costs of holding excess reserves rise, we would expect the level of excess reserves and hence e to fall; when the benefits of holding excess reserves rise, we would expect the level of excess reserves and e to rise. Two primary factors affect these costs and benefits and hence affect the excess reserves ratio: market interest rates and expected deposit outflows.

Market interest rates. As you may recall from our analysis of bank management, the cost to a bank of holding excess reserves is its opportunity cost, the interest that could have been earned on loans or securities if they had been held instead of excess reserves. For the sake of simplicity, we assume that loans and securities earn the same interest rate i, which we call market interest rate. If i increase, the opportunity cost of holding excess reserves rises, and the desired ratio of excess reserves to deposits falls. A decrease in I, conversely, will reduce the opportunity cost of excess reserves, and e will rise. The banking system's excess reserves ratio e is negatively related to the market interest rate i.

Another way of understanding the negative effect of market interest rates on e is to return to the theory of asset demand, which states that if the expected returns on alternative assets rise relatives to the expected returns on a given asset, the demand for that asset will decrease. As the market interest rate increases, the expected return on loans and securities rises relative to the zero return on excess reserves, and the excess reserves ratio falls.

Figure 1 shows us (as the theory of asset demand predicts) that there is a negative relationship between the excess reserves ratio and a representative market interest rate, the federal funds rate. The period 1960 – 1981 saw an upward trend in the federal funds rate and a declining trend in e, whereas in the period 1981– 2005, a decline in the federal funds rate is associated with a rise in e. the empirical evidence thus supports our analysis that the excess reserves ratio is negatively related to market interest rates.

Figure (no.1) the excess ratio and the interest rate (federal funds rate)



Expected deposit outflows. Our analysis of bank management also indicated that the primary benefit to a bank of holding excess reserves is that they provide against losses due to deposit outflows; that is , they enable the bank experiencing deposit outflows to escape the costs of calling in loans, selling securities borrowing from the Fed or other corporations, or bank failure , if banks fear that deposit outflows are likely to increase (that is, if expected deposit outflows increase), they will want more insurance against this possibility and will increase the excess reserves ratio. Another way to put it is this: if expected deposit outflows rise, the expected benefits, and hence the expected returns for holding excess reserves. Increase. As the theory of asset demand predicts, excess reserves will then rise. Conversely a decline in expected deposit outflows will reduce the insurance benefit of excess reserves, and their level should fall. We have the following result: the excess reserves ratio e is positively related to expected deposit outflows.

The variables are grouped by the player or players when either influence the variable or are most influenced by it. The Federal Reserve, for example, influences the money supply by controlling the first three variables (called tools of the Fed) – r, MB_n and BR. Depositors influence the money supply though their decisions about the currency ratio c. while banks influence the money supply by their decisions about e, which are affected by their expectations about deposit outflows. Because depositors' behavior also influences bankers' expectations about deposit outflows, this variable also reflects the role of both depositors and bankers in the money supply process. Market interest rates, as represented by I, affect the money supply through the excess reserves ratio e the demand for loans by borrowers influences market interest rates, as does the supply of money. Therefore, all four players are important in the determination of i.

Application Explaining Movements in the Money Supply, 1980-2005.

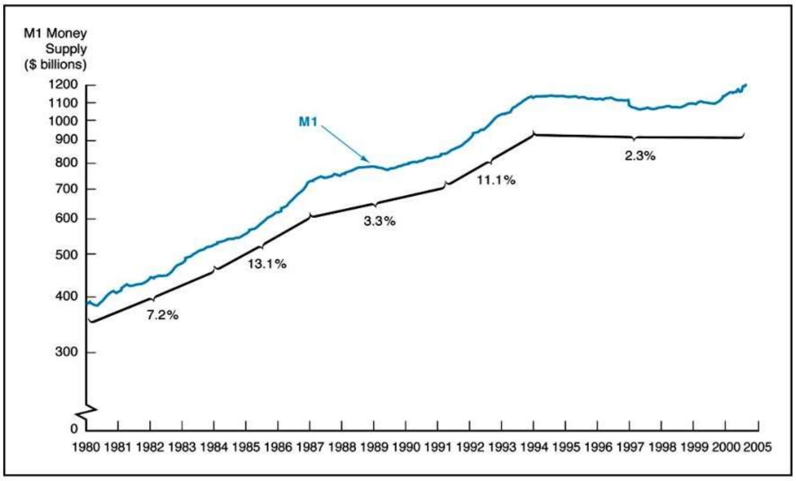
To make the theoretical analysis of this chapter more concrete, we need to see whether the model of the money supply process developed here helps us understand recent movements of the money supply. We look at money supply movements from 1980 to 2005 – a particularly interesting period, because the growth rate of the money supply displayed unusually high variability.

Figure 2 shows the movements of the money supply (MU from 1980 to 2005, with the percentage next to each bracket representing the annual growth rate for the bracketed period: from January 1980 to October 1984, for example, the money supply grew at a 7.2% annual rate. The variability of money growth in the 1980 – 2005 period is quite apparent, swinging from 7.2% to 13.1% down to

3,3%, then up to 11.1% and finally back down to 1.6%. What explains these sharp swings in the growth rate of the money supply?

Our money supply model as represented by Equation 5, suggests that the movements in the money supply that, we see in Figure 2 are explained by either changes in MB, + BR (the nonborrowed monetary base plus borrowed reserves) or be changes in

Figure 2 Money Supply 1980 -2005



percentage for each bracket indicates the annual growth rate of the money supply over the bracketed period.

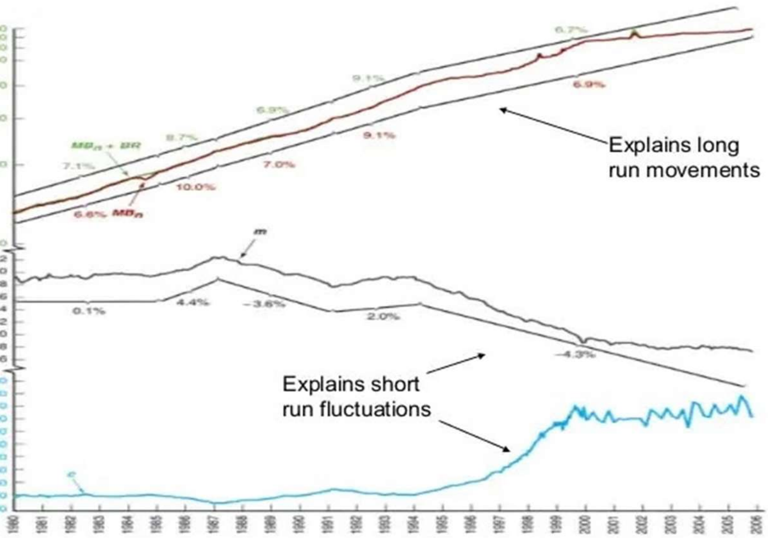
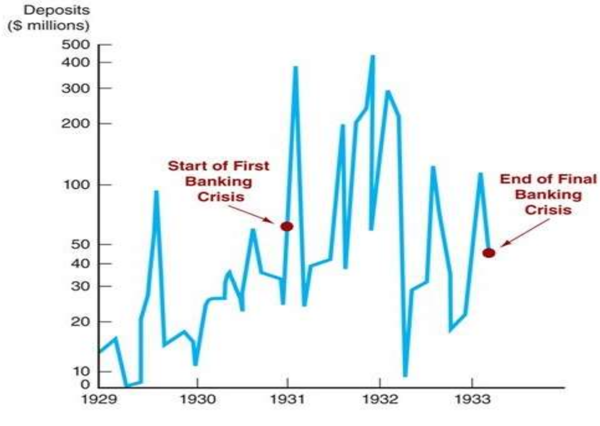


Figure3. Determinants of the Money Supply, 1980 - 2005 percentage for each bracket indicates the annual growth rate of the series over the bracketed period.

Figure 4 Deposits of Failed Commercial Banks, 1929–1933



Figure(no 4) Deposits of Failed commercial Banks 1929 1933

See that another consequence of bank panics is that they can cause a substantial reduction in the money supply. As we will see in the chapters on monetary theory later in the book, such reductions can also cause severe damage to the economy.

Figure 4 traces the bank crisis during the Great Depression by showing the volume of deposits at failed commercial banks from 1929 to 1933. In their classic book. A monetary History of the United States, 1867-1960, Milton Friedman and Anna Schwartz describe the onset of the first banking crisis in late 1930 as follows:

Before October 1930, deposits of suspended [failed] commercial banks had been somewhat higher than during most of 1929 bur not out of line with experience during the preceding decade. In November 1930, they were more than double the highest value recorded since the start of monthly data in 1921. A crop of bank failures, particularly in Missouri, Indiana, Illinois, Iowa, Arkansas, and North Carolina, led to widespread attempts to convert checkable and time deposits into currency, and also, to a much lesser extent, into postal savings deposits. A contagion of fear spread among depositors, starting from the agricultural areas, which had experienced the heaviest impact of bank failures in the twenties. But failure of 256 banks with $180 million of deposits in November 1930 was followed by the failure of 532 with over $370 million of deposits in December (all figures seasonally unadjusted), the most dramatic being the failure on December 11 of the bank of United States with over $200 million of deposits. That failure was especially important. The Bank of United States was the largest commercial bank, as measured by volume of deposits, ever to have failed up to that time in U.S. history. Moreover, though it was just an ordinary commercial bank, the Bank of United States 's name had led many at home and abroad to regard it somehow as an official bank, hence its failure constituted more of a blow to confidence than would have been administered by the fall of a bank with a less distinctive name.[21]

[21] - Mihon Friedman and Anna Jacobson Schwanz, A Monetary History of the united states, 1867-1960 (Princeton NJ.: Princeton University press. 1963) pp 308 - 311.

Figure 5
Excess Reserves Ratio and Currency Ratio, 1929–1933

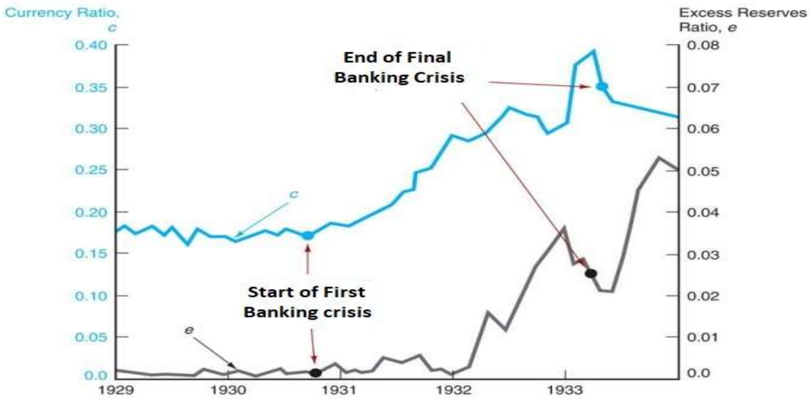


Figure 5. Excess reseres Ratio and Currency Ratio.1929 -1933

The first bank panic, from October 1930 to January 1931, is clearly visible in Figure 4 at the end of 1930, when there is a rise in the amount of deposits at failed banks. Because there was no deposit insurance at the time (the FDIC wasn't established until 1934), when a bank failed, depositors would receive only partial repayment of their deposits. Therefore, when banks were failing during a bank panic, depositors knew that they would be likely to suffer substantial losses on deposits and thus the expected return on deposits would be negative. The theory of asset demand predicts that with the onset of the first bank crisis, depositors would shift their holdings from checkable deposits to currency by withdrawing currency from their bank accounts and c would rise. Our earlier analysis of the excess reserves ratio suggests that the resulting surge in deposit outflows would cause the banks to protect themselves by substantially increasing their excess reserves ratio e. both of these predictions are borne out by the data in figure 5. During the first bank panic (October 1930− January 1931) c began to climb. Even more striking is the behavior of e, which more than doubled from November 1930 to January 1931.

Figure 6 M1 and the Monetary Base, 1929–1933

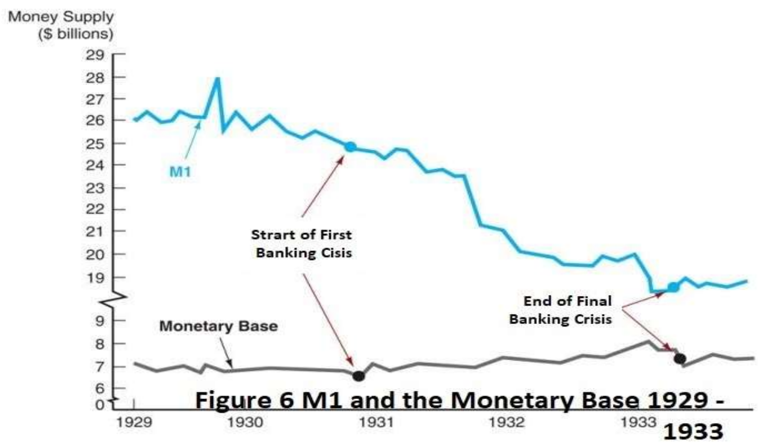


Figure 6. M1 and the Monetary Base 1929 - 1933

The money supply model predicts that when e and c increase, the money supply will contract. The rise in c results in a decline in the overall level of multiple deposit expansion, leading to a smaller money multiplier and a decline in the money supply, while the rise in e reduces the amount of reserves available to support deposits and also causes the money supply to decrease. Thus our model predicts that the rise in e and c after the onset of the first bank crisis would result in a decline in the money supply a prediction borne out by the evidence Figure6.

Banking crises continued to occur from 1931 to 1933, and the pattern predicted by our model persisted: c continued to rise and so did e. by the end of the crises in March 1933, the money supply (M1) had declined by over 25% by far the largest decline in all of American history and coincided with the nation's worst economic contraction. even more remarkable is that this decline occurred despite a 20% rise in the level of the monetary base-which illustrates how important the changes in c and e during bank panics can be in the determination of the money supply it also illustrates that the Fed's job of conducting monetary policy can be complicated by depositor and bank behavior.

Exercises

The sum of currency in circulation and total reserves is called the monetary base or high-powered money. because Federal Reserve actions have a more predictable effect on the monetary base than on (1)…………………… money supply models typically focus on the Fed's control over high powered money.

In our model of multiple deposit creation. We ignored the effects on deposit creation of changes in the public's holding of (2) …………………… and banks holding of excess reserves. We incorporate these changes into the deposit expansion model by assuming that the desired levels of currency and excess reserves grow proportionally with (3) …………………… That is, the currency and excess reserves ratios are constants

The money multiplier is the Key factor separating the Fed's control of the money supply from its ability to affect the (4) …………………… An important characteristic of the money multiplier is that it is less than the simple deposit multiplier (of 10).

Inclusions of depositor behavior into the money supply model reveal that the money multiplier depends on depositor preferences for currency relative to checkable deposits. A numerical example that accounts for currency withdrawals reveals that the simple deposit multiplier greatly (5) …………………… the expansion in deposits. The key to understanding this result is that although there is multiple expansion of deposits, there is no such expansion for currency. Since an (6) …………………… in the monetary base will mean an increase in currency in circulation, only part of any increase in the monetary base will be available for deposit expansion. Because reserves leave the bank as currency in circulation, the money supply will not increase as much for a given change in the monetary base, meaning a smaller money multiplier.

When banks increase their holdings of excess reserves, their volume of loans contracts for a given level of the monetary base. Thereby causing a (7) …………… in the money multiplier. The banking system's excess reserves ratio is negatively related to the market (8)……………………but (9) ……………………related to expected deposit outflows

Changes in the required reserve ratio, the currency ratio, and the excess reserve ratio alter the value of the money (10) …………………… increases in any of these ratios − because they reduce the reserves available for lending and deposit expansion reduce the money multiplier.

Also, banks decisions to borrow reserves from the Fed affect the money supply. If banks seek additional discount loans from the Fed, the money supply (11) ……………………, if the Fed does not act to offset the increase in reserves. Alternatively, if banks choose to reduce their level of discount borrowing, the money supply contracts. The amount of discount loans demanded by banks is positively related to the market interest rate and (12) …………………… related to the discount rate.

An examination of the 1980 − 1996 time periods indicates that the behavior of players other than Federal Reserve can lead to sharp changes in money supply growth in the short run. Importantly, the period indicates that growth rate of the money supply is closely linked to the growth rate of the (13)……………… monetary base.

Exercises

The money multiplier

A– Write the formula for the money multiplier.

…………………………………………………………………….

B– Calculate the currency ratio, the excess reserves ratio, and the money multiplier for the following numbers

ID = 0.10 C = $280 billion

D = $800 billion ER = $40 billion

{C/D} =……………………………………………..

{ER/D} =……………………………………………

M=…………………………………………………..

C– Calculate required reserves (RR), total reserves (R), and the monetary base (MB)

RR$ =……………………………………………

R$ = ……………………………………………

MB$ = …………………………………………….

D- Calculate the new money multiplier and money supply assuming that the Fed lowers the required reserve ratio on checkable deposits to 0.08 and does nothing to change the monetary base. Assume that the deposit ratios remain unchanged

m = ……………………………………………………….

M = $……………………………………………………

E- Calculate the new level of deposits (D) and currency in circulation (C)

D = $………………………………………………………

C = $………………………………………………………

F- Calculate the new level of required reserves (RR) and excess reserves (ER)

RR = $………………………………………………………

ER = $………………………………………………………

Exercise 2: Adding Bank Behavior into the Money Supply model

A . Given the following values, calculate the money multiplier and the money supply

$r_D = 0.10$ $\{C/D\} = 0.40$

$ER = DL = 0$ $MB_n = \$400$ billion

m = ……………………………………………

M = $…………………………………………

B− Calculate the level of currency (C), the level of deposits (D), the level of required reserves (RR), and the level of total reserves (R) in banking system

C = $………………………… RR = $……………………

D = $………………………… R = $……………………

C − Suppose that bankers suddenly decide to hold a cushion of excess reserves equal to six percent of their checkable deposits. Calculate the new money multiplier, the new money supply. The level of deposits, currency in circulation, and the amount of excess reserves that banks will now hold

m = ……………………………………………

M = $ ……………………………………………

D = $ ……………………………………………

C = $……………………………………………

RR = $……………………………………………

ER = $……………………………………………

Exercise 3: Factors that Affect the Money Supply

Indicate how the money supply responds to the following changes by filling in the second column of the table below with either a (↑) to indicate a rise in the money supply or a (↓) to indicate a fall in the money supply

Player	Change in variable		Money Supply Response
Federal reserve	r_D	↓	
system	MB_n	↓	
	i_d		
depositors	{C/D}	↓	
Depositors & Banks	Expected deposit outflows	↓	
Borrowers & other players	1	↓	

Self-Test

Part A True - False Questions

Circle whether the following statements are true (T) or false (F)

1- The ratio that relates the change in the money supply to a given change in the monetary base is called the money multiplier.

2- Another name for the nonborrowed base is high powered money.

3- The banking system's excess reserves ratio is negatively related to the market interest rate.

4- The excess reserves ratio is negatively related to expected deposit outflows.

5- When individuals reduce their holdings of currency by depositing these funds in their bank accounts, the money multiplier increases.

6- If the Fed purchase $ 10,000 in government securities from a bank and simultaneously extends $ 10,000 in discount loans to the same bank, then the Fed has kept the monetary base from changing.

7- The Fed has better control over the nonborrowed base than the borrowed base.

8- As the currency ratio falls, fewer reserves are available to support checkable deposits causing a decrease in the money supply.

9- For a given level of the monetary base, if the Fed began to pay interest on deposits that banks maintain at the Federal Reserve, Banks would have greater incentive to hold excess reserves, which would lead to a decline in the money supply, all else constant.

10- The money multiplier from the money supply model that includes depositor and bank behavior is larger than the simple deposit multiplier.

Part B: Multiple Choice Questions

Circle the appropriate answer

1- When comparing the simple model of multiple deposit creation with the money supply model that accounts for depositor and bank behavior, the more complicated model indicates that

a- an increase in the monetary base that goes into currency is not multiplied.

b- the money multiplier negatively related to their currency ratio c- the money multiplier positively related to the excess reserves ratio

d- all of the above occur.

e. only (a) and (b) of the above

2- The money multiplier increase in value as the

a- currency ratio increases.

b- excess reserves ratio increases

c- required reserve ratio decreases

d- required reserve ratio increases

3- Depositors often withdraw more currency from their bank accounts during Christmastime. Therefore, one would predict that

a- the money multiplier will tend to fall during Christmastime.

b- the money multiplier will tend to rise during Christmastime.

c- discount borrowing will tend to fall during Christmastime.

d- none of the above will occur.

4- The Fed lacks complete control over the monetary base because

a- it cannot set the required reserve ratio on checkable deposits.

b- it cannot perfectly predict the amount of discount borrowing by banks

c- it cannot perfectly predict shifts from deposits to currency.

d- of each of the above.

e- of only (a) and (b) of the above

5- The money multiplier is smaller than the simple deposit multiplier when

a - the currency ratio is greater than zero.

b- the excess reserves ratio is greater than zero.

c-the required reserve ratio on checkable deposits is greater than zero.

d- all of the above occur

e- both (a) and (b) of the above occur.

6- the money multiplier is negatively related to

a- the excess reserves ratio.

b- the currency ratio,

c- the required reserve ratio on checkable deposits.

d- all of the above.

e- only (a) and (b) the above.

7- For a given level of the monetary base, a drop in the excess reserve ratio means

a- an increase in the money supply.
b- an increase in the monetary base
c- an increase in the nonborrowed base
d- all of the above
e- only (b) and (c) of the above

8- for a given level of the monetary base, a drop in the currency ratio means

a- an increase in the nonborrowed base, but a decrease in the borrowed base of equal magnitude

b- an increase in the borrowed base, but a decrease in the nonborrowed base of equal magnitude

c- an increase in the money supply.

d- a decrease in the money supply

e- none of the above.

9- If banks reduce their holdings of excess reserves

a- the monetary base will increase
b- the money supply will increase
c- both (a) and (b) of the above will occur

d- neither (a) nor (b) of the above will occur.

10- An examination of the 1980 -1996 period indicates that

a- the primary detertminant of movements in the money supply is the nonborrowed base.

b- the shorter the time period, the better is the Fed's control over the money supply.

c- both (a) and (b) of the above are true

d- neither (a) nor (b) of the above are true.

11- The banking system's excess reserves ratio is

a- negatively related to both the market interest rate and expected deposit outflows.

b- positively related to both the market interest rate and expected deposit outflows.

c- positively related to the market interest rate and negatively related to expected deposit outflows.

d-negatively related to the market interest rate and positively related to expected deposit outflows.

12- The monetary base less discount loans is called

a- reserves

b- high powered money

c- the nonborrowed monetary base.

d- the borrowed monetary base

13- If the required reserve ratio is one-fourth, currency in circulation is $400 billion, excess reserves are not held, and checkable deposits are $1200 billion, then the money multiplier is approximately.

a- 2.3 b- 2.8 c- 2.0 d- 1.8

The following questions cover the material in the appendix.

14- The M2 money multiplier is………………than M1 multiplier because the required reserve ratio for a time deposit or a money market mutual fund share is……………….than the reserve requirement for checkable deposits.

a- larger – lower b- larger - higher

c- smaller – lower d- smaller – higher

15- The M2 money multiplier is positive related to

a- high- powered money

b- the time deposit - checkable deposit ratio

c- the required reserve ratio

d- the excess reserves ratio

Exercises

chapter four

determinants of the money supply

part A true or false questions

Circle whether the following statements are true (T) or false (F)

1) The quantity theory of money is a theory of the supply of money.

2) A given change in the monetary base will lead to a smaller increase in checkable deposits than indicated by the simple deposit multiplier.

3) The money multiplier is positively related to the excess reserve ratio

4) The money multiplier is smaller than the simple deposit multiplier when the excess reserves ratio is zero.

5) The money multiplier is smaller than the simple deposit multiplier when the currency – checkable deposit ratio is greater than zero

6) For a given level of the monetary base, an increase in the required reserve ratio on checkable deposits will mean an increase in the money supply.

7) All else constant, an increase in the required reserve ratio on checkable deposits will cause the money supply to fall.

8) For a given level of the monetary base, a decrease in the required reserve ratio on checkable deposits will mean a decrease in the money supply.

9) For a given level of the monetary base, an increase in the required reserve ratio on checkable deposits causes the money multiplier to decrease and the money supply to decrease.

10) For a given level of the monetary base, an increase in the currency – checkable deposit ratio will mean a decrease in the money supply.

part B: multiple– choice question

circle the appropriate answer

1) if the money supply is 500 and nominal income is 3.000, the velocity of money is

a) 60 b) 6 c) 1/6 d) undefined

2) if nominal GDP is $ 10 trillion, and velocity is 10, the money supply is

a) $100 trillion. b) $10 trillion

c) $5 trillion d) $ 1 trillion

3) If the money supply is $ 2 trillion and velocity is 5, then nominal GDP is

a) $2 trillion. b) $5 trillion

c) $10 trillion d) $ 1 trillion

4) The velocity of money is defined as

a) real GDP divided by the money supply.

b) nominal GDP divided by the money supply.

c) real GDP times the money supply.

d) nominal GDP times the money supply.

5) The equation of exchange states that the quantity of money multiplied by the number of times this money is spent in a given year must equal

a) nominal income

b) real income

c) real gross national product

d) velocity

6) The ratio that relates the change in the money supply to a given change in the monetary base is called the

a) money multiplier

b) required reserve ratio

c) deposit ratio

d) discount rate

7) The formula linking the money supply to the monetary base is

a) $M = m/MB$ b) $M = m*MB$

c) $m = M*MB$ d) $MB = M*m$

8) The variable that reflects the effect on the money supply of changes in factors other than the monetary base is the

a) currency – checkable deposits ratio

b) required reserve ratio

c) money multiplier

d) non borrowed base

9) An increase in the monetary base that goes into currency is…………….while an increase that goes into deposit is………………

a) multiplied, multiplied

b) not multiplied, multiplied

c)multiplied, not multiplied

d) not multiplied, not multiplied

10) During the Christmas holiday season, depositors typically withdraw more currency from their accounts. this implies that

a) the money multiplier falls during the Christmas season

b) the money multiplier rises during the Christmas season

c) discount borrowing falls during the Christmas season

d) none of the above

11) If the Fed inject reserves into the banking system and they are held as excess reserves then the money supply.

a) increases by only the initial increase in reserves

b) increases by only one half the initial increase

c) increases by a multiplier of the initial increase in reserves

d) does not change

12) The Fed injects reserves into the banking system and they are held as excess, then the monetary base and the money supply

a) remains unchanged, remains unchanged

b) remains unchanged, increases

c) increases, increases

d) increases, remains unchanged

13) The formula for the money multiplier that includes excess reserves and currency is

a) $m = 1/(r + e + c)$ b) $M = 1/(r + e + c)$

c) $M = (1 + c)/(r + e c)$ d) $D = 1/(r + e + c)$

14) The formula for the checkable deposits that includes excess reserves and currency is

a) $m = 1/(r + e + c)$ b) $M = 1/(r + e + c)$

c) $M = (1 + c)/(r + e c)$ d) $D = (1/(r + e + c)) \times MB$

15) The formula for the money supply that includes excess reserves and currency is

a) $m = 1/(r + e + c)$ b) $D = 1/(r + e + c)$

c) $M = (1 + c)/(r + e + c)$ d) $M = ((1 + c)/(r + e + c)) \times MB$

16) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the money supply is

a) $8000 b) $1200 c) $1200.8 d) $8400

17) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the money multiplier is approximately

a) 2.5 b) 1.67 c) 2.0 d) 0.601

18) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the currency ratio is

a) 25 b) 50 c) 40 d) 05

19) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the excess reserves– checkable deposit ratio is

a) 0.001 b) 0.10 c) 0.01 d) 0.05

20) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the monetary base is

a) $ 480 billion b) $ 480.8 billion

c) $ 80 billion d) $ 80.8 billion

21) If the required reserve ratio is 15 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the money multiplier is approximately

a) 2.5 b) 1.67 c) 2.3 d) 0.651

22) If the required reserve ratio is 5 percent, currency in circulation is $400 billion, checkable deposits are $800 billion, and excess reserves total $0.8 billion, then the money multiplier is approximately

a) 2.5 b) 2.72 c) 2.3 d) 0.551

23) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $1000 billion, and excess reserves total $1billion, then the money supply is

a) $10.000 b) $4000 c) $1400 d) $10.400

24) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $1000 billion, and excess reserves total $1 billion, then the money multiplier is approximately

a) 2.5 b) 2.8 c) 2.0 d) 0.7

25) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $1000 billion, and excess reserves total $1 billion, then the currency ratio is

a) 25 b) 50 c) 40 d) .05

27) If the required reserve ratio is 10 percent, currency in circulation is $400 billion, checkable deposits are $1000 billion, and excess reserves total $1 billion, then the monetary base is

a) $400 billion b) $401 billion

c) $500 billion d) $501 billion

28) If the required reserve ratio is 15 percent, currency in circulation is $400 billion, checkable deposits are $1000 billion, and excess reserves total $1 billion, then the money multiplier is approximately

a) 2.55 b) 2.67 c) 2.35 d) .0551

29) If the required reserve ratio is one − third, currency in circulation is $300 billion, and checkable deposits are $900 billion, then the money supply is

a) $2700 b) $3000 c) $1200 d) $1800

30) If the required reserve ratio is one − third, currency in circulation is $300 billion, and checkable deposits are $900 billion, then the money multiplier is approximately

a) 2.5 b) 2.8 c) 2.0 d) 0.67

31) If the required reserve ratio is one − third, currency in circulation is $300 billion, and checkable deposits are $900 billion, then the currency ratio is

a) 2.5 b) 33 c) 67 d) 375

32) If the required reserve ratio is one – third, currency in circulation is $300 billion, and checkable deposits are $900 billion, then the level of excess reserves in the banking system is

a) $300 billion b) $30 billion c) $3 billion d) 0

33) If the required reserve ratio is one – third, currency in circulation is $300 billion, and checkable deposits are $900 billion, then the monetary base is

a) $300 billion b) $600 billion

c) $333 billion d) $667 billion

34) Because an increase in the monetary base will mean an increase in the level of currency in circulation

a) the actual money multiplier will be smaller than the simple deposit multiplier

b) a given change in the monetary base will lead to a smaller increase in checkable deposits than indicated by the simple deposit multiplier.

c) a given change in the monetary base will lead to a larger increase in checkable deposits than indicated by the simple deposit multiplier.

d) both a and b of the above will occur

35) the money multiplier is smaller than the simple deposit multiplier when

a) the currency – checkable deposit ratio is zero

b) the currency checkable deposit

c) banks choose to hold excess reserves

d) only b and c of the above are true

36) Assuming initially that r = 10%, c = 40%, and e = 0, an increase in r to 15% causes

a) the money multiplier to increase from 2.55 to 2.8

b) the money multiplier to decrease from 2.8 to 2.55

c) the money multiplier to increase from 1.82 to 2

d) the money multiplier to decrease from 2 to 1.82

37) Assuming initially that r = 10%, c = 40%, and e = 0, an decrease in r to 15% causes

a) the money multiplier to increase from 2.8 to 3.11

b) the money multiplier to decrease from 3.11 to 2.8

c) the money multiplier to increase from 2 to 2.22

d) the money multiplier to decrease from 2.22 to 2

Chapter Five

The IS LM Model

Chapter 5.

ISLM Model

The objective from studying this chapter it to understand and apply the following topics:

- **Deriving the IS curve graphically and algebraically**
- **Deriving the LM curve graphically and algebraically**
- **Using IS – LM model to analyses the general equilibrium between good and money market.**

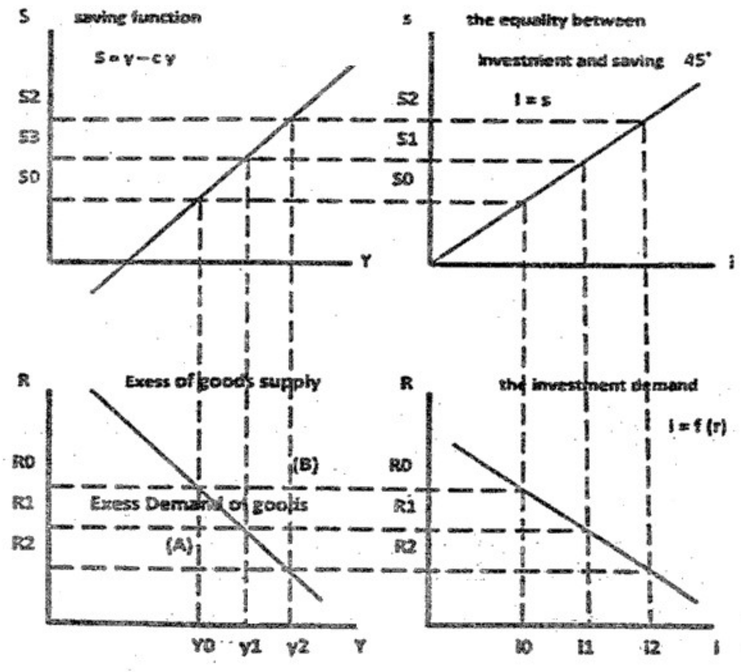
Chapter Five

ISLM Model

Derive the IS and LM curve and explain the equilibrium situation in both good and service market and money market by using ISLM model.

Driving the IS Curve

We can use Hicks and Hanssen analyses the general equilibrium between good and money market by use the ISLM model. We began to drive IS curve by using the following quartet diagram.



The above diagram consists of four parts. The first part explains the relationship between rate of interest and investment level this mean it explain the investment function where I = f(r) and we Know this relationship is negatively. The second part shows the 45^{o} line where the vertical range equal horizontal range. The third part shows the saving function S = (y –cy), and final the forth part shows the collet the income (y) levels. And interest rate levels from first and third parts and driving the IS curve, where imply the all point which equality between investment and saving. This means all point in IS curve shows the equilibrium situation in goods and services market.

The IS curve is a useful concept because output tends to move toward points the curve that satisfy goods market equilibrium if the economy is located in the area to the left of the IS curve. It has an excess demand for goods.at point (A) aggregate output y_o is below the equilibrium level of output y_2 on the IS curve. The excess demand for good results in an unplanned decrease in inventory. Which causes output to rise toward the IS curve, stopping only when aggregate output is again at its equilibrium level on the IS curve.

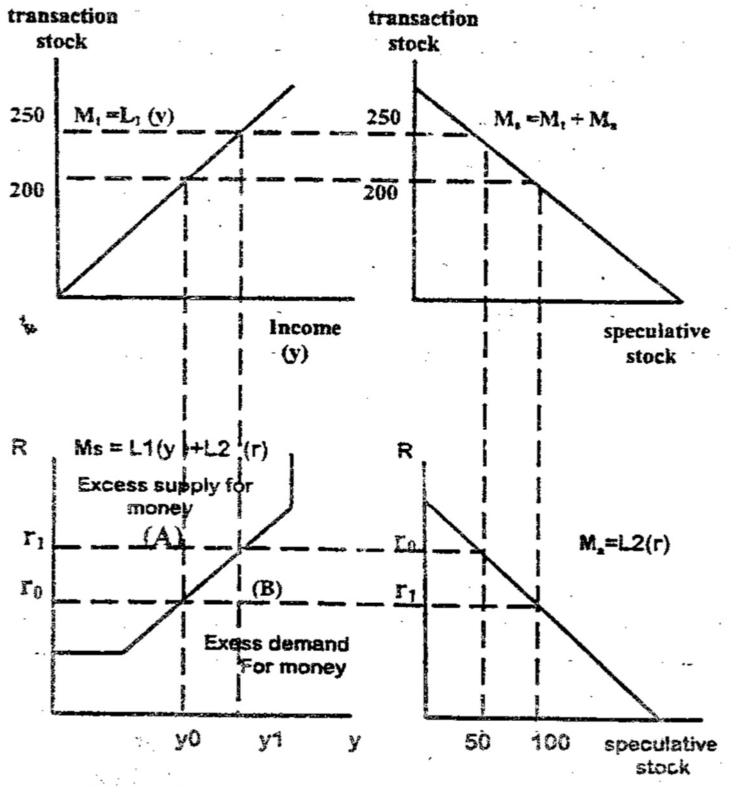
Deriving the LM Curve

By using Hicks – Hanssen analysis we can derive the LM curve which traces out the points that satisfy the equilibrium condition that the quantity of money demanded equals the quantity of money supplied for each given level of aggregate output, the Lm curve tells us what the interest rate must be for there to be equilibrium in the market for money as aggregate output rises, the demand for money increases and the interest rate rises so that money demanded equals money supplied and the market for money is in equilibrium.

We began to derive the LM curve by using the following quartet diagram. The equilibrium condition in money market (assume the general prices level is constant)

$$Ms = L1\ (y) + L2\ (r)$$

The above tell us when the money supply is constant



There is determined relationship between real income (y) and interest rate (R) it's represent the equilibrium condition this relationship named LM.

In the previous diagram which implies four parts, the first par (below and right) shows the link between speculative stock and interest rate (negativity), the horizontal, part in the relationship represent the liquidity trap. The second part refer the money supply (Ms) implies demand money for transaction (Mt) and demand money for speculative (Ma). The third part (up and left) shows the relationship between the income and transaction stock (positively). The forth part, we linking between the interest rate level from the first part and income level from the third part to drive the LM curve, we can see the positive relationship between income curves, we can see the positive relationship between income and interest rate.

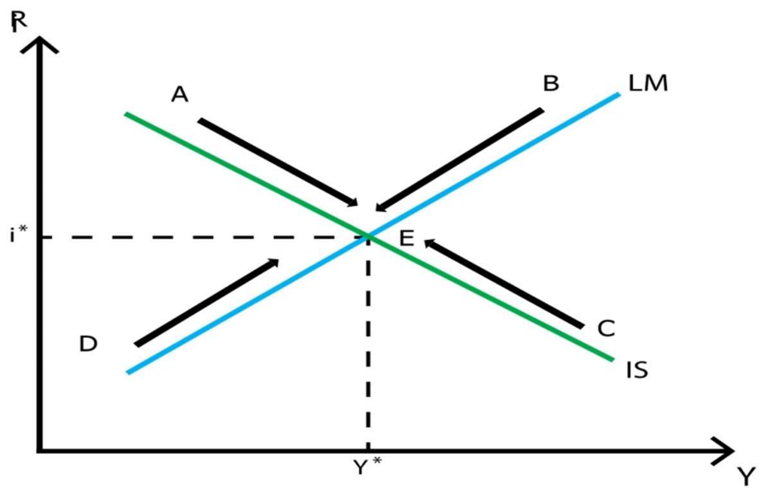
Just as the economy tends to move toward equilibrium points represented by the IS curve, it also move toward the equilibrium points on the LM curve. If the economy is located in the area to the left of LM curve, there is an excess supply of money. At point (A) for example, the interest rate is (r0) and the aggregate output is y0. the interest rate is above equal it, and the people are holding more money than they want. To eliminate their excess money balances they will purchase bonds, which cause the price of bonds to rise and their interest rate to fall. as long as excess supply of money exists, the interest rate will fall until it comes to rest on the LM curve.

If the economy is located in the area to the right of the LM curve there is an excess demand for money. At point (B) for example, the interest rate (r1) is below the equilibrium level and people want to hold more than they currently do. To acquire this money. They will sell bonds and drive down bond prices and the interest rate will rise this process will stop only the interest rises to an equilibrium point on the LM curve

ISLM Approach to Aggregate Output and Interest Rate

Now that we have derived the Is and LM curves, we can put them into the same diagram to produce a model that enables us to determine both aggregate output and the interest rate. The only point at which the goods market and the market for money for money are in simultaneous equilibrium is at the intersection of the IS and LM curve, point E.

At this point, aggregate output equals aggregate demand (IS) and the quantity of money demand equals the money Supplied (LM). At any other point in the diagram at least one of these equilibrium conditions is not satisfied and market forces move the economy toward the general equilibrium, point E.



To learn how this works. Let's consider what happens if the economy is at point A which is on the IS curve but not the LM curve. Even though at point A the goods market is in equilibrium, so that aggregate output equals aggregate demand the interest rate is above its equilibrium level, so the demand for money is lee than the supply. Because people have more money than they want to hold they will try to get rid of it by buying bonds. The resulting rise in bond prices causes a fall in interest rates, which in turn cause both planned investment spending and net exports to rise and thus aggregate output rises. The economy then moves down along the IS curve and the process continues until the interest rate falls to I*, and aggregate output rises to y* that is until the economy is at equilibrium point E.

If the economy is on the LM curve but off the IS curve at point (B). it will also head toward the equilibrium at point E, at point (B), even though money demand equals money supply output is higher than the equilibrium level and exceeds aggregate demand. Firms are unable to sell all their output and unplanned inventory accumulates, prompting firms to cut production and lower output the decline in output means that the demand for money will fall lowering interest rates. The economy then moves down along the LM curve until it reaches equilibrium point E.

Exercises

Monetary and fiscal policy in the ISLM Model Synopsis/ Completions

In this chapter we explore the mechanics of the ISLM model, discovering how monetary policy– the control of the money supply and interest rates– and (1)………………… Policy – the control of government spending and taxes– affect the level of aggregate output and interest rates. Since government policy makers have these two tools at their disposal they will be interested in knowing the effects each policy can be expected to have on the economy.

The ISLM model provides a convenient but powerful framework for comparing the relative effects of proposed– monetary and fiscal actions. By comparing the relative effects of proposed monetary and fiscal actions. By comparing these predicted effects, policymakers can better decide which policy is most appropriate. The ISLM model also provides a framework that allows one to compare the desirable of interest rate targeting against money supply targeting. In addition, the aggregate demand curve is derived using the ISLM model. It is for these three important reasons that we study the ISLM model in the money and banking course.

As is true for any economic model, we can better comprehend the workings of the ISLM model by first examining the behavior of the individual curve. Once this has been done, the effects on interest rates and aggregate output of changes in fiscal and monetary variables can be determined.

The (2)……………… curve shows the combinations of interest rates and aggregate output that ensure equilibrium in the goods markets. Therefore, changes in autonomous consumer expenditures, autonomous (3)………………… spending, and government spending or taxes are all factors that shift the IS curve. For example, if congress enacts legislation to spend $500 billion over the next ten years to repair the decaying infrastructure (roads, bridges, canals) of the economy, the added government spending shifts the IS curve to the (4)………………… An example of a leftward shift in the IS curve is provided by the precipitous drop in autonomous investment spending during the Great Depression. It is important to distinguish between autonomous changes in investment and changes in investment due to changes in interest rates. A change in investment the results from a change in interest rates is shown as a movement along a given IS curve, not as a shift in the IS curve.

Interest rate and aggregate output combinations that represent equilibrium in the money market define an (5)...................................Therefore, changes in either money supply or money demand can cause the LM curve to shift.

Consider the effect an increase in money supply has on the LM curve. At the initial interest rate, an increase in the money supply creates an (6)……………………. supply of money, holding output constant, equilibrium is regained in the money market by a fall in the interest rates. Alternatively, the interest held constant, equilibrium is regained in the money market end the increase in aggregate (7)………………….. is sufficient raise money demand to a level that eliminates the excess supply of money.

Changes in money demand also shift the LM curve. If more people come to expect a surge in the stock market, they will try to conserve on their holding of money, filling their portfolio with more Stoke. The drop in money demand creates an excess supply of money at the initial interest rate therefore, interest rates will (8)……………………… holding output constant, and the LM curve shifts to the (9)……………………… conversely, an increase in the demand for money shifts the LM curve left.

Putting the IS and LM curves together allows us to consider the effects of autonomous spending and policy changes on the equilibrium levels of the interest rate and aggregate output. For example, an increase in taxes aimed at reducing the budget deficit shifts the IS curve. (10)…………………… due to the decline in spending by consumers. The decline in output cause the demand for money to fall, which in turn creates an excess supply of money, putting downward pressure on interest rates. Although the decline in interest rates causes interest sensitive investment to increase is not enough to offset the contractionary effects of the tax increase. No wonder tax increases are so unpopular among incumbent politicians: a tax increase may cause rising unemployment and a net loss of votes on election day.

Some economists contend that there is a tendency for the money supply to expand prior to elections. Since the ISLM model indicates that an increase in the money supply causes aggregate output to (11)………………… and interest rates to fall, and since both are likely to help the incumbent politicians, such a contention has credibility.

The ISLM framework also has been employed to analyze to the appropriateness of Federal Reserve operating procedures While interest rate targets can be shown to be more consistent with stable economic activity when the LM curve is unstable, a money supply target helps ensure greater stability when the (12)……………… curve is unstable. Since neither targeting procedure outperforms the other in every situation, it becomes an empirical question as to which curve is more stable and under which conditions. Thus it is not surprising that economists still debate over the appropriate targeting procedure the Fed should employ.

Another debate has centered around the slops of the LM curve. If the LM curve is very steep, approaching a vertical line, then an expansionary fiscal policy is likely to be an (13)…………………… tool for expanding aggregate output since investment spending will be crowded out by the rising interest rates.

Finally, the ISLM model is useful in deriving the aggregate demand curve used in aggregate demand and supply analysis. Since aggregate demand and supply analysis is so powerful, this function of the ISLM model is especially important. A decline in the price level raises the real money supply, causing interest rates to fall and investment spending to rise. Simultaneous goods and money market equilibrium will correspond to higher levels of aggregate output as the price level falls, indication that the aggregate demand curve slopes (14)…………………. to the right.

The aggregate demand curve shifts in the same direction as a shift in the IS or LM curves increases in the money supply and government spending or decreases in taxes all cause the aggregate demand curve to shift (15)……………………. We see that the aggregate demand and supply model confides a powerful framework for understanding recent economic events.

Exercise 1 factors that cause the IS and LM curves to shift this exercise provides a summary of the cause the IS and LM curves to shift.

A list factors that cause the IS curve to shift to the right

1-………………………………………………

2- ………………………………………………

3- ………………………………………………

4- ………………………………………………

B- A list factors that cause the IS curve to shift to the left

1-…………………………………………………

2-…………………………………………………

3-………………………………………………

4-………………………………………………

C- A list factors that cause the LM curve to shift to the right

1-………………………………………………

2-………………………………………………

3-………………………………………………

4-………………………………………………

D- A list factors that cause the LM curve to shift to the left.

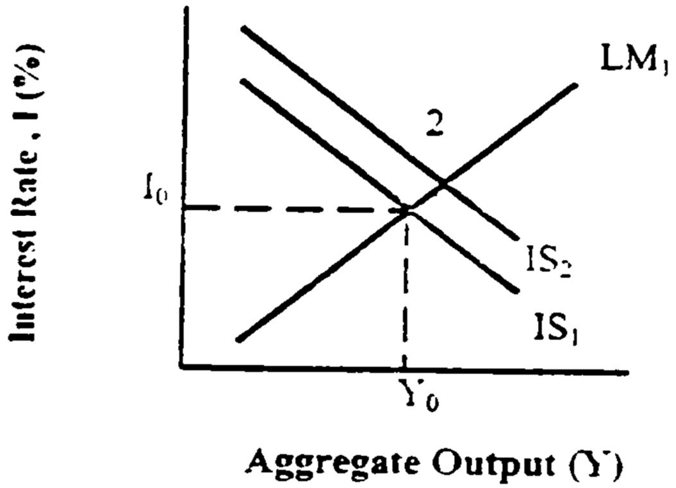
1-………………………………………………

2-………………………………………………

Exercise 2: response to a change in both monetary and fiscal policy

The United States experienced its deepest post-World war *Π* recession in the years 1981 and 1982 despite the fiscal stimulus provided by the Reagan tax cut. The recession was somewhat unusual in that interest rates rose throughout 1981 and the first half of 1982 in Figure1, the stimulus provided by the tax cut is shown as the rightward shift of the IS curve from IS_1 to IS_2 moving the economy from point 1 to point 2. Draw in the new LM curve in Figure1, consistent with the decline in aggregate output and rise in interest rates.

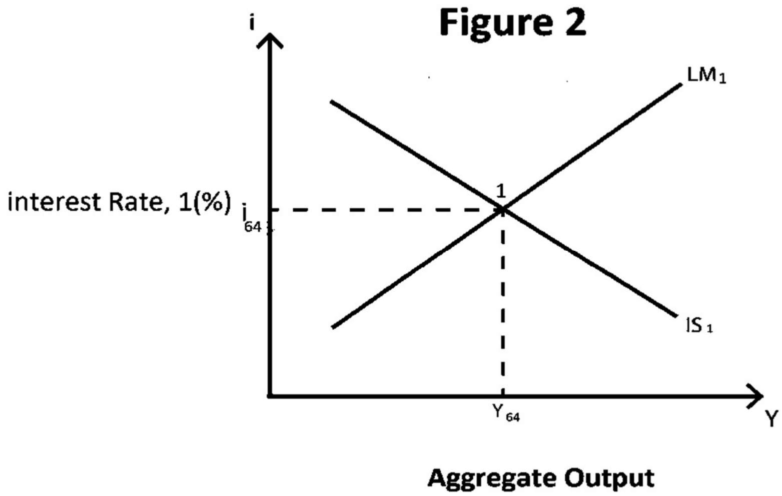
Figure 1.



Explain why the LM curve right have shifted in the direction it did.

Exercise 3: Expansionary monetary and fiscal policy

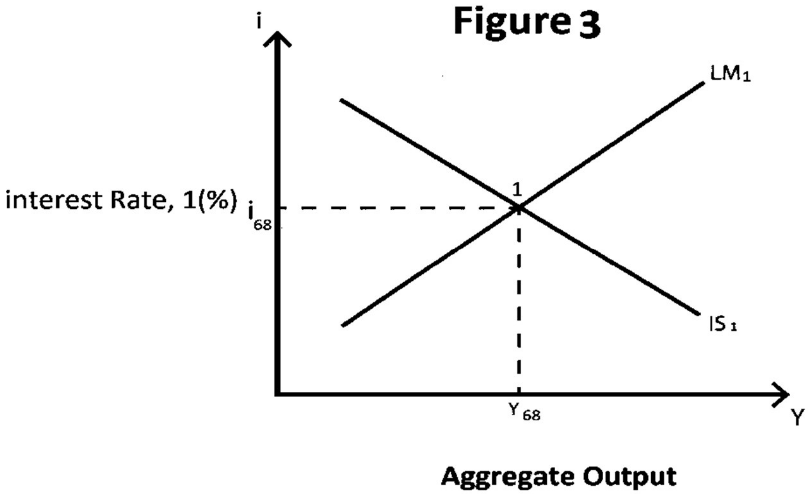
When President Kennedy took office in 1961, he appointed Walter Heller as his chairman for the council of economic advisors. Heller was concerned with the high rate of unemployment and suggested that Kennedy adopt an expansionary fiscal policy. Heller convinced Kennedy that a tax cut would lead to economic expansion, lowering unemployment and thereby fulfilling Kennedy's campaign promise to get the economy moving again. As a consequence of these efforts, taxes were cut in 1964. The results were favorable as unemployment fell from 5.7% in 1963 to 4,5% in 1965. In addition interest rates remained relatively stable over this period, suggesting that the Federal Reserve was pursuing an interest rate targeting strategy, effectively accommodating the fiscal expansion. The position of the economy just prior to the tax cut provides the initial conditions in figure 2, at point 1. Graph the position of the economy in 1965 in Figure 2, showing the increase in aggregate output and stable interest rates.



Exercise 4 contractionary Monetary and fiscal policies

The combination of the tax cut in 1964 and the increase in government spending due to involvement in the Vietnam war significantly reduced unemployment by 1968, but this reduction has come at the cost of higher inflation to the high inflation came on two fronts, First, Congress enacted a measure in 1968 that imposed a 10% surtax on personal income taxes and on corporate incomes. Then in 1969 Richard Nixon reduced federal spending growth. Thus fiscal policy became contractionary in 1968-1969. Second, the Federal Reserve tightened monetary policy. While both fiscal and monetary policy turned contractionary, it appears that fiscal policy proved less contractionary than monetary policy. In figure 3, the condition of the economy in early 1968 is represented by the intersection of the IS curve (IS_1) and the LM curve (LM_1) at point 1. In figure 3, show the shifts in IS and LM curves that took place in 1969.

Predict what happened to interest rates and the unemployment rate by mid. 1970



Exercise 5: monetary and fiscal policy

Indicate whether the following statements are a description of monetary policy (M), fiscal policy (F), or both (B), place the appropriate letter in the bank next to the statement.

1_ Change in money supply and interest rates

2- Shown as a shift in the IS curve

3- Change in government spending and taxing.

4- Shown as a shift in the LM curve

5- Policy made by the Federal Reserve.

6- Policy made by the president and Congress

7- Shown as a shift in the aggregate demand curve.

Exercise 6 Effectiveness of monetary versus fiscal policy

Policymakers often must choose between monetary and fiscal policies. Under some circumstances fiscal policies will be preferred to monetary policies, while the converse may be true under alternative conditions. For the given hypothetical conditions, indicate whether the policy marker would have a preference for fiscal policy (f) or monetary policy (M).

1- Investment is relatively responsive to changes in interest rates

2- The demand for money is unaffected by the interest rate.

3- Investment is relatively responsive to changes in interest rates, and the demand for money is unaffected by the interest rate.

4- The demand for money is relatively responsive to changes in interest rates and, investment is relatively unresponsive to changes in interest rates.

5- Investment is completely crowded out when taxes are cut or government spending is increased.

Exercises7: Factors that cause the aggregate demand curve to shift

In the following table, factors that cause the aggregate demand curve to shift are listed. For a decrease in variable, indicate whether the aggregate demand shifts to the right. (←) or to the left (→)

Factors that cause the aggregate demand curve to shift

Change in variable		Direction of aggregate demand curve shift
Taxes	↓	A.
Money	↓	B.
Government spending	↓	C.
Autonomous	↓	D.
Consumption	↓	E.
Money demand Business confidence	↓	F.

Self- Test

Part A: true - false Questions

Circle whether the following statements are true (T) or false (F)

1- An increase in the interest rate cause the IS curve to shift to left, since investment spending will fall.

2- If businesses should suddenly become bearish (pessimistic) about the future profitability of investment, aggregate output will fall, all else constant. This is shown as a leftward shift of the IS curve.

3- Financial innovation - by increasing the liquidity of financial assets - has enabled some people to reduce their demand for money. The decline in the demand for money has the effect of shifting the LM curve to the left.

4- An expansion of the money supply will lead to lower interest rates and an increase in investment spending as people attempt to rid themselves of excess money balances.

5- The condition known as complete crowding out occurs when the demand for money is insensitive to the interest rate.

6- The effect of an open market purchase is to shift the LM curve to the left

7- Assume that money demand is very unstable and the IS curve is stable. Relative to the LM curve.

8- A decline in taxes as occurred in 1964 causes the aggregate demand curve to shift to the left.

9- Monetary policy changes have no effect on the aggregate demand curve, since it is only factors that shift the IS curve which affect aggregate demand

10- High unemployment leads the Federal Reserve to expand the money supply. Such a policy will shift both the LM and aggregate demand curves to the right.

Part B: Multiple-choice Questions

Circle the appropriate answer.

1- Which of following causes the IS curve to shift to the left?

a- increase in taxes

b- increase in government spending

c- increase in the money supply

d- all of the above

2- An increase in government spending causes both interest rates and aggregate output to increase. In the ISLM framework, this is represented by a………… shift of the……………. curve.

a- leftward; LM b- rightward; LM

c- leftward; IS d- rightward; IS

3- In the early 1930s there was a significant contraction in the money supply. In the ISLM framework, such a contraction is illustrated a……………shift of the…………… curve.

a- rightward; IS b- rightward; LM

c- leftward; IS d- leftward; LM

4- In 1981, president Reagent was able to get through congress a fiscal package containing a tax cut and increased federal expenditures. Such a policy shifts the………… curve to the……………

a- LM left b- IS; right

c- LM; right d- IS; left

5- Assume that an economy suffers a recession in spite of an expansionary monetary policy. The ISLM framework suggests that even if the LM curve shifts to the right, the level of aggregate output might fall if the

a. IS curve shifts to the right

b- investment function shifts to the right

c- IS curve shifts to the left

d- taxes are cut

e- none of the above occurs

6- Suppose that the economy is suffering from both high interest rates and high unemployment. Viewed from an ISLM framework, we can conclude that……….policy has been too……………

a. fiscal; expansionary

b- monetary; expansionary

c- monetary; contractionary

d- fiscal; contractionary

7- Assume that econometric studies indicate that the demand for money is highly sensitive to interest rate change. Such evidence would tend to support the belief that

a- fiscal policy has no aggregate output effects.

b- fiscal policy is effective in increasing output

c- monetary policy is effective in increasing output

d- none of the above is true.

8- investment spending in the country Curtonia is highly unstable, making the IS curve very unstable relative to the LM curve. Given the nature of the economy, the Central bank of Curtonia will want to target the

a- money supply

b- interest rate

c- exchange rate

d- discount rate

e- monetary base

9- The aggregate demand curve slopes downward to the right since

a- a decline in the price level raises the real money supply, lowering interest rates.

b- a decline in the price level raises the real money supply, causing output to fall.

c- an increase in the price level raises the real money supply, causing output to rise.

d- none of the above occurs.

10- A Federal Reserve purchase of government securities will shift the aggregate demand……………curve in which direction?

a- Right

b- left

c- A Fed purchase of securities does not shift the aggregate demand curve

d- all of the above are a possible result of an expansion in the money supply.

11- Assume that the Federal Reserve purchase a policy of pegging the interest rate. If government policymakers………………. government spending, the Fed will be forced to………………the money supply to keep interest rates from……………..

a- decrease; decrease; rising

b- decrease; increase; falling

c- increase; increase; rising

d- increase; decrease; rising

12- Within the ISLM framework an expansionary fiscal policy causes a (n)…………….in aggregate output and cause interest rates to……………

a- increase; fall

b- increase; rise

c- decrease; fall

d- decrease; rise

13- Interest rates in the United States rose over the period 1965 through 1966. Since this coincided with the Vietnam War buildup, we can assume that…………curve shifted to the………………

a- LM; left

b- LM; right

c- IS; left

d- IS; right

14- The………………responsive is money demand to the interest rate, the………….effective is……………policy

a- more; more; fiscal

b- more; less; fiscal

c- less; more; fiscal

d- less; less; monetary

Is LM Model

Part A true false question

Circle whether the following statement are true (T) or false (F)

1) suppose that the situation of economy was to the right of IS curve this mean that three excess demand

2) the excess demand for good result in an unplanned decrease in inventory

3) the unplanned decrease in inventory cause the output will fall in order to restore the equilibrium in the good market

4) investment depends primarily on two factors: production (+) and interest rate (−)

5) the downward −sloping IS curve represents the negative relation between the interest rate and the equilibrium output.

6) the upward−sloping LM curve represents the positive relation between the interest rate and the equilibrium output.

Part B multiple choice questions

circle the appropriate answer

1) suppose that fiscal policy expanded in IS- LM model. this result in

a) IS shift to right, i increase, output decrease

b) LM shift to right, i increase, output increase

c) IS shift to right, i increase, output increase

d) LM shift to left, I decrease, output decrease

2) suppose that the monetary policy expanded in IS-LM model, this result in

a) LM shift to right, i increase, output increase

b) IS shift to right, i increase, output increase

c) IS shift to left, i decrease, output decrease

d) LM shift to right, i decrease, output increase

3) suppose that both the monetary policy and the fiscal policy expanded in IS-LM model, this result in

a) both LM and IS curve shift to right, output decrease

b) both LM and IS curve shift to left, output increase

c) both LM and IS curve shift to right, output increase

d) LM curve shift to left, IS shift to right, output decrease

4) Suppose that the monetary policy expanded and the fiscal policy contracted in IS–LM model, this result in

a) LM shift to right, IS shift to left, the interest rate increase,

b) LM shift to right, IS shift to left, the interest rate decrease,

c) LM shift to left, IS shift to right, the interest rate decrease,

d) LM shift to left, IS shift to right, the interest rate increase,

Problem 1

We have an IS –LM model $c = 200 + 0.25YD$ $I = 150 + 0.25Y - 1000i$ $G = 250$ $T = 200$ $(M/P)d = 2Y - 8000i$ $M/P = 1600$

Solve graphically if possible

Required

1) Derive this IS and LM relations

2) Use the IS and LM relations from (1) to solve for the equilibrium levels of output (Y) and interest rate (i)

3) Use your answer from (2) to find values for C (consumption) and I (investment) in this equilibrium

4) Suppose that M_s Increase of 1600 to 1840 determine the effect of this monetary expansion on Q, i, I, C in the model comment on your answer.

5) Suppose that G increase of 250 to 400, determine the effect of this fiscal

Expansion on the equilibrium values of Y, i, C and I comment on your answer

Problem 2:

Imagine an economy that can be described with the following equations:

$$C = 500 + 8(Y-T)$$

$$I = 200 - 5r$$

$$G = 100$$

$$T = 100$$

required

1) Assuming $r = 10$, What is this economy's equilibrium level of income?
2) Choose different levels of r and plot this IS curve. What is the equation for the IS curve?
3) Now imagine that government spending rises from 100 to 200. What has happened to the IS curve?

Problem 3

Suppose an economy can be described by the following function

Money Demand = MD = $1000 - 100\,r + 5Y$

Money supply = MS = $1000/P$

required

1) Graph the money supply/ money demand diagram Assume that Y = 100 and P = 1. What is the equilibrium interest rate?
2) now choose different levels of Y. Graph the LM curve in this economy. What is the equation for the LM curve?
3) assume that the Federal Reserve raises the money supply to 1250. how does the LM curve change? how much does it shift? what determines the size of this shift?

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Chapter

Tools of Monetary policy

THE MARKET FOR RESERVES AND THE FEDERAL FUNDS RATE

We saw how open market operations and discount lending (changes in borrowed reserves) affect the balance sheet of the Fed and the amount of reserves. The market for reserves is where the federal funds rate is determined, and this is why we turn to a supply and demand analysis of this market to analyze how all three tools of monetary policy affect the federal funds rate.

Supply and Demand in the Market for Reserves

The analysis of the market for reserves proceeds in a similar fashion to the analysis of the bond market. We derive a demand and supply curve for reserves. Then the market equilibrium in which the quantity of reserves demanded equals the quantity of reserves supplied determines the federal funds rate, the interest rate charged on the loans of these reserves.

Demand Curve. To derive the demand curve for reserves, we need to ask what happens to the quantity of reserves demanded, holding everything else constant, as the federal funds rate changes. Recall from the amount of reserves can be split up into two components: (I) required reserves, which equal the required reserve ratio times the amount of deposits on which reserves are required, and (2) excess reserves, the additional reserves banks choose to hold. Therefore, the quantity of reserves demanded equals required reserves plus the quantity of excess reserves demanded. Excess reserves are insurance against deposit outflows, and the cost of holding these excess reserves is their opportunity cost, the interest rate that could have been earned on lending these reserves out, which is equivalent to the federal funds rate. Thus, as the federal funds rate decreases, the opportunity cost of holding excess reserves falls and holding everything else constant, including the quantity of required reserves, the quantity of reserves demanded rises. Consequently, the demand curve for reserves, R^d, slopes downward in Figure 1.

Supply Curve. The supply of reserves, R^s, can be broken up into two components: the amount of reserves that are supplied by the Fed's open market operations, called nonborrowed reserves (NBR), and the amount of reserves borrowed from the Fed, called borrowed reserves (BR). The primary cost of borrowing from the Fed is the interest rate the Fed charges on these loans, the discount rate i_d). Because borrowing federal funds from other banks is a substitute for borrowing (taking out discount loans) from the Fed, if the federal funds rate i_{ff} is below the discount rate i_d, then banks will not borrow from the Fed and borrowed reserves will be zero because borrowing in the federal funds market is cheaper. Thus, as long as i_{ff} remains below l_d, the supply of reserves will just equal the amount of nonborrowed reserves supplied by the Fed, NBA and so the supply curve will be vertical as shown in Figure 1. However, as the federal funds rate begins to rise above the discount rate, banks would want to keep borrowing more and more at i_d and then lending out the proceeds in the federal funds market at the higher rate, i_{ff}. The result is that the supply curve becomes flat (infinitely elastic) at i_d, as shown in Figure 1.

Equilibrium in the Market for Reserves

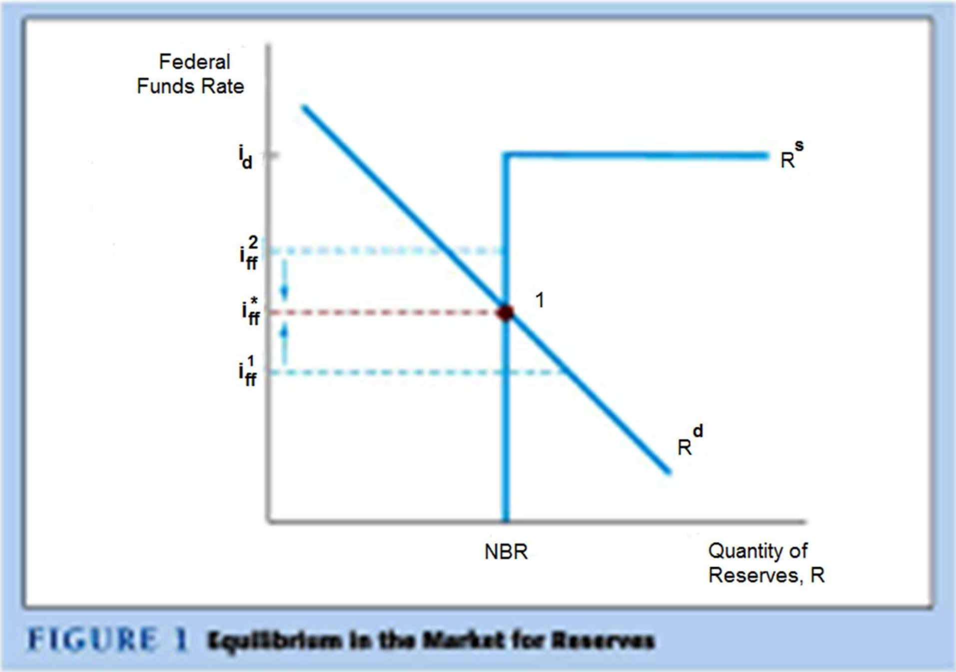


Figure 1, Equilibrium the Market for Reserves
Equilibrium occurs at the intersectionof the supply curve R^s and the demand curve R^d at point 1 and an interest rate of i_{ff}^*

Market Equilibrium. Market equilibrium occurs where the quantity of reserves demanded equals the quantity supplied, R^s = R^d. Equilibrium therefore occurs at the intersection of the demand curve R^d and the supply curve R^s at point 1, with an equilibrium federal funds rate of $i\,^*_{ff}$. When the federal funds rate is above the equilibrium rate at i_{ff}^2, there are more reserves supplied tharn demanded (excess supply) and so the federal funds rate falls to i_{ff}^* as shown by the downward arrow.

When the federal funds rate is below the equilibrium rate at i_{ff}^1, there are more reserves demanded than supplied (excess demand) and so the federal funds rate rises as shown by the upward arrow (Note that Figure 1 is drawn so that i_d is above i_{ff}^* because the Federal Reserve now keeps the discount rate substantially above the target for the federal funds rate.)

How Changes in the Tools of Monetary Policy

Affect the Federal Funds Rate

Now that we understand how the federal funds rate is determined, we can examine how changes in the three tools of monetary policy-open market operations, discount lending, and reserve requirements-affect the market for reserves and the equilibrium federal funds rate.

Open Market Operations. We have already seen that an open market purchase leads to a greater quantity of reserves supplied; this is true at any given federal funds rate because of the higher amount of nonborrowed reserves, which rises from NBR_1 to NBR_2. An open market purchase therefore shifts the supply curve to the right from R_1^s to R_2^s and moves the equilibrium from point 1 to point 2, lowering the federal funds rate From i_{ff}^1 to i_{ff}^2 (see Figure 2). The same reasoning implies that an open market sale decreases the quantity of nonborrowed reserves supplied, shifts the supply curve to the left, and causes the federal funds rate to rise.

The result is that an open market purchase causes the federal funds rate to fall, whereas an open market sale causes the federal funds rate to rise.

Discount Lending. The effect of a discount rate change depends on whether the demand curve intersects the supply curve in its vertical section versus its flat section. Panel (a) of Figure 3 shows what happens if the intersection occurs at the vertical section of the supply curve so there is no discount lending and borrowed reserves, BR, are zero. In this case, when the discount rate is lowered by the Fed from i_d^1 to i_d^2, the vertical section of the Supply curve where there is no discount lending just shortens, as in R_2^s, while the intersection of the supply and demand curve remains at the same point. Thus, in this case, there is no change in the equilibrium federal funds rate, which remains at i_{ff}^1. Because this is the typical situation-since the Fed now usually keeps the discount rate above its target for the federal funds rate-the conclusion is that most changes in the discount rate have no effect on the federal funds rate.

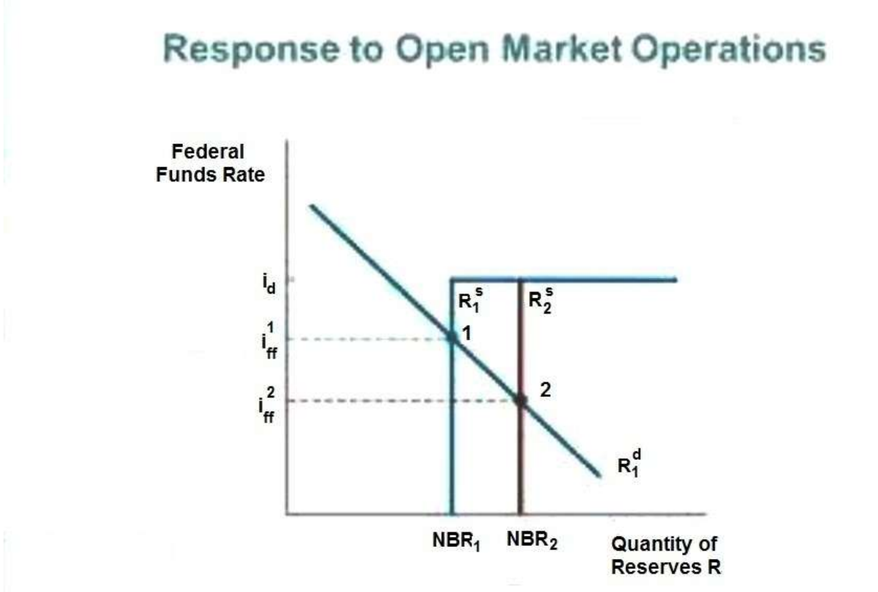


Figure 2, Response to an Open market Operation

An open market purchase increases nonborrowed reserves and hence the reserves supplied, and shifts the supply curve from R_1^s to R_2^s The equilibrium moves from point 1 to point 2, lowering the federal funds rate from i_{ff}^1 to i_{ff}^2

However, if the demand curve intersects the supply curve on its flat section, so there is some discount lending, as in panel (b) of Figure 3, changes in the discount rate do affect the federal funds rate. In this case, initially discount lending is positive and the equilibrium federal funds rate equals the discount rate, $i_{ff}^1 = i_d^1$. When the discount rate is lowered by the Fed from i_d^1 to i_d^2. the horzontal section of the supply curve R_2^s falls, moving the equilibrium from point l to point 2, and the equilibrium federal funds rate falls From i_{ff}^1 to i_{ff}^2 (= i_d^2) in panel (b).

Reserve Requirements. When the required reserve ratio increases, required reserves increase and hence the quantity of reserves demanded increases for any given interest rate. Thus a rise in the required reserve ratio shifts the demand curve to the right from R_1^d to R_2^d in Figure 4, moves the equilibrium from point 1 to point 2, and in turn raises the federal funds rate from i_{ff}^1 to i_{ff}^2.

The result is that when the Fed raises reserve requirements, the federal funds rate rises.

FIGURE 3 Response to a Change in the Discount Rate

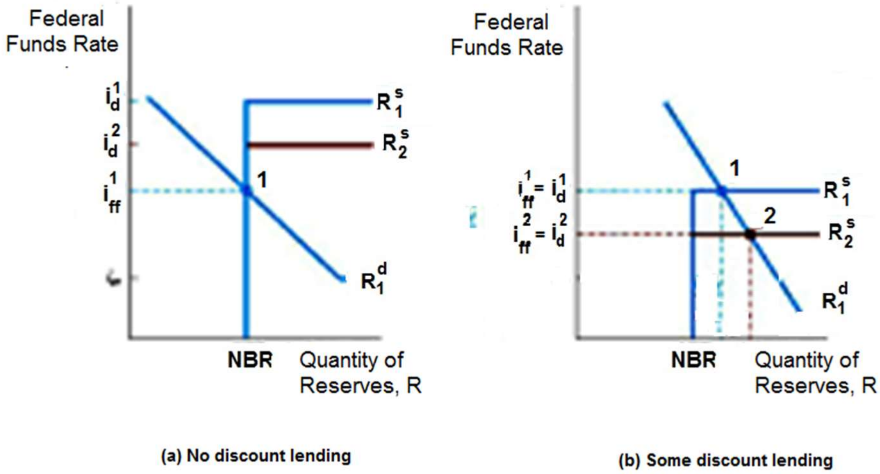


Figure 3, response to a Change in the Discount Rate

In panel (a) when the discount rate is lowered by the Fed from i_d^1 to i_d^2 the vertical section of the supply curve just shortens, as in R_2^s, so that the equilibrium federal funds rate remains unchanged at i_{ff}^1. in panel (b) when the discount rate is lowered by the Fed from i_d^1 to i_d^2 the horizontal section of the supply curve R_2^s falls, and the equilibrium federal funds rate falls from i_{ff}^1 to i_{ff}^2.

Figure 4, Response to Change in Required Reserves

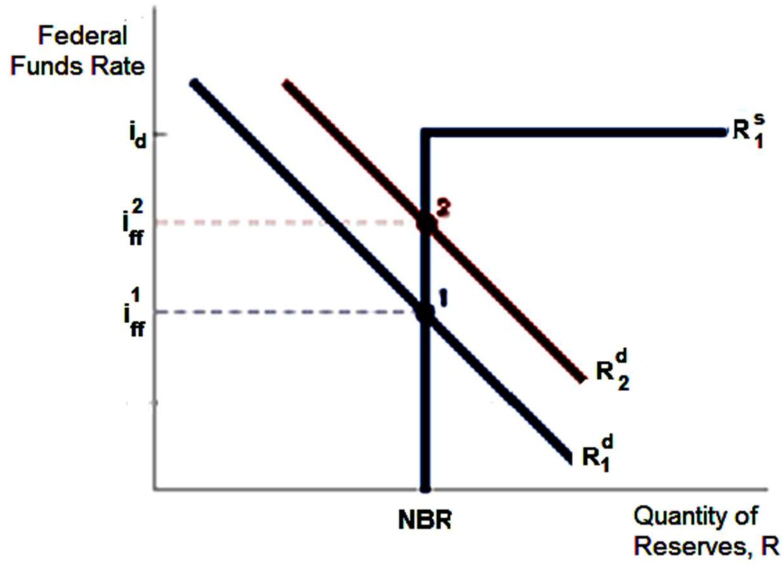


Figure 4, Response to Change in Required Reserves

When the Fed raises reserve requirements, required reserves increase, which increases the demand for reserves. The demand curve shifts from R_1^d to R_1^d the equilibrium moves from point 1 to point 2, and the federal fund rate rises from i_{ff}^1 to i_{ff}^2.

Similarly, a decline in the required reserve ratio lowers the quantity of reserves demanded, shifts the demand curve to the left, and causes the federal funds rate to fall. When the Fed decreases reserve requirements, the federal funds rate falls.

Now that we understand how the three tools of monetary policy-open market operations, discount lending, and reserve requirements-can be used by the Fed to manipulate the money supply and interest rates, we will look at each of them in turn to see how the Fed wields them in practice and how relatively useful each tool is.

OPEN MARKET OPERATIONS

Open market operations are the most important monetary policy tool, because they are the primary determinants of changes in interest rates and the monetary base, the main source of fluctuations in the money supply. Open market purchases expand reserves and the monetary base, thereby increasing the money supply and lowering short-term interest rates. Open market sales shrink reserves and the monetary base, decreasing the money supply and raising short-term interest rates. Now that we understand from the factors that influence the reserves and monetary base, we can examine how the Federal Reserve conducts open market operations with the objective of controlling short-term interest rates and the money supply.

There are two types of open market operations Dynamic open market operations are intended to change the level of reserves and the monetary base, and defensive open market operations are intended to offset movements in other factors that affect reserves and the monetary base, such as changes in Treasury deposits with the Fed or changes in float. The Fed conducts open market operations in U.S. Treasury and government agency securities, especially U.S. Treasury bills. The Fed conducts most of its open market operations in Treasury securities because the market for these securities is the most liquid and has the largest trading volume. It has the capacity to absorb the Fed's substantial volume of transactions without experiencing excessive price fluctuations that would disrupt the market.

The decision-making authority for open market operations is the Federal Open Market Committee (FOMO), which sets a target for the federal funds rate. The actual execution of these operations, however, is conducted by the trading desk at the Federal Reserve Bank of New York. The best way to see how these transactions are executed is to look at a typical day at the trading desk, located in a newly built trading room on the ninth floor of the Federal Reserve Bank of New York.

A Day at the Trading Desk

The manager of domestic open market operations supervises the analysts and traders who execute the purchases and sales of securities in the drive to hit the federal funds rate target. To get a grip on what might happen in the federal funds market that day, her workday and that of her staff begins with a review of developments in the federal funds market the previous day and with an update on the actual amount of reserves in the banking system the day before. Later in the morning, her staff issues updated reports that contain detailed forecasts of what will be happening to some of the short-term factors affecting the supply and demand of reserves. For example, if float is predicted to decrease because good weather throughout the country is speeding up check delivery, the manager of domestic open market operations knows that she will have to conduct a defensive open market operation (in this case, a purchase of securities) to offset the expected decline in reserves and the monetary base from the decreased float. However, it Treasury deposits with the Fed are predicted to fall; a defensive open market sale would be needed to offset the expected increase in reserves. The report also predicts the change in the public's holding of currency. If currency holdings are expected to rise, then, reserves fall, and an open market purchase is needed to raise reserves back up again.

This information will help the manager of domestic open market operations and her staff decide how large a change in nonborrowed reserves is needed to reach the federal funds rate target. If the amount of reserves in the banking system is too large, many banks will have excess reserves to lend that other banks may have little desire to hold, and the federal funds rate will fall. If the level of reserves is too low, banks seeking to borrow reserves from the few banks that have excess reserves to lend may push the funds rate higher than the desired level. Also during the morning, the staff will monitor the behavior of the federal funds rate and contact some of the major participants in the funds market, which may provide independent information about whether a change in reserves is needed to achieve the desired level of the federal funds rate. Early in the morning, members of the manager's staff contact several representatives of the primary dealers, government securities dealers (who operate out of private firms or commercial banks) that the open market desk trades with. Her stall finds out how the dealers view market conditions to get a feel for what may happen to the prices of the securities they trade in over the course of the day. They also call the Treasury to get updated information on the expected level of Treasury balances at the Fed to refine their estimates of the supply of reserves.

Shortly after 9 a.m., members of the Monetary Affairs Division at the Board of Governors are contacted, and the New York Fed's forecasts of reserve supply and demand are compared with the Boards. On the basis of these projections and the observed behavior of the federal funds market, the desk will formulate and propose a course of action to be taken that day, which may involve plans to add reserves to or drain reserves from the banking system through open market operations. If an operation is contemplated, the type, size, and maturity will be discussed.

At 9:20 a.m., a daily conference call is arranged linking the desk with the Office of the Director of Monetary Affairs at the Board of Governors and with one of the four voting Reserve Bank presidents outside of New York. During the call, a member of the open market operations unit will outline the desk's proposed reserve management strategy for the day. After the plan is approved, the desk is instructed to execute immediately any temporary open market operations that were planned for that day. (Outright operations, to be described shortly, may be conducted at other times of the day.)

The desk is linked electronically with its domestic open market trading counterparties by a computer system called TRAPS (Trading Room Automated Processing system), and all open market operations are now performed over this system. A message will be electronically transmitted simultaneously to all the primary dealers over TRAPs indicating the type and maturity of the operation being arranged. The dealers are given several minutes to respond Via TRAPS with their propositions to buy or sell government securities. The propositions are then assembled and displayed on a computer screen for evaluation. The desk will select all propositions, beginning with the most attractively priced, up to the point where the desired amount is purchased or sold, and it will then notify each dealer via TRAPS which of its propositions have been chosen. The entire selection process is typically completed in a matter of minutes.

These temporary transactions are of two basic types. In a repurchase agreement (often called a repo), the Fed purchases securities with an agreement that the seller will repurchase them in a short period of time, anywhere from one to fifteen days from the original date of purchase. Because the effects on reserves of a repo are reversed on the day the agreement matures, a repo is actually a temporary open market purchase and is an especially desirable way of conducting a defensive open market purchase that will be reversed shortly. When the Fed wants to conduct a temporary open market sale, it engages in a matched sale-purchase transaction (sometimes called a reverse repo) in which the Fed sells securities and the buyer agrees to sell them back to the Fed in the near future.

At times, the desk may see the need to address a persistent reserve shortage or surplus and wish to arrange an operation that will have a more permanent impact on the supply of reserves. Outright transactions, which involve a purchase or sale of securities that is not sell-reversing, are also conducted over TRAPS. These operations are traditionally executed at times of day when temporary operations are not being conducted.

Advantages of Open Market Operations

Open market operations have several advantages over the other tools of monetary policy.

1. Open market operations occur at the initiative of the Fed, which has complete control over their volume. This control is not found, for example, in discount operations, in which the Fed can encourage or discourage banks to borrow reserves by altering the discount rate but cannot directly control the volume of borrowed reserves.

2. Open market operations are flexible and precise; they can be used to any extent. No matter how small a change in reserves or the monetary base is desired, open market operations can achieve it with a small purchase or sale of securities. Conversely, if the desired

change in reserves or the base is very large, the open market operations tool is strong enough to do the job through a very large purchase or sale of securities.

3. Open market operations are easily reversed. It a mistake is made in conducting an open market operation, the Fed can immediately reverse it. If the Fed decides that the federal funds rate is too low because it has made too many open market purchases, it can immediately make a correction by conducting open market sales.

4. Open market operations can be implemented quickly; they involve no administrative delays. When the Fed decides that it wants to change the monetary base or reserves, it just places orders with securities dealers, and the trades are executed immediately.

Exercises

SELF-TEST

Part A: True-False Questions

Circle whether the following statements are true (T) or false (F).

T F 1. Open market operations are the most important monetary policy tool because they are the most important determinant of changes in the money multiplier, the main source of fluctuations in the money supply.

T F 2. Defensive open market operations are intended to change the level of reserves and the monetary base in an effort to influence economic activity.

T F 3. When the Fed purchases or sells a security in the open market, it is most likely trading in U.S. Treasury bills.

T F 4. The Fed has less than complete control over the volume of open market operations because banks can refuse to buy Treasury securities.

T F 5. Because banks in agricultural areas experience greater demands for funds in the spring, the Federal Reserve issues adjustment credit to these banks when they have deficient reserves.

T F 6. Evidence from the past twenty years suggests that Fed discount policy has approximated to some degree the variable discount rate proposal.

T F 7. The Fed's role of lender of last resort may still be useful even though deposit insurance has reduced the probability of bank panics.

T F 8. Changes in the discount rate may signal a change in monetary policy or may be an adjustment to a change in market interest rates, making it difficult to decipher the Fed's intentions regarding monetary policy.

T F 9. Abolishing discounting would reduce fluctuations in the borrowed base.

T F 10. Assume that the required reserve ratio set by the Fed exceeds that desired by banks, which tends to be volatile. Then eliminating reserve requirements may tend to increase the instability in the money multiplier.

Part B: Multiple-Choice Questions

Circle the appropriate answer.

1. Open market operations are of two types:

a. defensive and offensive.

b. dynamic and reactionary.

c. actionary and passive.

d. dynamic and defensive.

2. If the Federal Reserve wants to inject reserves into the banking system, it will usually

a. purchase government securities.

b. raise the discount rate.

c. sell government securities.

d. lower reserve requirements.

e. do either (a) or (b) of the above.

3 To temporarily raise reserves in the banking system, the Fed engages in

a. a repurchase agreement.

b. a reverse repo.

c. a matched sale-purchase transaction.

d. none of the above.

4. When float increases, causing a temporary increase in reserves in the banking system, the Fed can offset the effects of float by engaging in

a. a repurchase agreement,

b. an interest rate swap.

c. a matched sale-purchase transaction.

d. none of the above.

5. The type of discount loan extended by the Fed in its role of lender of last resort is called

a. adjustment credit.

b. seasonal credit.

c. extended credit.

d. installment credit.

6. Which of the following proposed policies would tend to reduce instability in the monetary base?

a. Penalty discount rate

b. Discount rate that is tied to market interest rates

C. Elimination of discounting

d. All of the above

e. Only (a) and (c) of the above

7. Changes in the reserve requirements are infrequently used for changing the money supply because

a. reserve requirement changes tend to be powerful and are costly for banks to adjust to.

b. reserve requirement changes tend to be ineffective.

c. reserve requirement changes must be approved by the president.

d. of only (a) and (C) of the above.

e. of none of the above.

8. A reduction in reserve requirements causes the money supply to rise, since the change causes

a. the money multiplier to fall.

b. the money multiplier to rise

C. reserves to fall.

d. reserves to rise.

9. Because the discount rate is frequently kept below the federal funds interest rate,

a. the Fed must ration discount loans on a first-come, first-serve basis.

b. the Fed limits how often a bank can come to the discount window.

c. the Fed refuses to extend discount credit to banks that are not members of the Federal Reserve System.

d. none of the above occurs.

10. Under 100% reserve banking, the money multiplier will be

a. 0

b. 1

c. 10.

d. 100.

11. Advantages of tying the discount rate to a market rate of interest include

a. increasing the confusion concerning the Fed's intentions about future monetary policy because of the uncertainty about what a change in the discount rate is intended to signal.

b. reducing the large fluctuations in the money multiplier from even small changes in the discount rate.

c. simplifying the Fed's administration of the discount window.

d. only (a) and (c) of the above.

12. When the Fed engages in a matched sale-purchase agreement, it __________ Securities which the other party agrees to__________ sell back within a few days.

a. buys, buy

b. buys; sell

C. sells; buy

d. sells; sell

13. When the Fed wants to conduct a_________ open market________ it engages in a__________.

a. permanent; purchase; reverse repo

b. permanent; purchase; repurchase agreement

c. temporary; sale; reverse repo

d. temporary; sale; repurchase agreement

e. temporary; purchase; reverse repo

14.The Fed extends__________ credit to banks that are expecting chronic deposit outflows.

a. adjustment

b. seasonal

c. extended

d. emergency

15. If either Treasury deposits or foreign deposits at the Fed are predicted to________, a ________ open market

_________ would be needed to offset the expected decrease in the monetary base.

a. rise; dynamic; purchase

b. fall; dynamic; sale

c. rise; defensive; purchase

d. fall; defensive; purchase

Chapter

THE ISLM MODEL

DETERMINATION OF AGGREGATE OUTPUT

Keynes Was especially interested in understanding movements of aggregate output because he wanted to explain why the Great Depression had occurred and how government policy could be used to increase employment in a similar economic situation. Keynes's analysis started with the recognition that the total quantity demanded of an economy's output was the sum of four types of spending: (1) consumer expenditure (C), the total demand for consumer goods and services (hamburgers, stereos, rock concerts, visits to the doctor, and so on); (2) planned investment spending (I), the total planned spending by businesses on new physical capital (machines, computers, factories, raw materials, and the like) plus planned spending on new homes; (3) government spending (G), the spending by all levels of government on goods and services (aircraft carriers, government workers, red tape, and so forth), and (4) net exports (NX), the net foreign spending on domestic goods and services, equal to exports minus imports. The total quantity demanded of an economy's output, called aggregate demand (Y^{ad}), can be written as

$$Y^{ad} = C + I + G + NX \qquad (1)$$

Using the common-sense concept from supply and demand analysis, Keynes recognized that equilibrium would occur in the economy when total quantity of output supplied (aggregate output produced) Y equals quantity of output demanded Y^{ad}:

$$Y = Y^{ad} \qquad (2)$$

When this equilibrium condition is satisfied, producers are able to sell all of their output and have no reason to change their production. Keynes's analysis explains two things: (1) why aggregate output is at a certain level (which involves understanding which factors affect each component of aggregate demand) and (2) how the sum of these components can add up to an output smaller than the economy is capable of producing, resulting in less than full employment of resources.

Keynes was especially concerned with explaining the low level of output and employment during the Great Depression. Because inflation was not a serious problem during this period, he assumed that output could change without causing a change in prices. Keynes's analysis assumes that the price level is fixed; that is, dollar amounts for variables such as consumer expenditure, investment, and aggregate output do cv have to be adjusted for changes in the price level to tell us how much the real quantities of these variables change. Because the price level is assumed to be fixed, when we talk in this chapter about changes in nominal quantities, we are talking about changes in real quantities as well.

Our discussion of Keynes's analysis begins with a simple framework of aggregate output determination in which the role of government, net exports, and the possible effects of money and interest rates are ignored. Because we are assuming that government spending and net exports are zero (G = 0 and NX = 0), we need examine only consumer expenditure and investment spending to explain how aggregate output is determined. This simple framework is unrealistic, because both government and monetary policy are left out of the picture, and because it makes other simplifying assumptions, such as a fixed price level. Still, the model is worth studying, because its simplified view helps us understand the key factors that explain how the economy works. It also clearly illustrates the Keynesian idea that the economy can come to rest at a level of aggregate output below the full-employment level. Once you understand this simple framework, we can proceed to more complex and more realistic models.

Consumer Expenditure and the Consumption Function

Ask yourself what determines how much you spend on consumer goods and services. Your likely response is that your income is the most important factor, because if your income rises, you will be willing to spend more. Keynes reasoned similarly that consumer expenditure is related to **disposable income**, the total income available for spending, equal to aggregate income (which is equivalent to aggregate output) minus taxes (Y – T). He called this relationship between disposable income Y_D and consumer expenditure C the **consumption function** and expressed it as follows:

$$C = a + (mpc \times Y_D) \qquad (3)$$

The term a stands for **autonomous consumer expenditure**, the amount of consumer expenditure that is independent of disposable income and is the intercept of the consumption function line. It tells us how much consumers will spend when disposable income is 0 (they still must have food, clothing, and shelter). If a is $200 billion when disposable income is 0, consumer expenditure will equal $200 billion.

The term mpc, the **marginal propensity to consume**, is the slope of the consumption function line ($\Delta C/\Delta Y_D$) and reflects the change in consumer expenditure that results from an additional dollar of disposable income. Keynes assumed that mpc was a constant between the values of 0 and I. If, for example, a $1.00 increase in disposable income leads to an increase in consumer expenditure of $0.50, then mpc =0.5.

A numerical example of a consumption function using the values of a = 200 and mpc = 0.5 will clarify the preceding concepts. The $200 billion of consumer expenditure at a disposable income of 0 is listed in the first row of Table 1 and is plotted as point E in Figure 1. (Remember that throughout this chapter, dollar amounts for all variables in the figures correspond to real quantities, because Keynes assumed that the price level is fixed.) Because mpc = 0.5, when disposable income increases by $400 billion, the change in consumer expenditure-ΔC in column 3 of Table 1-is $200 billion (0.5 X $400 billion). Thus, when disposable income is $400 billion, consumer expenditure is $400 billion (initial value of $200 billion when income is 0 plus the $200 billion change in consumer expenditure). This combination of consumer expenditure and disposable income is listed in the second row of Table I and is plotted as point F in Figure 1. Similarly, at point G, where disposable income has increased by another $400 billion to $800 billion, consumer expenditure will rise by another $200 billion to $600 billion. By the same reasoning, at point H, at which disposable income is $1,200 billion, consumer expenditure will be $800 billion. The line connecting these points in Figure 1 graphs the consumption function.

TABLE 1	Consumption Function; schedule of consumer Expenditure C When mpc = 0.5			
Point in Figure 1	**Disposable income Y_D (1)**	**Change in Disposable Income ΔY_D (2)**	**Change in Consumer Expenditure ΔC (0.5 X ΔY_D) (3)**	**Consumer Expenditure C (4)**
E	0	_____	_____	200 (= a)
F	400	400	200	400
G	800	400	200	600
H	1,200	400	200	800

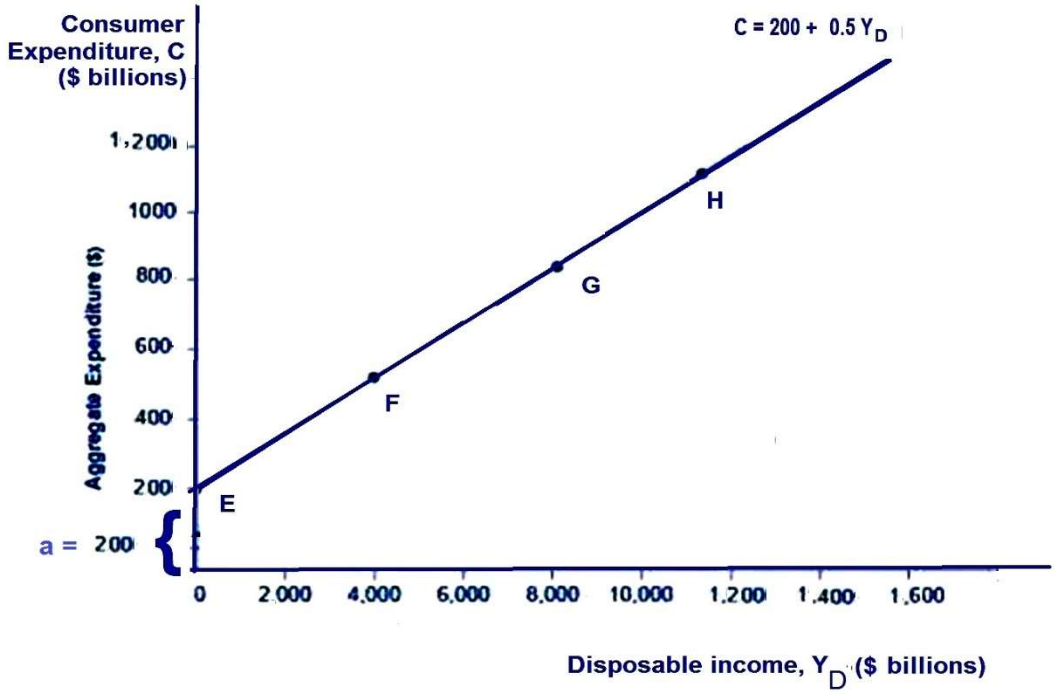


Figure 1, Consumption Function

The consumption function plotted here is from Table 1; a = 200 and mpc = 0.5.

Investment Spending

It is important to understand that there are two types of investment. the first type, **fixed investment**, is the spending by firms on equipment (machines, computers, airplanes) and structures (factories, office buildings, shopping centers) and planned spending on residential housing The second type, **inventory investment**, is spending by firms on additional holdings of raw materials, parts, and finished goods, calculated as the change in holdings of these items in a given time period-say a year. (The FYI box explains how economists' use of the word investment differs from everyday use of the term.)

Suppose that Dell, a company that produces personal computers, has 100,000 computers sitting in its warehouses on December 31, 2006, ready to be shipped to dealers. If each computer has a wholesale price of $1,000, Dell has an inventory worth $100 million. lf by December 3l, 2007, its inventory of personal computers has risen to $150 million, its inventory investment in 2007 is $50 million, the change in the level of its inventory over the course of the year ($150 million minus $100 million). Now suppose that there is a drop in the level of inventories; inventory investment will then be negative.

Dell may also have additional inventory investment if the level of raw materials and parts that it is holding to produce these computers increases Over the Course of the year. If on December 31, 2006, it holds $20 million of computer chips used to produce its computers and on December 31, 2007, it holds $30 million, it has an additional $10 million of inventory investment in 2007.

An important feature of inventory investment is that-in contrast to fixed investment, which is always planned-some inventory investment can be unplanned. Suppose that the reason Dell finds itself with an additional $50 million of computers on December 31, 2007, is that $50 million less of its computers were sold in 2007 than expected. this $50 million of inventory investment in 2007 was unplanned. In this situation, Dell is producing more computers than it can sell and will cut production.

Planned investment spending, a component of aggregate demand Y^{ad}, is equal to planned fixed investment plus the amount of inventory investment planned by firms. Keynes mentioned two factors that influence planned investment spending: interest rates and businesses expectations about the future. How these factors affect investment spending is discussed later in this chapter. For now, planned investment spending will be treated as a known value. At this stage, we want to explain how aggregate output is determined for a given level of planned investment spending; we can then examine how interest rates and business expectations influence aggregate output by affecting planned investment spending

Equilibrium and the Keynesian Cross Diagram

We have now assembled the building blocks (consumer expenditure and planned investment spending) that will enable us to see how aggregate output is determined when we ignore the government. Although unrealistic, this stripped-down analysis clarifies the basic principles of output determination. In the next section, government enters the picture and makes our model more realistic.

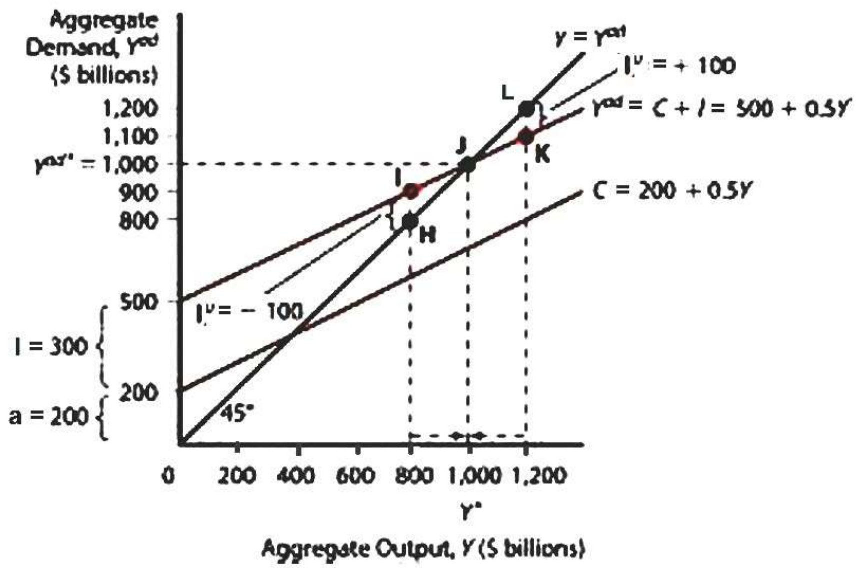


Figure 2, Keynesian Cross Diagram

When I = 300 and C = 200 + 0.5 Y, equilibrium output occurs at Y* = 1,000, where the aggregate demand function Y^{ad} = C + I intersects with the 45 line $Y = Y^{ad}$

The diagram in Figure 2, known as the Keynesian cross diagram, shows how aggregate output is determined. The vertical axis measures aggregate demand and the horizontal axis measures the level of aggregate output. The 45° line shows all the points at which aggregate output Y equals aggregate demand Y^{ad}, that is, it shows all the points at which the equilibrium condition Y = Y^{ad} is satisfied. Because government spending and net exports are zero (G = 0 and NX = 0), aggregate demand is

Y^{ad} = C + I

Because there is no government sector to collect taxes, there are none in our simplified economy; disposable income Y_D then equals aggregate output Y (remember that aggreate income and aggregate output are equivalent). Thus the consumption function with a = 200 and mpc = 0.5 plotted in Figure 1 can be written as C = 200 + 0.5Y and is plotted in Figure 2. Given that planned investment spending is $300 billion, aggregate demand can then be expressed as follows:

Y^{ad} = C + I = 200 + 0.5Y + 300 = 500 + 0.5Y

This equation, plotted in Figure 2, represents the quantity of aggregate demand at any given level of aggregate output and is called the **aggregate demand function**.

The aggregate demand function Y^{ad} = C + I is the vertical sum of the consumption function line (C = 200 + 0.5Y) and planned investment spending (I = 300). The point at which the aggregate demand function crosses the 45° line Y= Y^{ad} indicates the equilibrium level of aggregate demand and aggregate output. In Figure 2, equilibrium occurs at point J, with both aggregate output Y* and aggregate demand Y^{ad} at $1,000 billion.

As you learned, the concept of equilibrium is useful only if there is a tendency for the economy to settle there, lo see whether the economy heads toward the equilibrium output level of $1,000 billion, let's first look at what happens if the amount of output produced in the economy is above the equilibrium level at $1,200 billion. At this level of output, aggregate demand is $1,100 billion (point K), $I00 billion less than the $1,200 billion of output (point L on the 45° line). Because output exceeds aggregate demand by $100 billion, firms are saddled with $100 billion of unsold inventory. To keep from accumulating unsold goods, firms will cut production. As long as it is above the equilibrium level, output will exceed aggregate demand and firms will cut production, sending aggregate output toward the equilibrium level.

Another way to observe a tendency of the economy to head toward equilibrium at point J is from the viewpoint of inventory investment. When firms do not sell all output produced, they add unsold output to their holdings of inventory, and inventory investment increases. At an output level of $1,200 billion, for instance, the $100 billion of unsold goods leads to $100 billion of unplanned inventory investment, which firms do not want. Companies will decrease production to reduce inventory to the desired level, and aggregate output will fall (indicated by the arrow near the horizontal axis). This viewpoint means that unplanned inventory investment for the entire economy I^u equals the excess of output over aggregate demand. In our example, at an output level of $1,200 billion, I^u = $100 billion. It I^u is positive; firms will cut production and output will fall. Output will stop falling only when it has returned to its equilibrium level at point J, where I^u = 0.

What happens if aggregate output is below the equilibrium level of output? Let's say output is $800 billion. At this level of output, aggregate demand at point I is $900 billion, $100 billion higher than output (point H on the 45° line). At this level, firms are selling \$100 billion more goods than they are producing, so inventory falls below the desired level. The negative unplanned inventory investment (I^u = -\$100 billion) will induce firms to increase their production so that they can raise inventory to the desired levels. As a result, output rises toward the equilibrium level, shown by the arrow in Figure 2. As long as output is below the equilibrium level, unplanned inventory investment will remain negative, firms will continue to raise production, and output will continue to rise. We again see the tendency for the economy to settle at point J, where aggregate demand Y equals output Y^{ad} and unplanned inventory investment is zero (I^u = 0).

Expenditure Multiplier

Now that we understand that equilibrium aggregate output is determined by the position of the aggregate demand function, we can examine how different factors shift the function and consequently change aggregate output. We will find that either a rise in Planned investment spending or a rise in autonomous consumer expenditure shifts the aggregate demand function upward and leads to an increase in aggregate output.

Output Response to a Change in Planned Investment Spending. Suppose that a new electric motor is invented that makes all factory machines three times more efficient. Because firms are suddenly more optimistic about the profitability of investing in new machines that use this new motor, planned investment spending increases by \$100 billion from an initial level of I_1 = \$300 billion to I_2 = \$400 billion. What effect does this have on output? The effects of this increase in planned investment spending are analyzed in Figure 3 using a Keynesian cross diagram. Initially, when planned investment spending I_1 is \$300 billion, the aggregate demand function is Y_1^{ad} , and equilibrium occurs at point 1, where output is \$1,000 billion. The \$100 billion increase in planned investment spending adds directly to aggregate demand and shifts the aggregate demand function upward to Y_2^{ad}. Aggregate demand now equals output at the intersection of Y_2^{ad} with the 45° line Y = Y^{ad} (point 2). As a result of the \$I00 billion increase in planned investment spending, equilibrium output rises by \$200 billion of \$1,200 billion (Y_2). For every dollar increase in planned investment spending, aggregate output has increased twofold.

FIGURE 3 Response of Aggregate Output to a Change in planned investement

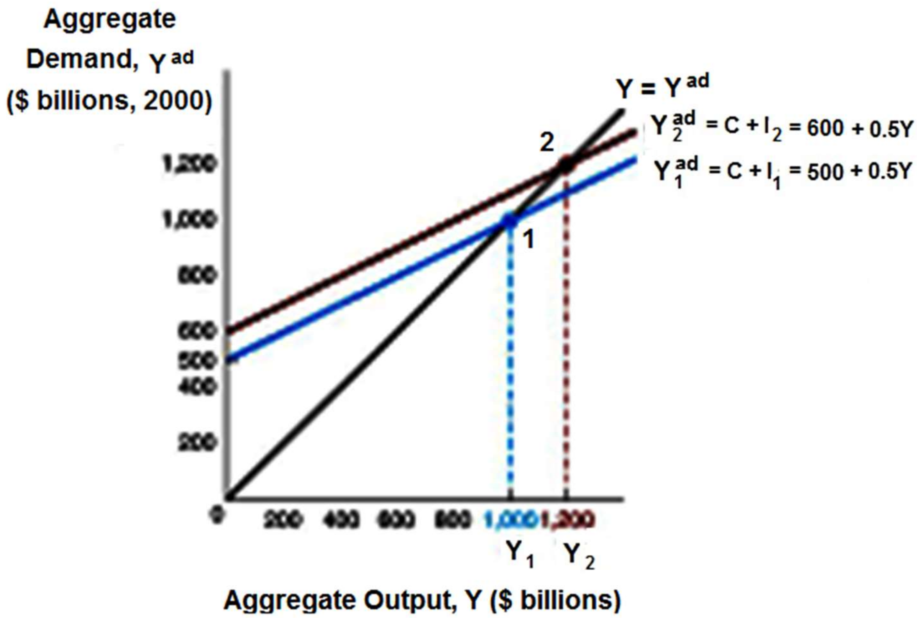


Figure 3, Response of Aggregate Output to a Change in planned Investment

A $100 billion increase in planned investment spending from $I_1 = 300$ to $I_2 = 400$ shifts the aggregate demand function upward from Y_1^{ad} to Y_2^{ad}. The equilibrium moves from point 1 to point 2, and equilibrium output rises from $Y_1 = 1{,}000$ to $Y_2 = 1{,}200$.

The ratio of the change in aggregate output to a change in planned investment spending, ΔY/ΔI, is called the **expenditure multiplier**. (this multiplier should not be confused with the money supply, which measures the ratio of the change in the money supply to the change in the monetary base.) In Figure 3, the expenditure multiplier is 2.

Why does a change in planned investment spending lead to an even larger change in aggregate output so that the expenditure multiplier is greater than 1? The expenditure multiplier is greater than I because an increase in planned investment spending, which raises output, leads to an additional increase in consumer expenditure (mpc X ΔY). The increase in consumer expenditure, In turn, raises aggregate demand and output further, resulting in a multiple change of output from a given change in planned investment spending. This conclusion can be derived algebraically by solving for the unknown value of Y in terms of a, mpc, and I, resulting in the following equation:

$$Y = (a + I) \times \frac{1}{1-\mathrm{mpc}} \qquad (4)$$

Because I is multiplied by the term 1/(1 - mpc), this equation tells us that a \$1 change in I leads to a \$1/(1 - mpc) change in aggregate output;, thus 1/(1- mpc) is the expenditure multiplier. When mpc =0.5, the change in output for a \$1 change in I is \$2 [= 1/(1- 0.5)]; if mpc =0.8, the change in output for a \$1 change in I is \$5. The larger the marginal propensity to consume, the higher the expenditure multiplier.

Response to Changes in Autonomous spending. Because a is also multiplied by the term 1/(1 – mpc) is Equation 4, a $1 change in autonomous consumer expenditure a also changes aggregate output by 1/(1 – mpc), the amount of the expenditure multiplier. Therefore, we see that the expenditure multiplier applies equally well to changes in autonomous consumer expenditure. In fact, Equation 4 can be rewritten as

$$Y = A \times \frac{1}{1 - \mathrm{mpc}} \qquad (5)$$

in which A = autonomous spending = a + I.

This rewritten equation tells us that any change in autonomous spending, whether from a change in a, in I, or in both, will lead to a multiplied change in Y. If both a and I decrease by $100 billion each, so that A decreases by $200 billion, and mpc = 0.5, the expenditure multiplier is 2 [=1/(1 -0.5)], and aggregate output Y will fall by 2 X $200 billion = $400 billion. Conversely, a rise in I by S100 billion that is offset by a $100 billion decline in a will leave autonomous spending A, and hence Y, unchanged. The expenditure multiplier 1/(1 mpc) can therefore be defined more generally as the ratio of the change in aggregate output to the change in autonomous spending (ΔY/ΔA).

Another way to reach his conclusion-that any change in autonomous spending will lead to a multiplied change in aggregate output-is to recognize that the shift in the aggregate demand function in Figure 3 did not have to come from an increase in I; it could also have come from an increase in a, which directly raises consumer expenditure and therefore aggregate demand. Alternatively, It could have come from an increase in both a and I. Changes in the attitudes of consumers and firms about the future, which cause changes in their spending, will result in multiple changes in aggregate output.

Keynes believed that changes in autonomous spending are dominated by unstable fluctuations in planned investment spending, which is influenced by emotional waves of optimism and pessimism- factors he labeled "animal spirits." His view was colored by the collapse in investment spending during the Great Depression, which he saw as the primary reason for the economic contraction. We will examine the consequences of this fall in investment spending in the following application.

APPLICATION, The Collapse of Investment Spending and the Great Depression

From 1929 to 1933, the U.S. economy experienced the largest percentage decline in investment spending ever recorded. One explanation for the investment collapse was the ongoing set of financial crises during this period. In 2000 dollars, investment spending fell from $232 billion to $38 billion-a decline of over 80%. What does the Keynesian analysis developed so far suggest should have happened to aggregate output in this period?

Figure 4 demonstrates how the $194 billion drop in planned investment spending would shift the aggregate demand function downward from Y_1^{ad} to Y_2^{ad}, moving the economy from point 1 to point 2. Aggregate output would then fall sharply; real GDP actually fell by $352 billion (a multiple of the $194 billion drop in investment spending). from $1,184 billion to $832 billion (in 2000 dollars). Because the economy was at full employment in 1929, the fall in output resulted in massive unemployment, with over 25% of the labor force unemployed in 1933.

FIGURE 4 Response of Aggregate Output to the Collapse of Investment Spending, 1929–1933

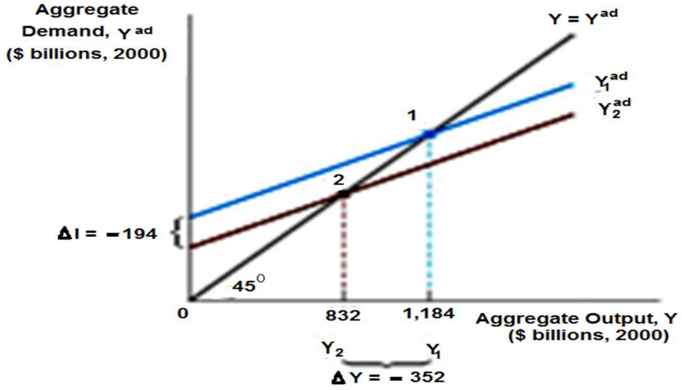


Figure 4, Response of Aggregate Output to the Collapse of Investment Spending 1929- 1933

The decline of $ 194 billion (in 2000 dollars) in planned investment spending from 1929 to 1933 shifted the aggregate demand function down from Y_1^{ad} to Y_2^{ad} and caused the economy to move from point 1 to point 2, where output fell by $352 billion. source: Economic Report of the President.

Government's Role

After witnessing the events in the Great Depression, Keynes took the view that an economy would continually suffer major output fluctuations because of the volatility of autonomous spending, particularly planned investment spending. He was especially worried about sharp declines in autonomous spending, which would inevitably lead to large declines in output and an equilibrium with high unemployment. If autonomous spending fell sharply, as it did during the Great Depression, how could an economy be restored to higher levels of output and more reasonable levels of unemployment? Not by an increase in autonomous investment and consumer spending, because the business outlook was so grim. Keynes's answer to this question involved looking at the role of government in determining aggregate output.

Keynes realized that government spending and taxation could also affect the position of the aggregate demand function and hence be manipulated to restore the economy to full employment. As shown in the aggregate demand equation Y^{ad} = C + I + G + NX, government spending G adds directly to aggregate demand. Taxes, however, do not affect aggregate demand directly, as government spending does. Instead, taxes lower the amount of income that consumers have available for spending and affect aggregate demand by influencing consumer expenditure. When there are taxes, disposable income Y_D does not equal aggregate output;, it equals aggregate output Y minus taxes T: Y_D = Y – T. The consumption function C = a + (mpc x Y_D) can be rewritten as follows:

C = a + [mpc x (Y – T)] = a + (mpc x Y) - (mpc x T)   (6)

This consumption function looks similar to the one used in the absence of taxes, but it has the additional term -(mpc x T) on the right side. This term indicates that if taxes increase by $100, consumer expenditure declines by mpc multiplied by this amount; if mpc = 0.5, consumer expenditure declines by $50. This occurs because consumers View $100 of taxes as equivalent to a $100 reduction in income and reduce their expenditure by the marginal propensity to consume times this amount.

To see how the inclusion of government spending and taxes modifies our analysis, first we will observe the effect of a positive level of government spending on aggregate output in the Keynesian cross diagram of Figure 5. Let's say that in the absence of government spending or taxes, the economy is at point 1, where the aggregate demand function Y_1^{ad} = C + I = 500 + 0.5Y crosses the 45° line Y = Y^{ad}. Here equilibrium output is at $1,000 billion. Suppose, however, that the economy reaches full employment at an aggregate output level of $1,800 billion. How can government spending be used to restore the economy to full employment at $1,800 billion of aggregate output?

If government spending is set at $400 billion, the aggregate demand function shifts upward to Y_2^{ad} = C + I + G = 900 + 0.5Y. The economy moves to point 2, and aggregate output rises by $800 billion to $1,800 billion. Figure 5 indicates that aggregate output is positively related to government spending and that a change in government spending leads to a multiplied change in aggregate output, equal to the expenditure multiplier, 1/(1 - mpc) = 1/(1 - 0.5) = 2. Therefore, declines in planned investment spending that produce high unemployment (as occurred during the Great Depression) can be offset by raising government spending.

What happens if the government decides that it must collect taxes of $400 billion to balance the budget? Before taxes are raised, the economy is in equilibrium at the same point 2 found in Figure 5. Our discussion of the consumption function (which allows for taxes) indicates that taxes T reduce consumer expenditure by mpc x T because there is T less income now available for spending. In our example, mpc = 0.5, so consumer expenditure and the aggregate demand function shift downward by $200 billion (= 0.5 x 400); at the new equilibrium, point 3, the level of output has declined by twice this amount (the expenditure multiplier) to $1,+400 billion.

Although you can see that aggregate output is negatively related to the level of taxes, it is important to recognize that the change in aggregate output from the $400 billion increase in taxes (ΔY = -$400 billion) is smaller than the change in aggregate ourput from the $400 billion increase in government spending (ΔY = $800 billion). If both taxes and government spending are raised equally-by $400 billion, as occurs in going from point 1 to point 3 in Figure 5-aggregate output will rise.

The Keynesian framework indicates that the government can play an important role in determining aggregate Output by changing the level of government spending or taxes. If the economy enters a deep recession, in which output drops severely and unemployment climbs, the analysis we have just developed provides a prescription for restoring the economy to health. The government might raise aggregate output by increasing government spending, or it could lower taxes and reverse the process described in Figure 5 (that is, a tax cut makes more income available for spending at any level of output, shifting the aggregate demand function upward and causing the equilibrium level of output to rise).

FIGURE 5 Response of Aggregate Output to Government Spending and Taxes

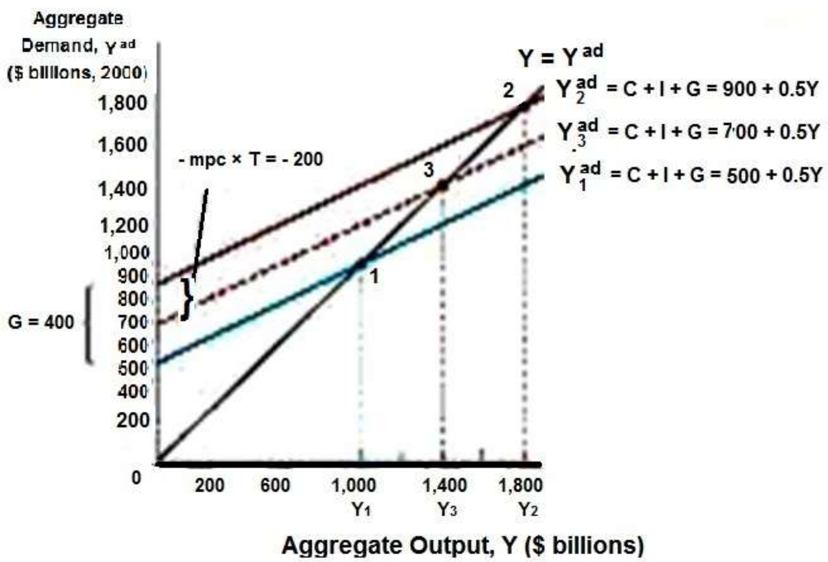


Figure 5, Response of Aggregate Output to Government Spending and Taxes

With no government spending or taxes, the aggregate demand function is Y_1^{ad} and equilibrium output is Y_1 = 1,000. With government spending of $400 billion, the aggregate demand function shifts upward to Y_2^{ad}, and aggregate output rises by $800 billion to Y_2 = $1,800 billion. Taxes of $400 billion lower consumer expenditure and the aggregate demand function by $200 billion from Y_2^{ad} to Y_3^{ad}, and aggregate outout falls by $400 billion to Y_3 = $1,400 billion.

Role of International Trade

International trade also plays a role in determining aggregate output because net (exports minus imports) are a component of aggregate demand. To analyze the effect of net exports in the Keynesian cross diagram of Figure 6, suppose that initially net exports are equal to zero (NX_1 = 0) so that the economy is at point 1, where the aggregate demand function Y_1^{ad} = C + I + G + NX_1 = 500 + 0.5Y crosses the 45° line Y = Y_1^{ad} . Equilibrium output is again at $1,000 billion. Now foreigners suddenly get an urge to buy more American products so that net exports rise to $I00 billion ($NX_2$ = 100). the $I00 billion increase in net exports adds directly to aggregate demand and shifts the aggregate demand function upward to Y_2^{ad} = C + I + G + NX_1 = 600 + 0.5Y. The economy moves to point 2, and aggregate output rises by $200 billion to $1,200 billion ($Y_2$). Figure 6 indicates that, just as we found for planned investment spending and govermment spending, a rise in net exports leads to a multiplied rise in aggregate output, equal to the expenditure multiplier, 1/(1 - mpc) = 1/(1 -0.5)= 2. Therefore, changes in net exports can be another important factor affecting fluctuations in aggregate output.

FIGURE 6 Response of Aggregate Output to a Change in Net Exports

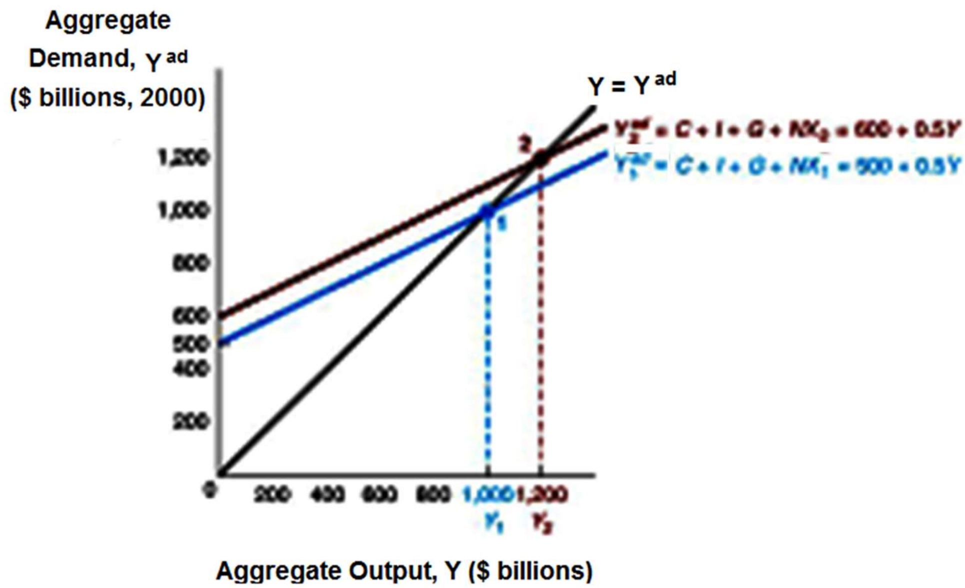


Figure 6, Response of Aggregate Output to a Change in Net Exports

A $100 billion increase in net exports from $NX_1 = 0$ to $NX_2 = 100$ shifts the aggregate demand function upward from Y_1^{ad} to Y_2^{ad}. The equilibrium moves from point 1 to point 2, and equilibrium output rises Y_1 = $1,000 billion to Y_2 = $1,200 billion

Summary of the Determinants of Aggregate Output

Our analysis of the Keynesian framework so far has identified five autonomous factors (factors independent of income) that shift the aggregate demand function and hence the level of aggregate output:

1. Changes in autonomous consumer expenditure (a)

2. Changes in planned investment spending (I)

5. Changes in government spending (G)

4. Changes in taxes (T)

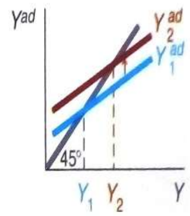
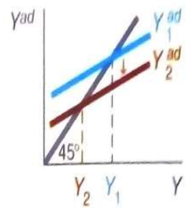
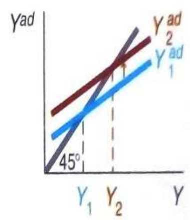
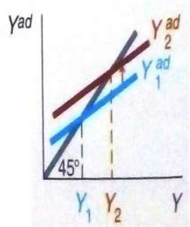
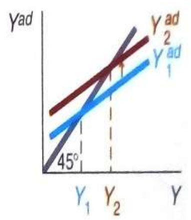
5. Changes in net exports (NX)

The effects of changes in each of these variables on aggregate output are summarized in Table 2 and discussed next in the text.

Changes in Autonomous Consumer Spending (a). A rise in autonomous consumer expenditure a (say, because consumers become more optimistic about the economy when the stock market booms) directly raises consumer expenditure and shifts the aggregate demand function upward, resulting in an increase in aggregate output. A decrease in a causes consumer expenditure to fall, leading ultimately to a decline in aggregate output. Therefore, aggregate output is positively related to autonomous consumer expenditure a.

Changes in Planned Investment Spending (I). A rise in planned investment spending adds directly to aggregate demand, raising the aggregate demand function and aggregate output. A fall in planned investment spending lowers aggregate demand and causes aggregate output to fall. Therefore, aggregate output is positively related to planned investment spending I.

Table, 2 Response of Aggregate Output Y to Autonomous Changes in a, I, G, T, NX

variable	Change in variable	Response of Aggregate Output, Y	
Autonomous consumer Expenditure, a	↑	↑	
Investment, I	↑	↑	
Government spending, G	↑	↑	
Taxes, T	↑	↓	
Net exports, NX	↑	↑	

Note Only increase (↑)` in the variable are shown; the effects of decreases in the variables on aggregate output would be the opposite of those indicated in the "Response" column

Changes in Government Spending (G). A rise in government spending also adds directly to aggregate demand and raises the aggregate demand function, increasing aggregate output. A fall directly reduces aggregate demand, lowers the aggregate demand function, and causes aggregate output to fall. Therefore, aggregate output is positively related to government spending G.

Changes in Taxes (T). A rise in taxes does not affect aggregate demand directly, but does lower the amount of income available for spending, reducing consumer expenditure. The decline in consumer expenditure then leads to a fall in the aggregate demand function, resulting in a decline in aggregate output. A lowering of taxes makes more income available for spending, raises consumer expenditure, and leads to higher aggregate output. Therefore, aggregate output is negatively related to the level of taxes T.

Changes in Net Exports (NX). A rise in net exports adds directly to aggregate demand and raises the aggregate demand function, increasing aggregate output. A fall directly reduces aggregate demand, lowers the aggregate demand function, and causes aggregate output to fall. Therefore, aggregate output is positively related to net exports NX.

Size of the Etfects from the Five Factors. The aggregate demand function in the Keynesian cross diagrams shifts vertically by the full amount of the change in **a**, I, G, or **NX**, resulting in a multiple effect on aggregate output through the effects of the expenditure multiplier, 1/(1 - mpc). A change in taxes has a smaller effect on aggregate output, because consumer expenditure changes only by mpc times the change in taxes (-mpc × ΔT), which in the case of mpc = 0.5 means that aggregate demand shifts vertically by only half of the change in taxes.

If there is a change in one of these autonomous factors that is offset by a change in another (say, I rises by $100 billion, but a, G, or NX falls by $100 billion or T rises by $200 billion when mpc = 0.5), the aggregate demand function will remain in the same position, and aggregate output will remain unchanged.

THE ISLM MODEL

So far, our analysis has excluded monetary policy. We now include money and interest rates in the Keynesian framework to develop the more intricate ISLM model of how aggregate output is determined, in which monetary policy plays an important role. Why another complex model? The ISLM model is versatile and allows us to understand economic phenomena that cannot be analyzed with the simpler Keynesian cross framework Used earlier. The ISLM model will help you understand how monetary policy affects economic activity and interacts with fiscal policy (changes in government spending and taxes) to produce a certain level of aggregate output, how the level of interest rates is affected by changes in investment spending as well as by changes in monetary and fiscal policy; how monetary policy is best conducted, and how the ISLM model generates the aggregate demand curve, an essential building block for the aggregate supply and demand analysis and thereafter.

Like our simplified Keynesian model, the full ISLM model examines an equilibrium in which aggregate output produced equals aggregate demand, and, because it assumes a fixed price level, in which real and nominal quantities are the same. The first step in constructing the ISLM model is to examine the effect of interest rates on planned investment spending and hence on aggregate demand. Next we use a Keynesian cross diagram, to see how the interest rate affects the equilibrium level of aggregate output. The resulting relationship between equilibrium aggregate output and the interest rate is known as the IS curve.

Just as a demand curve alone cannot tell us the quantity of goods sold in a market, the IS curve by itself cannot tell us what the level of aggregate output will be because the interest rate is still unknown. We need another relationship, called the LM curve, to describe the combinations of interest rates and aggregate output for which the quantity of money demanded equals the quantity of money supplied. When the IS and LM curves are combined in the same diagram, the intersection of the two determines the equilibrium level of aggregate output as well as the interest rate. Finally, we will have obtained a more complete analysis of the determination of aggregate output in which monetary policy plays an important role.

Equilibrium in the Goods Market: The IS Curve

In Keynesian analysis, the primary way that interest rates affect the level of aggregate output is through their effects on planned investment spending and net exports. After explaining why interest rates affect planned investment spending and net exports, we will use Keynesian cross diagrams to learn how interest rates affect equilibrium aggregate output.

Interest Rates and Planned Investment Spending. Businesses make investments in physical capital (machines, factories, and raw materials) as long as they expect to earn more from the physical capital than the interest cost of a loan to finance the investment. When the interest rate is high, few investments in physical capital will earn more than the cost of borrowed funds, so planned investment spending is low. When the interest rate is low, many investments in physical capital will earn more than the interest cost of borrowed funds. Therefore, when interest rates are lower, business firms are more likely to undertake an investment in physical capital, and planned investment spending will be higher.

Even if a company has surplus funds and does not need to borrow to undertake an investment in physical capital, its planned investment spending will be affected by the interest rate. Instead of investing in physical capital, it could purchase a security, such as a bond. If the interest rate on this security is high, the opportunity cost (forgone interest earnings) of an investment is high, and planned investment spending will be low, because the firm would probably prefer to purchase the security than to invest in physical capital. As the interest rate and the opportunity cost of investing fall, planned investment spending will increase because investments in physical capital are more likely than the security to earn greater income for the firm.

The relationship between the amount of planned investment spending and any given level of the interest rate is illustrated by the investment schedule in panel (a) of Figure 7. The downward slope of the schedule reflects the negative relationship between planned investment spending and the interest rate. At a low interest rate i_1. the level of planned investment spending I_1 is high; for a high interest rate I_3, planned investment spending I_3 is low.

Interest Rates and Net Exports. When interest rates rise in the United States (with the price level fixed), U.S. dollar assets become more attractive relative to assets denominated in foreign currencies, thereby causing an increased demand for dollar assets and thus a rise in the exchange rate. The higher value of the dollar resulting from the rise in interest rates makes domestic goods more expensive than foreign goods, thereby causing a fall in net exports. The resulting negative relationship between interest rates and net exports is shown in panel (b) of Figure 7. At a low interest rate I_1, the exchange rate is low and net exports NX_1 are high; at a high interest rate I_3, the exchange rate is high and net exports NX_3 are low.

D**eriving the IS Curve**. We can now use what we have learned about the relationship of interest rates to planned investment spending and net exports in panels (a) and (b) to examine the relationship between interest rates and the equilibrium level of aggregate output (holding government spending and autonomous consumer expenditure constant). The three levels of planned investment spending and net exports in panels (a) and (b) are represented in the three aggregate demand functions in the Keynesian cross diagram of panel (c). The lowest interest rate i_1 has the highest level of both planned investment spending I_1 and net exports NX_1, and hence the highest aggregate demand function Y_1^{ad}. Point 1 in panel (d) shows the resulting equilibrium level of output Y_1 , which corresponds to interest rate i_1. As the interest rate rises to i_2, both planned investment spending and net exports fall, to I_2 and NX_2, respectively, so equlibrium output falls to Y_2. Point 2 in panel (d) shows the lower level of output Y_2, which corresponds to interest rate i_2. Finally, the highest interest rate i_3, leads to the lowest level of planned investment spending and net exports, and hence the lowest level of equilibrium output, which is plotted as point 3.

The line connecting the three points in panel (d), the IS curve, shows the combinations of interest rates and equilibrium aggregate output for which aggregate output produced equals aggregate demand. The negative slope indicates that higher interest rates result in lower planned investment spending and net exports, and hence lower equilibrium output.

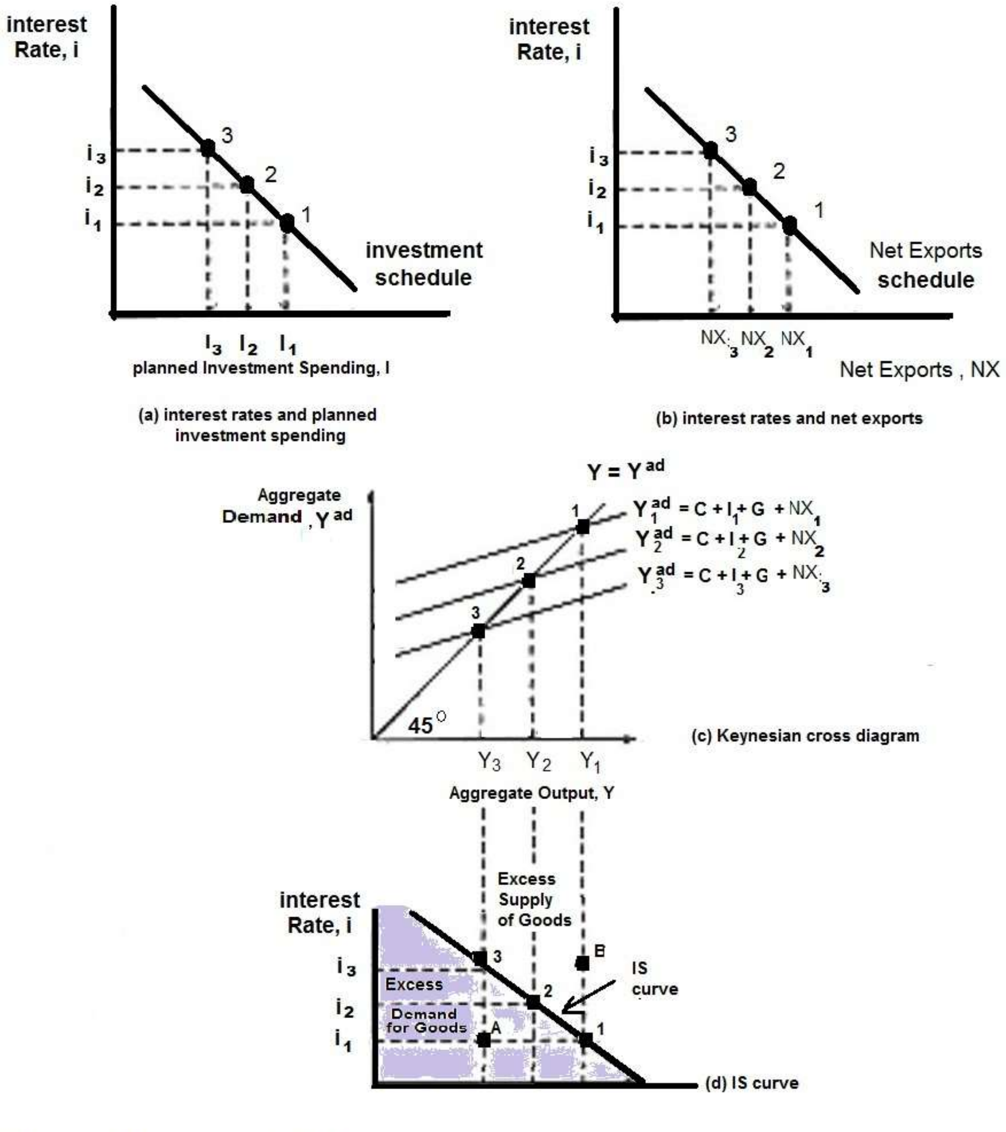


Figure 7, Deriving the IS Curve

The investment schedule in panel (a) shows that as the interest rate rises from i_1 to i_2 to i_3 planned investment spending falls from I_1 to I_2 to I_3 . Panel (b) shows that net exports also fall from NX_1 to NX_2 to NX_3 as the interest rate rises panel (c) then indicates the levels of equilibrium output Y_1, Y_2 and Y_3 that correspond to those three levels of planned investment and net exports, Finally , panel (d) plots the level of equilibrium output corresponding to each of the three interest rates; the line that connects these points is the IS curve.

What the IS Curve Tells Us. The IS curve traces out the points at which the total quantity of goods produced equals the total quantity of goods demanded. It describes points at which the goods market is in equilibrium. For each given level of the interest rate, the IS curve tells us what aggregate output must be for the goods market to be in equilibrium. As the interest rate rises, planned investment spending and net exports fall, which in turn lowers aggregate demand; aggregate output must be lower for it to equal aggregate demand and satisfy goods market equilibrium.

The IS curve is a useful concept because output tends to move toward points on the curve that satisfy goods market equilibrium. If the economy is located in the area to the right of the IS curve, it has an excess supply of goods. At point B, for example, aggregate output Y_1 is greater than the equilibrium level of output Y_3 on the IS curve. This excess supply of goods results in unplanned inventory accumulation, which causes output to fall toward the IS curve. The decline stops only when output is again at its equilibrium level on the IS curve.

If the economy is located in the area to the left of the IS curve, it has an excess demand for goods. At point A, aggregate output Y_3 is below the equilibrium level of output Y_1 on the IS curve. The excess demand for goods results in an unplanned decrease in inventory, which causes output to rise toward the IS curve, stopping only when aggregate output is again at its equilibrium level on the IS curve.

Significantly, equilibrium in the goods market does not produce a unique equilibrium level of aggregate output. Although we now know where aggregate output will head for a given level of the interest rate, we cannot determine aggregate output because we do not know what the interest rate is. To complete our analysis of aggregate output determination, we need to introduce another market that produces an additional relationship that links aggregate output and interest rates. The market for money fulfills this function with the LM curve. When the LM curve is combined with the IS curve, a unique equilibrium that determines both aggregate output and the interest rate is obtained.

Equilibrium in the Market for Money: The LM Curve

Just as the IS curve is derived from the equilibrium condition in the goods market (aggregate output equals aggregate demand), the LM curve is derived from the equilibrium condition in the market for money, which requires that the quantity of money demanded equal the quantity of money supplied. The main building block in Keynes's analysis of the market for money is the demand for money he called liquidity preference. Let us briefly review his theory of the demand for money.

Keynes's liquidity preference theory states that the demand for money in real terms M^d/P depends on income Y (aggregate output) and interest rates i. The demand for money is positively related to income for two reasons. First, a rise in income raises the level of transactions in the economy, which in turn raises the demand for money because it is used to carry out these transactions. Second, a rise in income increases the demand for money because it increases the wealth of individuals who want to hold more assets, one of which is money. The opportunity cost of holding money is the interest sacrificed by not holding other assets (such as bonds) instead. As interest rates rise, the opportunity cost of holding money rises, and the demand for money falls. According to the liquidity preference theory, the demand for money is positively related to aggregate output and negatively related to interest rates.

Deriving the LM Curve. In Keynes's analysis, the level of interest rates is determined by equilibrium in the market for money (when the quantity of money demanded equals the quantity of money supplied). Figure 8 depicts what happens to equilibrium in the market for money as the level of output changes. Because the LM curve is derived holding the real money supply at a fixed level, it is fixed at the level of $\bar{M}$/P in panel (a).

Each level of aggregate output has its own money demand curve because as aggregate output changes, the level of transactions in the economy changes, which in turn changes the demand for money.

When aggregate output is Y_1, the money demand curve is $M^d(Y_1)$: It slopes downward because a lower interest rate means that the opportunity cost of holding money is lower, so the quantity of money demanded is higher. Equilibrium in the market for money occurs at point 1, at which the interest rate is i_1. When aggregate output is at the higher level Y_2, the money demand curve shilts rightward to $M^d(Y_2)$ because the higher level of output means that at any given interest rate, the quantity of money demanded is higher. Equilibrium in the market for money now occurs at point 2, at which the interest rate is at the higher level of i_2. Similarly, a still higher level of aggregate output Y_3 results in an even higher level of the equilibrium interest rate i_3.

Panel (b) plots the equilibrium interest rates that correspond to the different output levels, with points 1, 2, and 3 corresponding to the equilibrium points 1, 2, and 3 in panel (a). The line connecting these points is the LM curve, which shows the combinations of interest rates and output for which the market for money is in equilibrium. The positive slope arises because higher output raises the demand for money and thus raises the equilibrium interest rate.

What the LM Curve Tells Us. The LM curve traces out the points that satisfy the equilibrium condition that the quantity of money demanded equals the quantity of money supplied. For each given level of aggregate output, the LM curve tells us what the interest rate must be for there to be equilibrium in the market for money. As aggregate output rises, the demand for money increases and the interest rate rises, so that money demanded equals money supplied and the market for money is in equilibrium.

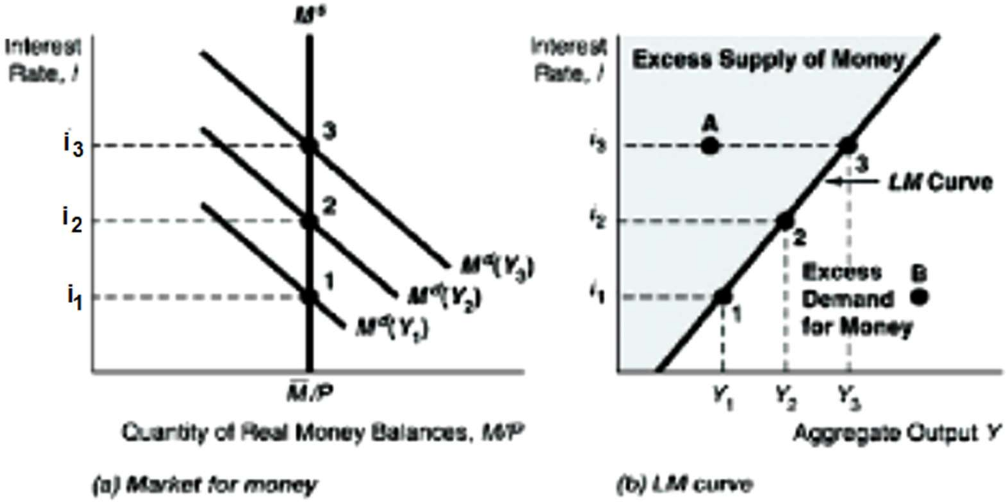


Figure 8, Deriving the LM Curve

Panel (a)shows the equilibrium levels of the interest rate in the market for money that arise when aggregate output is Y_1 Y_2 and Y_3 . Panel (b) plots the three levels of the equilibrium interest rate i_1, i_2 and i_3 corresponding to these three levels of output; the line that connects these points is the LM curve

Just as the economy tends to move toward the equilibrium points represented by the IS curve, it also moves toward the equilibrium points on the LM curve. If the economy is located in the area to the left of the LM curve, there is an excess supply of money. At point A, for example, the interest rate is i_3 and aggregate output is Y_1. The interest rate is above the equilibrium level, and people are holding more money than they want to. To eliminate their excess money balances, they will purchase bonds, which cause the price of the bonds to rise and their interest rate to fall. As long as an excess supply of money exists, the interest rate will fall until it comes to rest on the LM curve.

If the economy is located in the area to the right of the LM curve, there is an excess demand for money. At point B, for example, the interest rate i_1 is below the equilibrium level, and people want to hold more money than they currently do. To acquire this money, they will sell bonds and drive down bond prices, and the interest rate will rise. This process will stop only when the interest rate rises to an equilibrium point on the LM curve.

ISLM APPROACH TO AGGREGATE OUTPUT AND INTEREST RATES

Now that we have derived the IS and LM curves, we can put them into the same diagram (Figure 9) to produce a model that enables us to determine both aggregate output and the interest rate. The only point at which the goods market and the market for money are in simultaneous equilibrium is at the intersection of the IS and LM curves, point E. At this point, aggregate output equals aggregate demand (IS) and the quantity of money demanded equals the quantity of money supplied (LM). At any other point in the diagram, at least one of these equilibrium conditions is not satisfied, and marker forces move the economy toward the general equilibrium, point E.

FIGURE 9 *ISLM* Diagram: Simultaneous Determination of Output and the Interest Rate

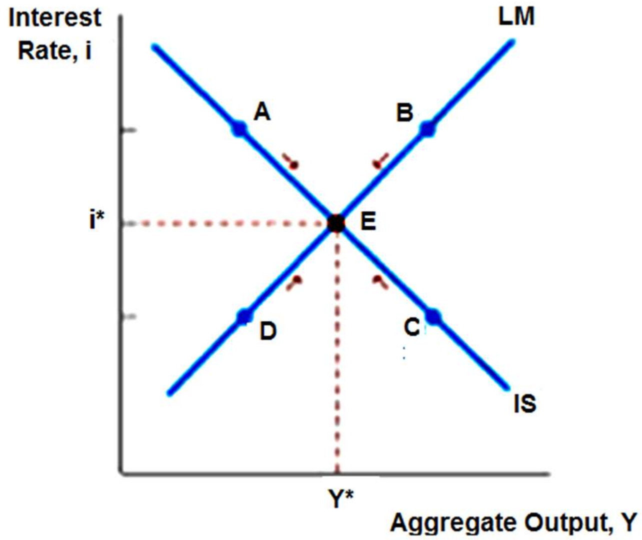


Figure 9, ISLM Diagram: Simultaneous Determination of Output and the Interest Rate

Only at point E, when the interest rate is i* and output is Y* , is there equilibrium simultaneously in both the goods market (as measured by the IS curve) and the market for money (as measured by the LM curve). At other points, such as A, B C, or D one of the two markets is not in equilibrium and there will be a tendency to head toward the equilibrium, point E.

To learn how this works, let's consider what happens if the economy is at point A, which is on the IS curve but not the LM curve. Even though at point A the goods market is in equilibrium, so that aggregate output equals aggregate demand, the interest rate is above its equilibrium level, so the demand for money is less than the Supply. Because people have more money than they want to hold, they will try to get rid of it by buying bonds. The resulting rise in bond prices causes a fall in interest rates, which in turn causes both planned investment spending and net exports to rise, and thus aggregate output rises. The economy then moves down along the IS curve, and the process continues until the interest rate falls to i* and aggregate output rises to Y*- that is, until the economy is at equilibrium point E.

If the economy is on the LM curve but off the IS curve at point B, it will also head toward the equilibrium at point E. At point B, even though money demand equals money supply, output is higher than the equilibrium level and exceeds aggregate demand. Firms are unable to sell all their output, and unplanned inventory accumulates, prompting firms to cut production and lower output. The decline in output means that the demand for money will fall, lowering interest rates. The economy then moves down along the LM curve until it reaches equilibrium point E.

EXERCISES

SELF-TEST

Part A: True-False Questions

Circle whether following statements are true (T) or false (F).

T F 1. The investment spending component of aggregate demand does not include unplanned inventory investment.

T F 2. Jean purchases 1000 shares of Exxon common stock through her broker. This transaction is included in the investment component of aggregate demand.

T F 3. The 45-degree line in the Keynesian cross diagram represents all possible or potential equilibrium points.

T F 4. If the level of aggregate output exceeds aggregate demand, income will rise, causing the level of output to expand.

T F 5. Unplanned inventory investment occurs when the level of aggregate demand exceeds aggregate output.

T F 6. Business firms are likely to cut production in the face of rising unplanned inventory levels.

T F 7. The simple Keynesian model suggests that an increase in planned investment will actually lead to an expansion in aggregate output that exceeds the initial change in investment spending. This is known as the multiplier effect.

T F 8. Keynes believed that business cycle fluctuations were dominated by changes in autonomous consumer expenditure.

T F 9. The slope of the IS curve reflects the fact that investment is negatively related to the interest rate.

T F 10. At any point along an IS curve the level of unplanned inventory investment is zero.

Part B: Multiple-Choice Questions

Circle the appropriate answer.

1. Which of the following describes the equilibrium condition in the simple Keynesian model?

a. Aggregate output equals aggregate demand.

b. Unplanned inventory investment is zero.

c. Actual investment equals planned investment.

d. All of the above.

e. Only (a) and (b) of the above.

2. Keynes believed that the economy could achieve an equilibrium level of output

a. only at the full-employment level of output.

b. below the full-employment level of output.

c. only if the government took a "hands off" approach.

d. by doing none of the above.

3. Inventory investment is distinguished rom fixed investment in that

a. fixed investment is never unplanned.

b. inventory investment is never planned.

c. unplanned inventory investment is always zero.

d. there is no distinction.

4. If one knows the value of the multiplier and the change in the level of autonomous investment, one can determine

a. the change in the interest rate.

b. the change in the money supply.

c. the change in the aggregate output.

d. all of the above.

5. Keynes believed that fluctuations in aggregate output were largely the result of fluctuations in

a. the money supply.

b. autonomous investment spending

c. autonomous consumer expenditure.

d. government spending.

6. If the mpc is 0.75, the multiplier is

a. 3.00

b. 3.75

c. 0.25

d. 4.00

7. Assume that an economy characterized by the simple Keynesian model is in equilibrium at full employment but the government budget is in deficit. If the government raises taxes to balance the budget, then

a. the rate of unemployment will increase.

b. the level of aggregate output will increase

c. the price level will increase.

d. all of the above will occur.

8 An increase in the interest rate will cause

a. investment spending to fall.

b. investment spending to rise.

c. tax rates to rise.

d. no change in aggregate spending

9. Points to the left of the IS curve represent interest rate and output combinations characterized by reductions in

a. unplanned inventory accumulations.

b. unplanned inventory reductions.

c. an excess demand for money.

d. an excess supply of money.

10. The money market is in equilibrium

a. at any point on the LM curve.

b. at only one point on the IS curve.

c. at any point on the IS curve.

d. at only one point on the LM curve.

e. when only (a) and (b) of the above occur.

f. when only (c) and (d) of the above occur.

11. At points to the_________ of the LM curve there is an excess__________ of money which causes interest rates to fall.

a. left, supply

b. left, demand

c. right, supply

d. right; demand

12. If the economy is on the IS curve, but is to the ________of the LM curve, then the ________market is in equilibrium, but the interest rate is ___________ the equilibrium level.

a. left, goods; below

b. left; goods; above

c. right; money; below

d. right; goods; above

e. left, money; above

13. The multiplier effect means that a given change in __________ autonomous expenditures will change equilibrium _________ income by an amount _________ greater than the initial change in autonomous expenditures.

a. autonomous, income, greater

b. autonomous; income; less

c. induced, income, greater

d. induced; employment, greater

e. autonomous; employment; less

14. If I^u is positive, firms will ______ production and output will_______.

a. cut, rise

b. cut, fall

c. increase, rise

d. increase; fall

15. In the Keynesian framework, as long as output is_________ the equilibrium level, unplanned inventory investment will remain negative and firms will continue to ___________ production.

a. below; lower

b. above; lower

c. below; raise

d. above; raise