MACROECONOMICS MADE SIMPLE:
A complete general theory.

By Greg Eubanks

ABSTRACT:

This article attempts to analyze the core markets in macroeconomic theory and examine the implicit assumptions behind the Keynesian general theory of macroeconomics, by developing a 3 asset economy starting with zero wealth. Using the circular flow and supply and demand analysis, we demonstrate the workings of the bond market and the market for balances in a closed economy and arrive at certain conclusions that reveal the assumptions behind the Keynesian general theory. The markets for bonds and balances are the core of macroeconomic theory but yet they are not examined in leading macroeconomic textbooks. This would be similar to a physiology textbook examining how the body works without ever mentioning the heart. Therefore, the macroeconomic theory presented in modern macroeconomic textbooks is incomplete and hence the reason for this article. Our analysis joins together the Classical quantity theory of money with the Keynesian income theory to build a simple yet complete model of the macro-economy. The focus and explanation of our analysis is on the mechanical interactions between our economic actors and their markets. This exposition helps to de-abstract the Keynesian theory into recognizable terms, allowing us to clearly see the workings of the macro-theory. The insights gained from identifying the assumptions behind the Keynesian theory will provide the economist or reader with the tools needed to build and manage a small experimental economy in a classroom or on an island. This article was developed to cure the lack of understanding by economic professors at universities and colleges who may not have a complete concept and understanding of the workings of a closed general theory of macroeconomics, despite their PhD degrees and professional training.

TARGET: Professors, students, theorists, citizens, all of those interested in macroeconomics.

REQUIRED TEXTS: Macroeconomics - Mankiw; The economics of

money and banking - Mishkin.

PREREQUISITE: Introduction to macroeconomics 101.

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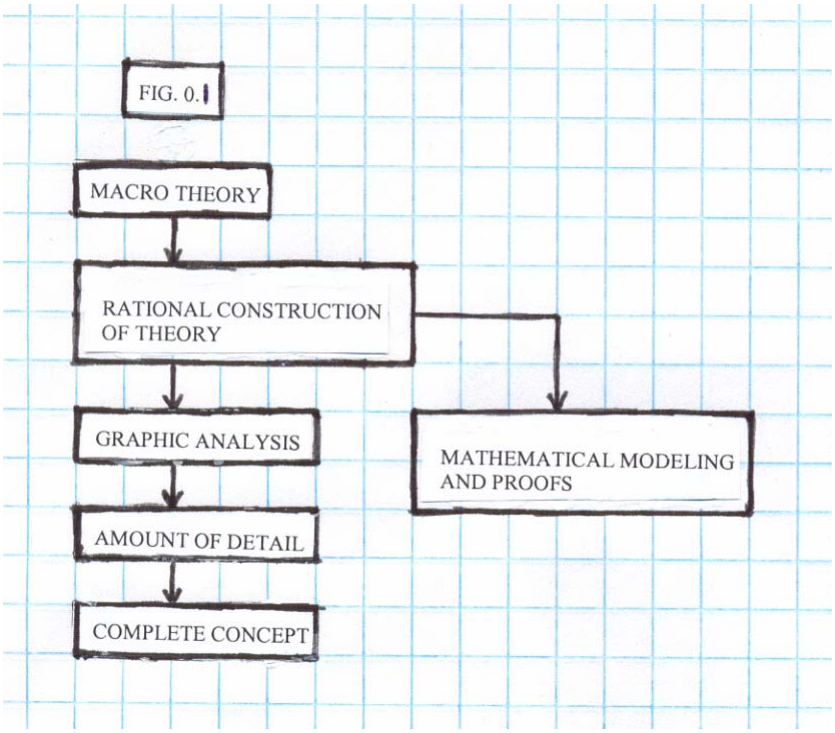
PURPOSE: The purpose of this article is to help instructors and economists build a complete concept of a closed general theory of macroeconomics, and to provide a solid understanding of how a simple macro-economy works. At the completion of this course, economists should be able to 1) identify fundamental economic variables, 2) know the function of each variable, 3) understand how those variables work together, 4) finally, be able to combine those variables together to build a fully operational macro-economy.
Just as an ASE certified mechanic is able to take a block, pistons, and crankshaft and put them together to build an engine, it is hoped that at the completion of this course the economist is able to build and manage a macro-economy. An interesting application of these lessons would be to build an experimental economy using a classroom of about 20 to 30 students. The economist could act as the head of the central bank or government agency to build and manage the economy.

This course focuses on how the essential parts of the economy fit and work together as a whole, not on the mathematical proofs of those parts. Fig. 0.1, shows the possible courses in which macroeconomics is presented in modern text books and classes. Although this text makes no revolutionary changes in theory, it does facilitate a better understanding of macroeconomics. This understanding will be an asset to any teacher or practitioner who desires to improve his or her competency in macroeconomics.



The Keynesian general theory of macroeconomics sets out to explain how a closed, two sector, fixed-price economy works. It is a general theory because it can be used to describe a national economy or the world economy. This article addresses these questions and more for the Keynesian general theory:

1) Is it realistic to just hand out the money to players at the beginning of a monopoly game? If no, then why do leading macroeconomic textbooks and classroom demonstrations pass out or assume people have money and then start the analysis afterwards?
2) Does the scenario of workers as the only consumers inevitably lead to an oversupply of output?
3) Do firms issue debt to make unplanned inventory investments?
4) How does the process of dissavings work?
5) Does the central bank (Fed) have the authority and power to create an unlimited amount of money?
6) Do banks need savers money to make loans?
7) Since banks only loan out the principal of a loan, where does the money come from to pay the interest?
8) If all bank debt were paid off all at once, would there be any money left in circulation?
9) Exactly how does a lower interest rate stimulate investment?
10) Does the bond market or the IS-LM model determine the

interest rate?

11) Can expenditure be greater than income when inventories are zero?
12) Is income dependant on expenditure, or is expenditure dependant on income?
13) Is it possible that a monetary injection has no effect on the economy?
14) How do speculative balances turn into transaction balances?
15) What allows the LM curve to slope upward?
16) How do the plans of savers affect investors and vice versa?

PREFACE

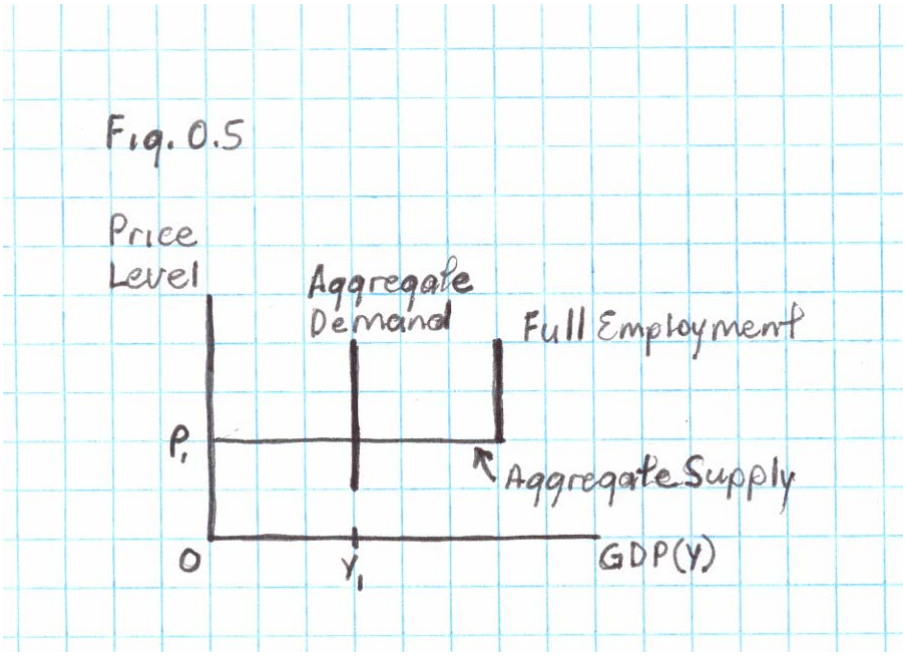
This article was written because of the frustrating and time consuming searches the author painfully went through to get answers about the assumptions behind "Modern Macroeconomic Theory" taught in the leading introductory college textbooks. There is an apparent lack of important theoretical considerations missing in the leading introductory college texts today and of the discussion of this knowledge from macro professors in the classroom. It is very surprising indeed to know that professors with PhD's and economists with professional training may not have a complete understanding of how a general theory of macroeconomics works. Amazingly, some professors with PhD's are not competent enough to build and manage an experimental economy in the same classrooms in which they teach. Because of the breadth and width of material that must be covered and the time constraints in economic programs, professors most likely don't have an in depth knowledge on the general theory and therefore it gets neglected in an introductory course. Never the less, if one wants to understand the general theory we must dig deeper, start from the beginning and develop the theory completely. In addition to the problem of a lack of general theory material not being covered in introductory courses, is the problem of the approach in the leading texts.

APPROACH

Leading texts today have a modern approach to theory; in contrast, we will have a developmental approach. The difference between a developmental approach and "Modern Macro Theory" is….you guessed it, the word "modern". "Modern" in this sense does not mean the theory is a new theory, but it means this theory sets out to explain our current economy the way it is now, as opposed to how we got here. Since our national

economy is now so large and complex, “Modern Macro Theory” mostly accounts for flows and does not fully account for stocks. This is why we use a developmental approach to keep track of how everything grows. Economic fluctuations (also called business cycles) are the rise and fall of economic activity relative to the recent growth trend of the economy. “Modern Macro Theory” typically focuses on the national economy and economic fluctuations, including how the national economy interacts with other national economies in the world. Our developmental approach focuses on the birth and structure of an economy and is less concerned with foreign trade. In building a complete general theory, we can then transpose that theory from an island to a national, global, or universe economy assuming interplanetary trade. Essentially what is meant by a “developmental approach” is that we reduce the economy down to its bare essentials and start building the economy in which the population is holding zero assets, as opposed to “Modern Macro Theory” which takes wealth as already provided and starts its analysis with our current large and complex economy. “Modern Macro Theory” is similar to passing all the money out at the beginning of a monopoly game. With a developmental approach we can start small and then account for the entire wealth of the economy as it grows. We should be able to see how the wealth gets distributed, how each market works, observe how the actors interact and how their portfolios of assets accumulate. A developmental approach will allow us to map out the possibilities of how the economy works and grows, not to mention it will help simplify and de-abstract the current modern macro theory found in leading texts.

PREREQUISITE: AGGREGATE SUPPLY AND DEMAND



The Keynesian general theory assumes that the aggregate supply curve is perfectly elastic up to the full employment level of output. The price level below the full employment level is decided by the height of the aggregate supply curve. With a perfectly elastic supply curve, the equilibrium level of output is determined solely by aggregate expenditure. Therefore, to know what the equilibrium level of output is, we need to know what determines aggregate expenditure. In the simple Keynesian model of a two sector economy, what determines total aggregate expenditure is the amount of consumption and investment spending in the economy. Throughout this analysis we are holding the price level constant, and the aggregate supply curve is horizontal. The assumptions for the aggregate supply curve are that the level of technology and the efficiency and depreciation of capital is held constant. The aggregate demand curve in relation to the aggregate supply curve is vertical because demand depends only on expenditure and not on the price level. This is shown in fig. 0.5. Here, firms are more than willing to increase the quantity supplied at existing prices. Increases in spending will exert no upward pressure on prices and output can be expanded without running into higher per unit costs of production. All that one needs to know to determine the equilibrium level of output is the amount of aggregate spending on output. The supply curve becomes vertical at the full employment level of output. This income level is determined by the economy's capacity to produce output. To measure a quantity of something like the amount of bonds or money, economists distinguish between two types of quantity variables: stocks and flows. A stock measure is an amount for a certain point in time. A flow measure is an

amount over a given period in time. To illustrate stocks and flows think of a bucket underneath a running faucet. The stock measure is the total quantity of gallons of water in the bucket, where the flow measure is the quantity of gallons of water pouring into the bucket per minute. Stocks and flows are related. The stock of water in the bucket is the accumulation of the flow out of the faucet, and the flow of water out of the faucet represents the change in the stock. A person's wealth is a stock but his income and expenditures are flows. The total number of people employed is a stock, whereas the unemployment rate is a flow. The government debt is a stock but the government budget deficit is a flow. The quantity of money in an economy is a stock measure. Gross domestic product (GDP), is a flow measure. The U.S. GDP is $10 trillion a year. GDP is the market value of the total output produced within an economy in a given year. Nominal GDP is computed by this equation GDP = the price of output x the quantity of that output. Because of our assumption that prices are held constant, GDP reflects changes in the quantity of the economy's output. Transaction balances is money that is used as a medium of exchange. Transaction balances are used to carry out and meet everyday transactions. Speculative balances are money that is used as a store of wealth. Speculative balances are also called idle balances because they are saved and not used for transactions. Transaction balances are active because they circulate around in the economy.

INTRODUCTION

One of the most important thesis's in the history of macroeconomics was presented by Thomas Malthus in the early 1800s to the leading economists of his time (called classical economists). This thesis basically states that, in a closed economy, spending by the working class will never be enough to purchase the entire amount of output produced by the working class. Workers can never buy back the products they produced because in order for the firm owner to make a profit, the value of output must necessarily exceed the amount of wages paid out. This thesis conflicted sharply with the prevailing classical economic theory of his time and caused a 100 year bitter debate over macroeconomic theory, which can still be felt in the schools of economic thought in today's time. Malthus' thesis had many ramifications to classical theory. The thesis suggested that the economy always overproduced goods and services, and without autonomous expenditure the economy would be in a chronic economic depression. It also suggested that the thesis led to excess accumulation of production capacity. It went against the classical assumption that money is never held as an asset.

Classical’s believed that money is used for one thing and one thing only, and that was to make purchases. If someone was holding money, it was because they haven’t had a chance yet to go to the store and spend it. Also according to Classical’s, the quantity of money in the economy has no affect on real output. This was later shown to not necessarily be true for the economy in the short term. Another blow to Classical’s, was that the thesis went against their belief (as if it were a religious doctrine), that the economy always returned to full employment equilibrium because they believed, wages and prices are flexible. If wages and prices are not flexible, but fixed or sticky, then the economy may not return to full employment. Still further, the implications of Malthus' thesis went against the classical view of savings. To Classical’s savings was a virtue, and without savings the economy could not grow. Malthus pointed out that an individual may be better off in the long run by saving more and consuming less, but such actions by the whole population may make everyone worse off, since aggregate income may fall by an amount greater than the rise in savings (fall in consumption). This was later known as the paradox of thrift. Malthus also believed that a more equal income distribution in the economy would increase aggregate income. Since purchases by the poor for necessities would make up a greater percentage of spending for every extra dollar of income than will those with higher incomes. This also went against the Classical’s attitude that the majority of the population is of the working class and the economy is better served when they earn subsistence wages. Although this thesis was postulated by Malthus in his day, he never developed it into a full blown macro theory and it was never completely explored until John Maynard Keynes developed his general theory of macroeconomics during the great depression of the 1930's. As Malthus kept writing to the Classical’s, the classical economists decided to ignore him and his dilemma of how to reconcile his thesis with classical theory remained unsolved until Keynes. Neo-classical’s were able to prove that an oversupply of goods and services or an excess accumulation of production capacity is not necessarily always the outcome in a closed economy. Therefore a chronic economic depression is not inevitable. **So on one extreme, according to Classical’s, the economy is always headed toward full employment, and on the other extreme, according to Malthus, the economy is headed for a depression.** Malthus' writings, once picked up by Keynes and his disciples, have led to major contributions in macroeconomics. Thomas Malthus is better known for his work on population control rather than his economic contributions. Keynes theory was able to show how the economy can fluctuate in either direction but is more likely to stagnate without autonomous expenditure. Therefore he

prescribed government fiscal policy be enacted to boost the economy. Neo-classical's were able to prove that firms could produce just the right amount of output that both the firm owner and his workers wanted to consume, and furthermore investments could be made year after year at equilibrium without causing an oversupply or excess production capacity if we account for capital depreciation. If we assume some capital depreciation, investment expenditures can be made on only the amount needed to replace worn out capital. This type of investment expenditure does not increase output or capacity assuming no improvements in efficiency. However Keynes pointed out that while this economy did not overproduce it would not grow or reach full employment without autonomous expenditure on capital and labor.
As simple as Malthus' thesis is, it makes a great place to start thinking about how the macro-economy works. For instance, if we assume: there are only two people in our economy, where one person is the firm owner of an orange grove and the other person as a laborer; the firm owner is holding $50 in cash to pay labor; and output is $100 worth of bushels of oranges; wages and prices are fixed. Suppose the laborer picks oranges all day produces 10 bushels of oranges, worth $100 market value and earns $50. To start our analysis we can obviously see that the worker can only buy $50 worth of oranges and we can see the over production aspect of Malthus' thesis. It also appears that the firm owner did not make a profit and only broke even because, in monetary terms, his costs were $50 and his revenue was $50. This simple example may seem feeble, but to bring it into a more realistic context, suppose you are a major luxury car maker like Mercedes Benz and you open a factory and dealership in a poor country like Afghanistan and it is your goal to sell the cars to those citizens. Suppose further that your car factory is the only employer in that country. Obviously the only income the workers will receive comes from making cars, and the only income you receive is from the cars that you sell to your own employees. As time passes you will see your inventories growing faster than your sales because the wages you pay out must be less than the value of the product you sell in order to make a profit. As inventories increase you will lay off employees and depress incomes resulting in decreased car sales. One way for inventories to fall, would be to start exporting some cars to consumers in a neighboring country. Only from the autonomous expenditure of a neighboring oil rich country will sales pick up, and incomes increase as well as profits. As easy as this solution would be, it is not acceptable since we are working out a theory of a closed economy. So the question still remains: since workers do not earn enough in wages to purchase the total amount of output they produce, how can expenditure be great enough to purchase

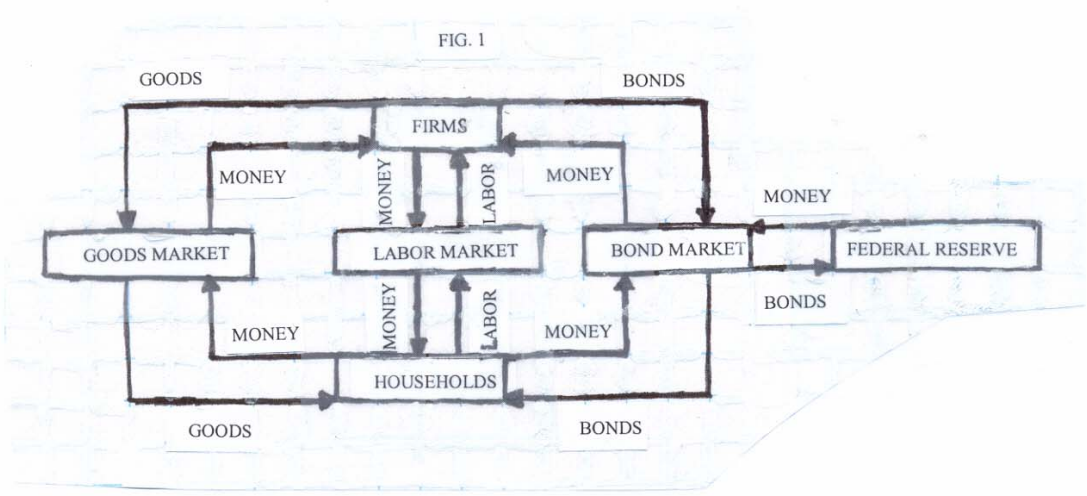
output? Also, how does the firm owner make a monetary profit? If we return to our first example of oranges, we said output was $100 worth of bushels. If we assume that $100 is equal to 10 bushels of oranges, then in real terms, total income was 10 bushels, 5 bushels in which labor earned and 5 of which is profit for the firm owner. In the car example, the inventories of cars were the firm owner's profit. So as we can see here, the amount labor earned in cars was the agreement they made with the firm owner. As long as the firm owner wants a profit, in real terms, labors income must be less than total output. The issue of importance here should be focused on an oversupply of output. With the car example we can see there is an oversupply because having more than say 5 cars is a waste, and the firm owner would have no use for an inventory of newly produced cars catching dust in a warehouse. At the same time this firm owners employees are still walking or riding bikes to work because they have not or may not earn enough to purchase a car. What if the laborers were able to renegotiate for a higher income of more cars (the price of cars fall), and the firm owner earned less profit in real terms of cars? As long as the firm owner is earning a profit of cars that is more than he wants or needs, it is an oversupply of output, and since it is the goal of the firm to maximize profit, there will be increases to inventory. One way to solve the problem of oversupply is to have investment led growth. If the firm owner hired more labor to produce more warehouses, machinery, and dealerships to expand the business for the future, this investment labor could purchase some output reducing the oversupply. This labor would be paid in real terms of cars, and thus would be a trade of the firm owner’s oversupply of cars for further production capacity.

Now let’s add money to these examples. Let us assume an economy with four actors and three assets. The four actors are: a firm owner, laborer, an investor, and a banker. The three assets are: bonds (debt), money, and output (GDP). Let us start our analysis where the amount of assets are zero. At this point the amount of debt is zero, the money supply is zero, and the amount of output produced is zero. The firm owner is the sole proprietor of an orange grove. To start the economy, the firm owner supplies a $50 bond to the bond market. The banker prints up $50 worth of cash and buys the bond. The firm owner recieves the $50 cash, which he uses to pay his labor for a day of picking oranges. The laborer produces 10 bushels of oranges at a market value of $100. At this point the amount of debt (held by the bank) is $50, the money supply is $50, and output is $100. The velocity of money is equal to 2. Wages and prices are fixed. Suppose the laborer picks oranges all day and earns $50. In the example we presented with the oranges, the firm or grove owner paid his laborer $50 to produce 10 bushels of oranges, a value

of $100. The laborer spent all of his income he earned for the day to buy 5 bushels of oranges from the grove owner, a value of $50. The grove owner's costs of $50 equaled his revenue of $50, so the firm owner broke even in terms of money, but he added 5 bushels of oranges to his inventory, a real profit of 5 bushels. What if the grove owner is sick and tired of oranges and would rather have a profit of $50 in cash? Obviously he could not sell the extra oranges to his laborer because the laborer spent the only money he had, which was the $50 he earned that day. We will assume there is only $50 between them and further the laborer has no wealth to trade for oranges. The fact that the grove owner would like to have a profit of $50 in cash rather than in 5 bushels of oranges, means that the grove owner has an asset demand for money. An asset demand for money means that the firm owner wants to hold his profit in cash as opposed to oranges. Therfore, the quantity of money ($50) must increase. How can the grove owner satisfy his asset demand for money? He must sell the 5 bushels of oranges. There are two ways the grove owner can sell these oranges. He could export them to a nearby community who would like to consume them, or he could sell them locally to an investor, say an orange juice maker. If the grove owner decides to export, he will receive his $50 profit and the quantity of money will now be $100, and the grove owner is satisfied. But this option is for an open economy, and we are working within a closed economy framework. If the grove owner sells the oranges to the investor, the investor must come up with the $50. If we assume that the investor does not have the money, he must issue a bond to raise the funds. Here the laborer cannot buy the bond because he has spent his money for oranges, but the grove owner cannot buy the bond either, because the $50 he has must be used to pay the laborer again for tomorrow's production. We will assume that the grove owner does not know how or where the investor gets the funds to purchase his oranges, because both oranges and bonds are supplied anonymously to bond and orange markets. We assume this because technically if the investor asked to borrow the $50 from the grove owner and promised to purchase his oranges, the grove owner could lend the investor the money. So the investor raises the funds by supplying a bond to the bond market. The banker decides to buy the bond and the investor takes the $50 he got from selling a bond and purchases the oranges. When the bank purchased the bond, this increased the quantity of money from $50 to $100. Now the grove owner is satisfied with his asset of cash and the over supply of oranges are eliminated. At this point the amount of debt is $100 (held by the bank), the money supply is now $100, and output is still $100. The velocity of money is equal to 1. The velocity of transaction balances are equal to 2. With the quantity of money at

$100, $50 of it must stay in the circular flow to settle transactions between the grove owner and the laborer, the other $50 is the profit of the grove owner. During the next round or period of production, let's assume the grove owner's asset demand is for bonds. So again, the laborer produces 10 bushels of oranges, in which he gets paid $50 to produce. The laborer again spends all of his income on oranges, $50 worth. In monetary terms the grove owner breaks even with a real profit of 5 bushels of oranges. This time the grove owner's asset demand is for bonds. So when the investor supplies a $50 bond to the bond market, the grove owner has the $50 from lasts periods savings to purchase the bond with. Instead of the bank purchasing the bond, the grove owner does, and when the investor buys the oranges the grove owner gets his $50 back. Now the grove owner has a portfolio of assets that include money and bonds and there is no over supply of oranges. At this point the amount of debt (held by the bank and the public) is now $150, the money supply is $100, and output is $100. Now with the grove owner selling output and with the investor making orange juice the economy is off and running. We should recognize that the key ingredient of this growth is debt and autonomous expenditure. As the economy grows so does the debt that finances it.

1.0 THE CIRCULAR FLOW



One of the most simplified constructions of classical economic theory is called "Crusoe Economics", a famous allegory that economists have borrowed from novelist Daniel Defoe. Crusoe economics is the economic analysis of a stranded sailor on a deserted island. Although the theory demonstrates the importance of capital accumulation with savings and investment, it is an unrealistic model since it is based on a barter economy.

Therefore, if our model is to be realistic, money must be at the heart of our analysis. Building a reliable model with money remains our central challenge. To start our analysis, we will again borrow from Defoe. Things are slightly different this time; Crusoe has brought two important things with him. One is a printing press, which he can print money with, the second, is a copy of a book on Keynesian general theory. Once Crusoe makes shore, he surveys the island for natural resources which he will need to survive. Crusoe finds these resources to be sufficient. Upon looking for natural resources, Crusoe quickly discovers he is not alone on the island and encounters a large tribe of natives living in squalid conditions. Since Crusoe has a similar resemblance to the Deity of the native's religion, they welcome him and try to appoint him king. Crusoe, being a modest man declines and decides to take a role behind the scenes as chairman of the central bank (Federal Reserve). A short time later, an entrepreneurial native discusses with Crusoe about starting his own business. Realizing the need for economic development, Crusoe and the new firm owner (native) consult Crusoe's Keynesian general theory book and decide to make an effort to develop the island's economy. Crusoe and the new firm owner plan and organize the economy according to the circular flow diagram in Fig. 1, where the Fed (Crusoe), the firm owner (native) and laborers make up total households. The circular flow shows a 2 sector closed economy, meaning there is no foreign trade sector. There will only be 3 assets in this economy: Bonds, money, and GDP. There is no formal banking sector in this economy, making the reality of this model limited. Further limiting the reality of this model is our assumptions of no exchange rates and all prices are fixed, except for the price of money which is the interest rate. These assumptions help to simplify our analysis and allows us to focus on the exchanges between our actors. Also in our model, there is no government agency that taxes and spends. The only government agency in our model is the central bank called the Federal Reserve. Further analysis of the government and trade sectors can always be added in later once we understand how our basic model works.

The process of production is to transform natural resources into assets. Although natural resources are a part of the islands wealth, they will be ignored. And when we use the term wealth we will be referring to the accumulation of created assets of bonds, money, and GDP held by households and firms. The circular flow model in Fig. 1, illustrates the economic transactions that occurs between households, firms, and the central bank (Fed) in this economy. Households sell their labor to firms; firms use the labor to produce goods and services, which the firm in turn sells to

households. Therefore, labor flows from households to firms and goods and services flow from firms to households. Since our model starts with the economy at zero wealth, the firm owner must borrow some money to get the economy started by supplying bonds to the bond market. This amounts to a direct loan from the Fed since it is the only source of money at this point. The Fed buys the bonds and the firm uses the money to pay for labor. Households receive the money income and use it to consume goods and services which they produced, and save through the bond market. The money goes full circle when the firm receives expenditure from the sale of goods and services and from loans through the bond market.
The firm then uses that money again to pay for next period's labor. Any remaining expenditure is the profit belonging to the owners of the firm. Both households and firms may borrow money through the bond market. Just as the Fed is the only authority to print and create money in our model, the firm is the only organization that creates new bonds. The firm supplies bonds to the market to buy investment goods such as new machinery or more labor. Households can supply previously purchased bonds to the market. They do so to take advantage of capital gains, to hold extra cash, or to spend more on consumption. In short, the circular flow model shows us that income in the form of wages and profit flows from firms to households and expenditure on goods and services flows from households to firms in the form of revenue. In our circular flow model households are the savers in the economy and the firms are the investors.

1.1 MONEY AND THE CIRCULAR FLOW

In the circular flow of income, firms paid a money income an amount equal to the entire value of output (GDP), making the money supply equal to GDP and velocity equal to 1. Households spend some of their income on consumption and save or hoard the balance. When households save in bonds, investors can make investments and have the funds available for the next round or periods production. If households hoard part of their income, firms must make unplanned inventory investments and the equilibrium level of income will decrease unless firms can entice household not to hoard. When households hoard, firms become short of the money income needed for the next period's production. This now means that the money in circulation is less than GDP and the velocity of that money must now be higher than 1. For velocity to remain equal to 1, firms must offer an incentive for households to hoard less money. The interest rate is the incentive savers receive to forego hoarding money. When households (savers) forego hoarding money, investors can get the funds they need to continue

production at equilibrium and velocity stays at 1.

The ease with which money converts in and out of one asset, say goods and services, or another is called liquidity. And the ease with which money distributes assets is called velocity. This combination of velocity and liquidity makes money the oil that lubricates the economic engine. As money circulates around the circular flow, it distributes the newly created wealth of goods and services (or current output). The income earned by households received as money income is then exchanged for goods and services. When the firm receives this money, the owner liquidates his assets of produced goods and services. As you recall from the chapter on money, money makes indirect transactions possible. When we say that a person "has a lot of money", what we really mean is that person "has a lot of wealth". When economists use the term money they refer to it in a specific way. Money is the one asset that can be readily used to make transactions, as opposed to a wealthy person who has accumulated a portfolio of assets including money, houses, cars, stocks and bonds. We should also recognize the difference between money and income. Money and income are not the same nor are they necessarily equal. Income is a flow of newly created wealth that adds to your stock of wealth. Again, money is just one form of asset in which your income is received. This money income can be later exchanged for a different asset with no change in the amount of your stock of wealth. The amount of money used to pay for your income may not be equal to your income. For instance, a $5 bill could be used to pay an individuals salary of $30,000. This would require the individual to be paid 6,000 times a year in $5 increments. Here the amount of money in this example is $5 and income is $30,000. The same $5 bill is used over and over again and circulates through the circular flow until it equals the $30,000 of newly created wealth. We will see how this works more clearly when we discuss the equation of exchange. So it is important to remember that wealth and money are stocks and that velocity and income are flows.

Just as these observations of wealth and income are true for an individual, they are also true for an entire economy. In our economy wealth is the total stock of assets including bonds, money, and GDP. Income is the flow of newly created GDP that adds to our stock of wealth. The primary increase in the economy's wealth comes from current output of goods and services (GDP). Therefore, when economists use the term income, GDP is the asset they are referring to. GDP is the main asset people in the economy desire to accumulate. Just as the individuals income is received in one form; money, the economy's income is received in one form; GDP. But the economy has additional ways to increase its wealth. That increase comes

from the production of bonds and money. It should be noted that while income increases the economy's wealth in a given time period, say a year, bonds and money may or may not increase. The economy's income is provided by the yearly output of goods and services (GDP), which is also equal to the total expenditure on the economy's output of goods and services. The reason these two quantities are the same is because of the fact that every transaction has both a buyer and a seller. Every dollar of expenditure by a buyer becomes a dollar of income to a seller.

1.2 THE EQUATION OF EXCHANGE

The link between GDP and money is expressed in the following equation: MV=GDP (1). Where GDP denotes the amount of current output, M is the money supply, and V is called the income velocity of money. The income velocity of money tells us the number of times a dollar bill needs to enter someone's income to allocate the amount of GDP. Velocity is defined more precisely when GDP is divided by the money supply: V=GDP/M. If GDP is $10 billion and the money supply is $2 billion, then velocity equals 5. Which means that the average dollar bill is spent 5 times on purchases of final goods and services in that year. Not only does the money supply and income determine velocity, but as we will see later, the interest rate affects velocity and wealth can put a limit on it. Equation (1) is an identity, a relationship that is true by definition. It states that the money supply multiplied by the number of times that the money spent or circulates in a year, must be equal to income. Therefore, expenditure (MV) = income (GDP). Equation (1) is a simple but useful equation that can be used as a rough guide in determining income and the demand for money. For a preliminary look at how the money supply might affect income, let's assume velocity and prices are held constant. If we double the money supply, the amount of income must also double; indicated by M^V- = GDP^. Where (^) stands for increase, and (-) stands for constant. So, if we continue to hold velocity at 5 and double M from $2 billion to $4 billion, then GDP will be $20 billion. With this equation, changes in the quantity of money determine the level of income.

2.0 ECONOMIC ACTORS

In our simple economy with 3 economic actors, it is important to identify the roles and functions of each actor to understand the interconnections between them and the economy. Each actor can play an active or passive role depending on the assumptions we make about them.

The Firms (investors):

A). Firms are responsible for producing output. This output may be divided between capital goods, consumption goods, and or inventory goods.

B). Firms and investors supply bonds to banks and or households (savers) through the bond market to raise funds.

C). These funds may be spent on capital and labor. Ultimately, the funds raised by firms and investors get paid to labor to increase output and income. Since wages are fixed, funds spent on labor decreases unemployment.

D). If the supply of money does not depend on the interest rate, then firms and investors respond passively to the plans of bankers.

E). Firms stock inventories to prevent shortages from increased expenditure. These inventories are monitored to signal when to increase or decrease production.

Households (savers):

A). Households include the laborers and owners of banks and firms. Households supply labor to firms and banks. They receive a money income in return for their labor.

B). This money income can be used to purchase consumption goods or bonds (supplied by the bank or firm-investors). It can also be saved as a store of wealth.

C). The portion of which the money income is divided, is determined by the marginal propensity to consume and the households demand for money.

D). The money households have left after purchasing consumption goods is savings. The household's asset portfolio consists of bonds and money. Households may decide to allocate a percentage of their savings to speculative balances and spend the rest on bonds.

Banks:

A). There are two types of banks we can include in our economy. A regular privately owned bank and a semi - governmental bank which is responsible for regulating privately owned banks and is also responsible for stabilizing economic fluctuations like recessions and expansions by targeting the money supply or the interest rate. This bank is called the central bank (known in the USA as the Federal Reserve). A bank like the Fed does not seek to make a profit (although at times it does

make a profit). In order to maintain the goal of economic stability, the Fed is likely to take losses. The Fed can create an unlimited amount of money and can create and sell bonds if needed.

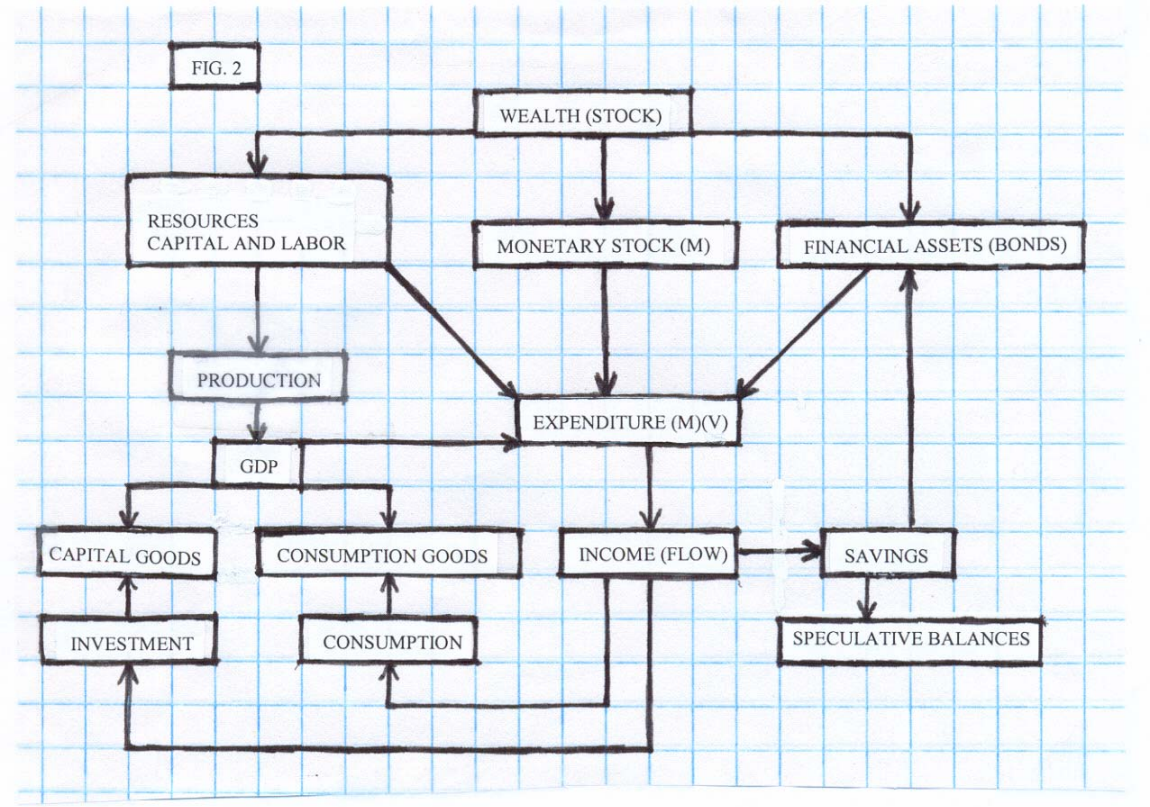
B). In our model, the money supply curve for the Fed is vertical because the supply of money does not depend on the interest rate, but only the goals of the Fed. For a private bank that seeks a profit, the money supply curve is upward sloping because the money supply depends on the interest rate.

C). Originally, banks were where households stored their extra cash or wealth for safekeeping. Today with all of the various types of accounts and services banks provide, making a determination of what money is and what a bank does is certainly more difficult than it was a century ago.

D). In our simple economy where the only money in circulation is cash, our bank serves 3 functions: as a place of safekeeping, as an intermediary between savers and investors, and to create money. When the bank acts as an intermediary, we will assume that the bank tries to minimize the amount of money it creates by using the funds savers have stored in the (bank for safekeeping) for loans to investors.

E). The interest earned on loans from the bank is the bankers income. This income is assumed to return to the circular flow through household spending.

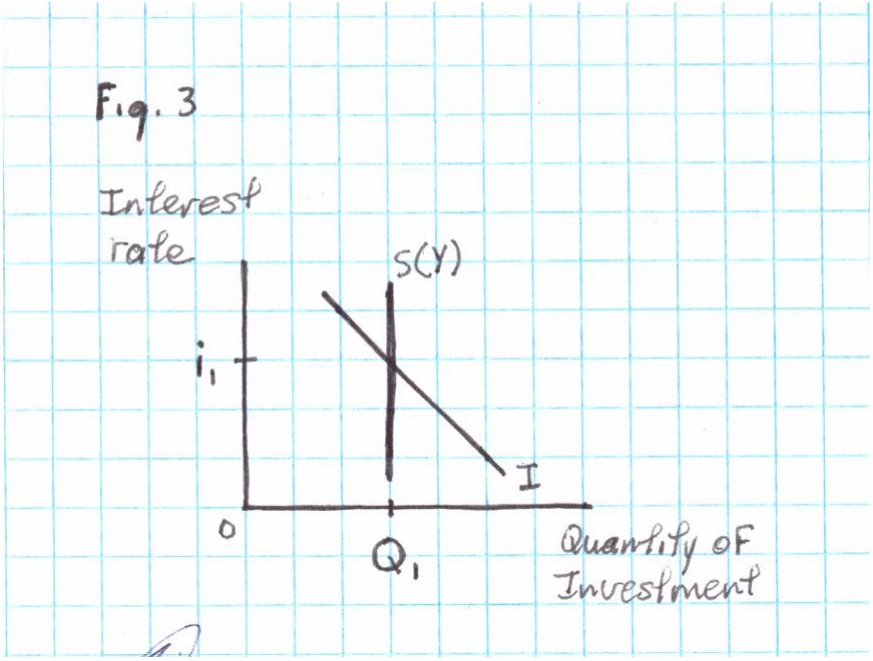
2.5 THE COMPONENTS OF INCOME



A money income is the amount of wealth earned by households from producing the economy's output, usually measured by the number of dollars received per time period such as $20k a year. Aggregate income is the amount of wealth earned by the economy from producing output and is measured in terms of GDP and is a flow measure. Aggregate income is also equal to the total spending on final goods and services during a given year. When households receive their money income, they are limited as to what they can do with this money. The possibilities are as follows: 1) Give it - obviously households or business could leave a bequest to relatives or a philanthropic organization. Grants are also important in economic development. 2) Consume it - one of the ways households spend their incomes is to spend it on consumption goods and services. Consumption is the major component of aggregate expenditure and remains in the circular flow. Consumption in our model is a function of income. 3) Save it - savings is the difference between income and consumption spending. When households are satisfied with the amount of consumption they have planned to spend, any remaining income is savings. Like income savings is a flow measure. When households have savings they can devote that savings to either bonds or they can hoard it. Hoarding is to keep money in a piggy bank, coffee can, or under the mattress. Essentially hoarding is holding money as an asset, and in our model when households hold money in

speculative balances, it is similar to hoarding. When households put all of their savings into bonds and do not hoard, one person's savings becomes another person's investment. In this instance saving and investment is the same thing. Because when savers buy bonds, investors use those funds to purchase investment goods. And of course investors do not hoard, because it would not make sense to borrow money and then just hold it. 4) Debt Reduction - the last rational possibility households or firms could do with their incomes would be to reduce their outstanding debt. In our model this is mostly an activity of the firm since they are the main issuers of bond debt, while savers are the holders of that debt. Here we have listed 4 possible activities our economic actors can do with their incomes, but for our analysis purposes we will only need to be concerned with 2 and 3, saving (including hoarding), investment and consumption spending.

3.0 INVESTMENT



To avoid the terminological problems of saving and investment, economists make a clear distinction between them. By investment we do not mean buying stocks, bonds, or other financial assets, to an economist this is savings. Investment consists of spending on 1) Capital, such as new factories or machinery. 2) Labor and 3) Inventory. Inventory investment is when firms add finished goods to their warehouses. It should be noted here that investors issue bonds to borrow the funds need for planned investment only. Investors do not borrow funds to make unplanned inventory investment. Unplanned inventory investment is assumed to be a purchase by the firm from itself and

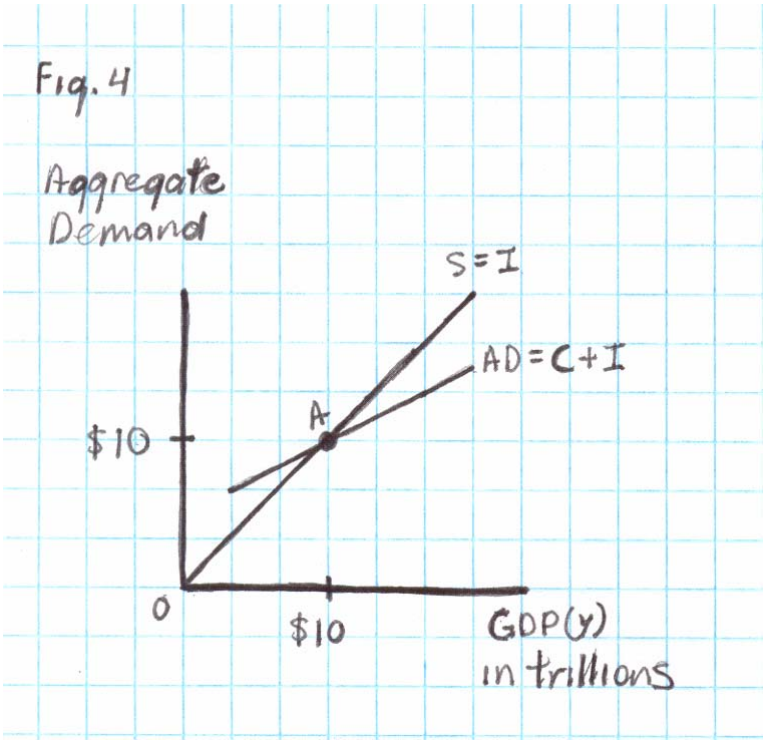
is counted as expenditure by the firm. Investment decisions are considered more on future forecasts of the return on investment rather than the current levels of income and output in the economy. Investment is determined by 1) Profitable investment opportunities and 2) The cost of borrowing, which is the interest rate.

Another possible determinate of investment would be the amount of available funds investors can borrow. After all it would seem that investors cannot borrow more than savers have dedicated to saving. But investors can get around this obstacle because in our model we have a central bank in which it has the authority to create an unlimited amount of money, and through the process of dissaving (which will be covered later), investors can get a hold of the extra funds needed to make their investments, allowing investors to borrow more funds than savers have to offer. This is why investment in our model is assumed to be autonomous with respect to income. If investors could not borrow more funds than savers had to loan, then investment would be dependant on income. And since investment expenditure is what allows income and output to increase, the economy would be stuck at equilibrium without the access to the additional funds. As we will see in the income-expenditure model, income is dependant on investment. In our model we will assume that the consumption function is constant while investment is subject to considerable change. These changes in investment demand arise from fluctuations in the interest rate. If we assume that the investment demand schedule is interest elastic, we must also assume that investment opportunities are always plentiful. If we fail to make these assumptions together then investment may become unresponsive to the interest rate even when the interest rate is at its lowest levels. This situation is called a liquidity trap. This happens in times during a temporary saturation of markets, a slowed rate of consumer spending (known as consumer fatigue), or when the economy has reached a state of maturity in which lucrative investment outlets are difficult to find.

In fig. 3, the economy's investment demand curve is shown in the market for loanable funds. It demonstrates the inverse relationship between the quantity of investment and the interest rate. The savings function is a vertical line because savings depends only on income and does not depend on the interest rate. Changes in income cause shifts in the savings curve. Also, since we are holding consumption constant, the savings function is vertical. If we relaxed this assumption of a non-shifting consumption function, then an increase in the interest rate may cause households to consume less and save more. This downward shift in consumption would free more savings for investment and allow the savings function to be

upward sloping rather than vertical. Fig. 3 shows the investment curve slopes downward because when the market interest rate is high, the quantity of investment demanded decreases. And when the interest rate is low, the investment demanded increases. If firms grow more optimistic about future investment opportunities, the demand for investment increases at every interest rate and the investment demand curve shifts to the right. It should be noted here that when investors make any investments in capital, labor or inventories, those investments only add to the economies capacity for output or the replacement of worn out capital and do not add to next period's income and output. Only the increases in investment expenditures by firms is what increases next periods income as we will see in the income-expenditure model. Realistically when a farmer invests in 10 additional acres of land and plants his crop, the next years harvest will have increased by x amount of bushels of output. This is not the case with the income-expenditure model in which firm owners keep an eye on inventories and increase or decrease production based on demand. The amount of output produced maybe less than what they have the capacity to produce. Therefore the farmer may have invested in additional land, but it may be left out of production if there is insufficient demand. This explanation helps us understand why at equilibrium, when savings equals planned investment, we can have investments year after year without any increase in next periods income or output. Also firms may invest in replacement capital (because of depreciation) at equilibrium year after year without increasing next periods output. We should make notice of the ever increasing debt in the income-expenditure model. When the economy is at equilibrium and stays at equilibrium year after year, debt from investments accumulate. This means that the amount of bonds issued year after year keeps growing. So if the amount of bonds issued in a year is $0.2 trillion, after 10 years at equilibrium, the amount of debt is now $2 trillion.

4.0 THE DETERMINATION OF GOODS AND SERVICES



Equilibrium is the condition when the plans of sellers match those of buyers and the quantity demanded equals the quantity supplied. If we refer back to the circular flow model of a two sector economy in fig.1, equilibrium is found where income equals expenditure. In that model, firms paid households a money income equal to the entire value of output (GDP) and households then spend that income on goods and services. The flow of money from firms to households is called income and the flow of money from households to firms is called expenditure. To satisfy the equilibrium condition, the aggregate income arising form the production of output must equal the aggregate expenditure on that output. The components of aggregate expenditure we have already discussed are consumption and investment (C+I). Therefore we can write an equilibrium identity equation of: C+I = GDP.

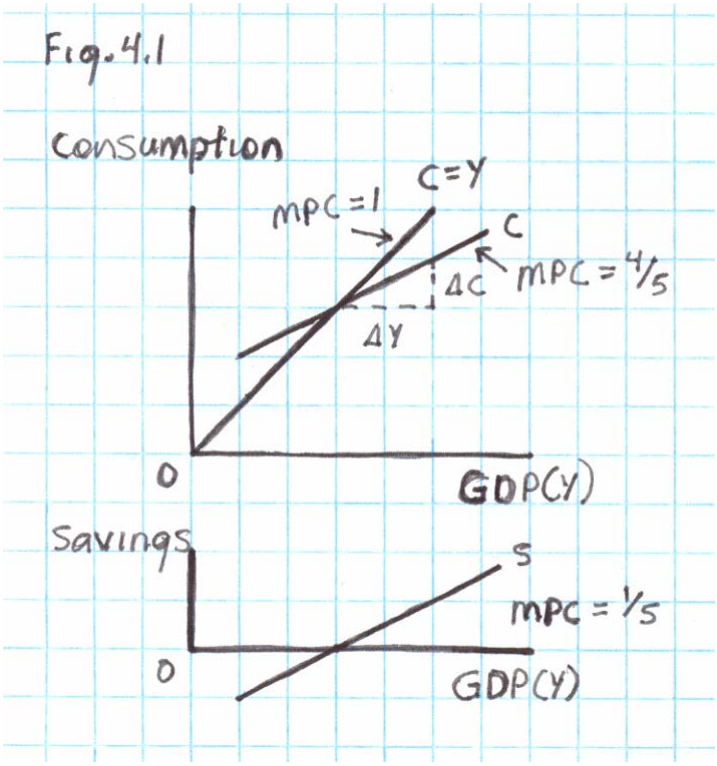
When households receive their income they have 4 choices of how they can use their incomes which were previously described. To simplify our analysis we will assume households have only 2 choices to make: they can spend their incomes on consumption and save their incomes or some combination. If households spent 100% of their incomes on consumption, the identity of expenditure equals income holds true. But if households save a portion of their incomes, and firms are unwilling to invest the amount of savings households are planning to save, it would appear as if this identity does not hold because expenditure would then be less than income, and none the less there would be unsold product rotting in warehouses. But this output

must be accounted for, and by the rules of accounting, this remaining output is considered unplanned inventory investment and adds to expenditure by the amount of the gap caused by savings. Therefore, any consumption spending short of the amount needed to equal income will be filled by investment. So, if income is the amount of wealth households earn for consumption and savings (C+S), and expenditure is the amount of income spent on current output (this periods GDP) in terms of consumption and investment (C+I) then: C+S = C+I. If we divide both sides by C, we get S=I. Savings is equal to investment on current output, and we have the same income = expenditure identity expressed in terms of saving and investment by S=I. This identity shows us what the conditions of savings and investment must be for the economy to achieve equilibrium. But in practice savings and investment are not necessarily equal and in fact are typically unequal in any given time period. The equilibrium identity therefore tells us nothing about whether there is equilibrium or disequilibrium in a particular time period. Nor does it tell us anything about whether the level of income and output will rise or fall in future time periods. To determine this adjustment process, we need a model that shows the relationship between planned savings and planned investment.

The following graph in fig. 4 shows the income-expenditure model. Our economy today is producing approximately $10 trillion in Gross Domestic Product, so income is measured on the horizontal axis and expenditure is measured on the vertical axis. The 45 degree line identifies all points where expenditure equals GDP and where savings equals investment. The line crossing the 45 degree line is called the aggregate demand curve or the current expenditure line denoted by C+I. Since our economy today is producing approximately $10 trillion in Gross Domestic Product, we use realistic figures for our graph; at point A is where the aggregate demand curve intersects the 45 degree line. At this point, the amount that households and firms demand of $10 trillion just equals the amount of output produced of $10 trillion. The slope of the aggregate demand curve is determined by the consumption function and the marginal propensity to consume. Remember that throughout this analysis we are holding the price level constant, and the aggregate supply curve is horizontal, perfectly elastic up to the full employment level. The aggregate demand curve in relation to the aggregate supply curve is vertical because demand depends only on expenditure and not on the price level. This is shown in fig. 0.5. Here, firms are more than willing to increase the quantity supplied at existing prices. Increases in spending will exert no upward pressure on prices and output can be expanded without running into higher per unit costs of production. All

that one needs to know to determine the equilibrium level of output is the amount of aggregate spending on output. The supply curve becomes vertical at the full employment level of output. This income level is determined by the economy's capacity to produce output.

4.1 THE CONSUMPTION FUNCTION

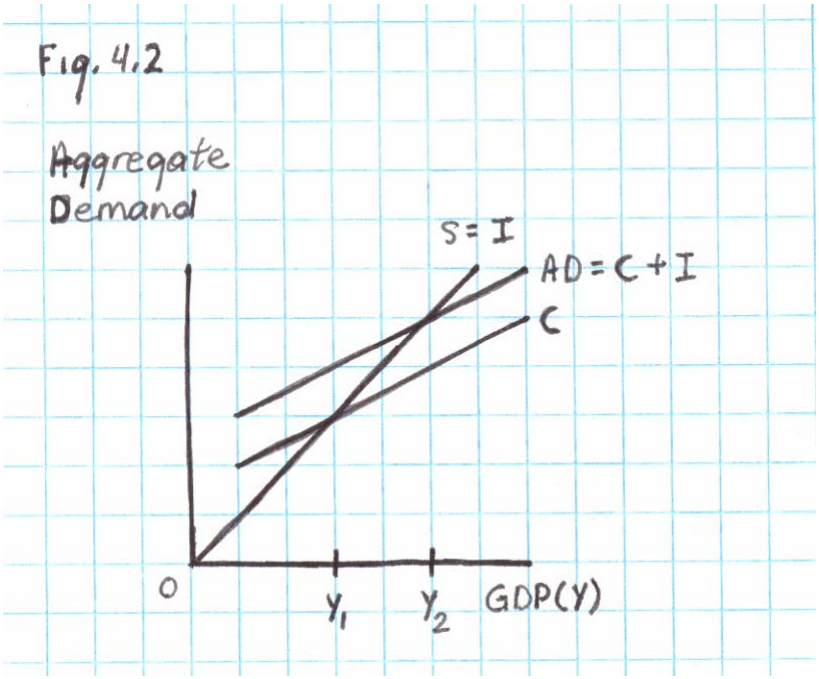


To consider how consumption is related to income, we will show that part of consumption spending varies directly with income. As income increases, households will spend some, but not all, of the increase on consumption. Therefore choosing to save part of the increase. We will assume further, that the ratio of savings to income will become greater with increases in income and the increase in consumption spending does not increase by an equal proportion of the increase in income. For instance, suppose an individual spends $75k a year on consumption with an income of $80k. That’s 94% of her income. Now when her income increases to $100k, she spends $91k a year on consumption; 91% of her income. Here as income increases, consumption as a portion of income goes down relative to savings. To know how an increase or decrease in income will be divided between consumption and savings we must determine the slope of the consumption function. The slope of the consumption function is called the marginal propensity to consume. As you remember from mathematics, the slope of a

line is its rise over run. Here it is the change in consumption divided by the change in income C^/GDP^ (^ is increase). The marginal propensity to consume is positive but less than 1. For convenience we will assume that the consumption function is a straight line. This consumption function may be mathematically represented in terms of its intercept at the vertical axis and its slope, with an equation of a straight line: C = Ca + (c)Y. Where Ca is the amount of consumption spending that is independent (autonomous) from the level of income, because it is the amount of consumption found even when income is zero. Where (c)Y is the amount of induced consumption, because it rises or falls by a constant fraction with any change in income (Y stands for GDP).

The consumption function and the marginal propensity to consume as well as the savings function, is presented graphically in fig. 4.1, where GDP or income is measured on the horizontal axis and consumption expenditure is measured on the vertical axis. For the straight line consumption function in our figure, the marginal propensity to consume is 4/5. The savings function has an inverse relationship to the consumption function and therefore the marginal propensity to save is 1/5. If income were a coin, consumption and savings are the opposite sides of the same coin. We can also say that the MPC + MPS must equal 1. A change in household's allocation of income between consumption and savings will shift the consumption upward or downward. An increase in consumption will shift the consumption function upward, and an increase in savings will shift the consumption function downward. Keep in mind that movements along the consumption function result from a change in income and that shifts in the consumption function result from a change in either consumption spending or savings. For our model we will assume there are no shifts in the consumption function so that consumption is held constant across all income levels with a marginal propensity to consume of 4/5.

4.2 THE INVESTMENT FUNCTION

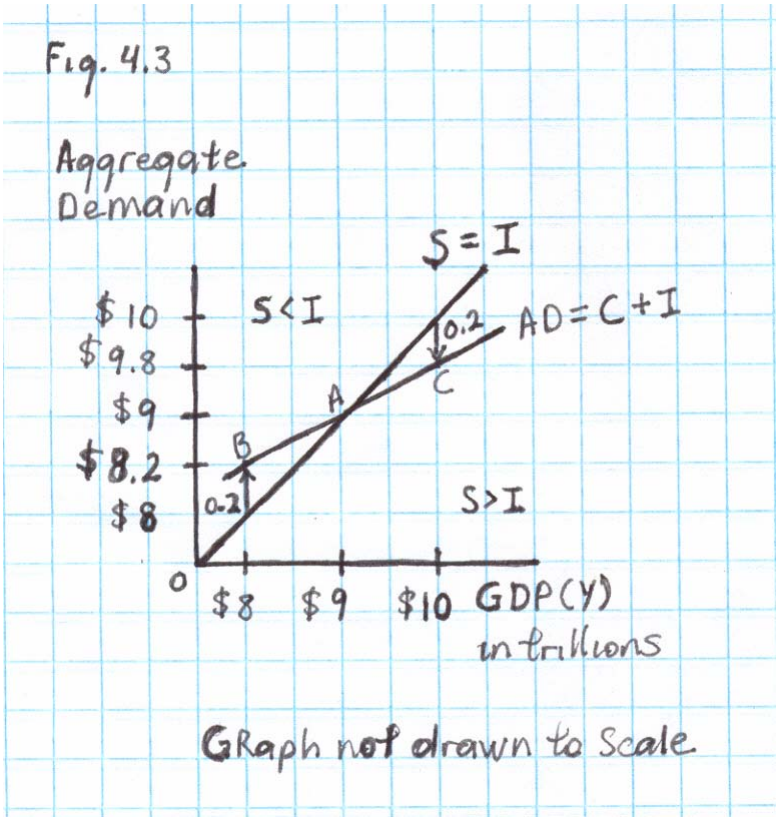


As we just saw in out analysis of consumption, consumption is dependant on income. In other words, a change in income had an effect on consumption spending causing it to vary with the income level. To now add investment to our analysis, we need to know how investment relates to income. In our model, the investment function is assumed to be autonomous with respect to income. This means that if we hold the interest rate and investment opportunities constant, investors will spend the same amount on investment across all levels of income. In other words, a change in income does not have the effect of changing investment spending. At least not directly. If the change in income affects the interest rate in some way, then it may have an affect on investment. Since investment is assumed to be autonomous, our investment function is simply I(r). In fig. 4.2, the investment function lies on top of the consumption function and is an equal distance from the consumption function across all levels of income. Investment spending is the main contributor to economic fluctuations. Investment varies from year to year depending of course on opportunities. Empirical evidence shows that the consumption function which makes up about 2/3 of GDP is relatively stable while investment varies much more than consumption and GDP. Investment expenditure makes up about 1/6 of GDP and accounts for nearly all of the variability in income. For the reasons already discussed, the investment function may shift up or down and any initial change in the level of income is typically the result of a shift in the investment function. For instance, if firms become optimistic about a future technology, investment demand will increase and the investment curve will

shift upward also causing the aggregate demand line to shift upward increasing output (GDP) and next period's income. An increase in investment along the investment curve and a shift of the investment curve will both cause the aggregate demand line to shift upward. It is important to distinguish between a one time increase in investment expenditure and an expenditure increase that sustains for more than one period or year. If the increase in investment is a temporary one, the rise in income and output will also be temporary. The aggregate demand line would shift up in one period and down the next making economic fluctuations and equilibrium difficult to achieve. We will assume that when the investment increases, a new higher equilibrium level of income will be determined and that equilibrium level will be maintained for more than one period.

Now that we have examined each component of aggregate expenditure, we can express the aggregate demand function with the equation: AD = C+I(r). The aggregate demand function in fig. 4.3 is drawn on the assumption that there is some level of income at which aggregate demand is equal to income. This is referred to as the equilibrium level of income; here it occurs at $9 trillion where the aggregate demand curve intersects the equilibrium (45 degree) line. At any level of income higher than $9 trillion, households save more of their incomes than investors plan to invest and savings is greater than investment. For example at an income level of $10 trillion, the aggregate demand curve is below the equilibrium line and the vertical distance between the two lines is equal to the amount of savings of $0.2 trillion over planned investment for that level of income. At a level of income below $9 trillion, households and/or firms spend more than their income. In this situation, the aggregate demand curve lies above the equilibrium line and the vertical distance between the two lines equals the amount of expenditure that is greater than income. At an income level of $8 trillion, the aggregate demand curve is above the equilibrium line and the amount of expenditure over income and the amount of investment over savings is $0.2 trillion.

4.3 DISEQUILIBRIUM INCOME AND EXPENDITURE



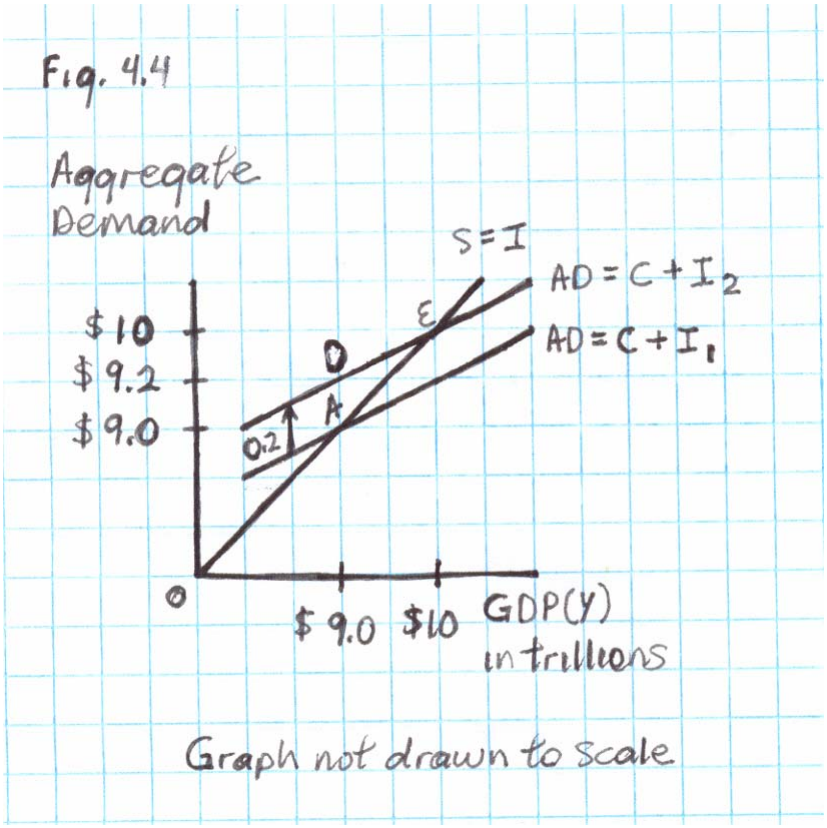
The actual level of output and income in any period is the result of the decisions of firms, and the actual level of expenditure in that period is the result of the decisions of both households and firms. To ensure that the amount of what households and firms actually spend on current output equals the amount of output produced, the price level must change. But since the price level is assumed to be constant, the amount of what households and firms actually spend may not equal output. As we see in fig. 4.3 when income is $8 trillion or $10 trillion for instance there is disequilibrium. When the income level is $8 trillion, aggregate demand is $8.2 trillion, as indicated by point B on the aggregate demand line. So, aggregate demand exceeds the amount of output firms produced by $0.2 trillion. When the amount of aggregate output demand by households and firms exceeds the amount of output firms produced, firms are forced to sell output from their inventories to make up the $0.2 trillion by which demand exceeds output. Since firms cannot reduce their inventories indefinitely, unplanned inventory reductions signal firms to increase their production. This increases employment and income, which leads to more spending. As long as aggregate demand exceeds output, the process of more employment, income, and spending continues until aggregate demand equals output (GDP), and equilibrium is achieved at point A. When output reaches $9 trillion, firms can stop reducing inventories and the amount of output demanded by

households and firms equals the amount of output produced by firms. This is also where the amount of savings by households equals the amount of planned investment by firms. Consider what happens when the amount of output produced is $10 trillion. The aggregate demand line is below the equilibrium line. The amount of expenditure by households and firms on output was $0.2 trillion less than the amount produced, indicated at point C. Because the amount of output produced exceeds the amount demanded, unsold goods accumulate in firms warehouses and this year's inventories swell to $0.2 trillion. Rather than letting inventories accumulate year after year, firms reduce production, cutting employment and expenditure. Unplanned inventory accumulation causes firms to cut production until the amount they produce equals the amount demanded, which occurs at $9 trillion. Equilibrium is found where the amount households and firms plan to spend equals the amount of GDP produced.

Why does a $0.2 trillion shortage of expenditure cause firms to reduce GDP by $1 trillion? When firms reduce production, we said that it also reduced employment and expenditure further. But the reduction of expenditure is not proportional to income and therefore expenditure does not decrease as fast as income, which allows income and expenditure to equalize at $9 trillion. This can be explained by the single spending multiplier (SSM). The SSM is the ratio of the change in GDP to the change in expenditure that caused the change in GDP. This ratio is called "single" because consumption is the only component that varies with income. The mathematical equation that expresses the SSM is: 1/(1 - MPC). Remember that the slope of the aggregate demand line is determined by the MPC and the MPC must be less than 1. The MPC and the multiplier are directly related. The larger the MPC, the larger the SSM. In our example, we found the MPC to be 4/5. When we plug the MPC into our equation we get a SSM of 5. The SSM shows us how much income will change from an initial change in expenditure. Therefore, an initial decrease in expenditure of $0.2 trillion will cause income to decrease by 5 times that amount, which is $1 trillion. To estimate the equilibrium level of income, the initial income level was $10 trillion, minus the amount determined by the SSM of $1 trillion, gives us a projected equilibrium level of income of $9 trillion. And this is exactly the amount our graph shows as equilibrium.

Now let's consider the effects of an upward shift in the aggregate demand line caused by an increase in one of the components of expenditure. Since we are assuming that consumption remains constant, this increase in expenditure must come from investment. The change in aggregate output produced depends on how much the aggregate expenditure line shifts.

Suppose that firms become more optimistic about future business prospects and planned investment increases from $9 trillion to $10 trillion per year. This means the investment curve shifts upward. Fig. 4.4 shows the upward shift in the aggregate demand line from C+I1 to C+I2 by $0.2 trillion. The economy is initially in equilibrium at point A, where aggregate demand and GDP are equal to $9 trillion. A $0.2 trillion increase in autonomous investment shifts the aggregate demand line up vertically from point A to point D. Income rises until it equals the amount of new spending at point E. A new equilibrium is found at point E. The increased investment expenditure of $0.2 trillion, in combination with the SSM, raises income by $1 trillion from $9 trillion to $10 trillion.



4.4 ACCOUNTING FOR GDP

Just as individual firms keep track of their assets and liabilities with standard accounting practices, economists and accountants keep track of this periods GDP. National income accounting is based on a double entry bookkeeping system. In that system, spending on aggregate output is recorded on one side of the ledger and income created by that spending is recorded on the other side. Therefore, by the rules of accounting, expenditure must equal income. Accounting for GDP ignores secondhand or used goods such as existing homes and used cars. These goods were counted

in GDP the year they were produced. The double entry bookkeeping ensures that the value of current output is equal to the income paid for the resources used to produce that output and equal to the expenditure on that output. The resources used in our model were labor and entrepreneurial ability paid in wages and profit. The wages and profit are taken home and divided by households into consumption and savings. Therefore we can express this relationship in an equation such as: C+S = GDP = C+I. Where C+S equals income, GDP is equal to this years output, and C+I is the expenditure on current output. This equation is virtually the same equilibrium identity we derived earlier. In that identity we concluded that savings must equal planned investment for the economy to be in equilibrium. Here we can use savings and investment again to account for GDP. If we divide the equation C+S = C+I by C, we get S = I. For accounting purposes, savings must equal investment. To see why, we must make a distinction between planned investment and realized investment. As you recall, firms produce the aggregate output expected to meet demand. But actual expenditure may not match the amount produced. Refer back to fig. 4.3 to point C, where firms end up with $0.2 trillion in unsold output. Here expenditure is less than output and savings is greater than planned investment. Firms must add this excess supply of unsold output to their inventories. Accountants count increases in inventory during the year as realized investment. With inventory investment, firms are assumed to have purchased the unsold output from themselves to add to their inventories. This realized investment also counts as expenditure of $0.2 trillion, making expenditure equal to income. This treatment of inventories ensures that expenditure reflects the economy's current production of output. What happens when the economy is at point B? Here expenditure is greater than output and planned investment is greater than savings. This means that firms have not produced as much as people demand and firms must reduce their inventories. Decreases in inventories during the year counts as negative investment, or disinvestment. This is because inventory reductions represent the sale of output already credited to a prior year's GDP. The national income accounting system reflects realized investment, not necessarily planned investment. Planned investment is the amount firms plan to invest before they know how much output they sell. Realized investment includes both planned investment and any unplanned changes in inventories. Only when planned investment and realized investment are equal will the economy be in equilibrium.

4.5 AUTONOMOUS EXPENDITURE

To gain better perspective on the relationship between income and

expenditure, we should examine the role of how autonomous expenditure and inventories affect the income-expenditure model. The fact that investment is assumed to be autonomous and a component of expenditure is what makes expenditure autonomous. We further showed that part of consumption is autonomous when income is zero. We also assumed that firms have inventories, in other words, inventories are greater than zero. Therefore, for the income-expenditure model to work, we must make these three assumptions: that expenditure is autonomous, inventories are greater than zero and the economy has not reached the full employment level of income. But what if expenditure is not autonomous, and/or inventories are equal to zero or we have reached full employment? With these questions in mind, we can identify three possible relationships between income and expenditure and inventories. They are: 1) Expenditure depends on income, 2) Expenditure is autonomous with zero inventories, and 3) Expenditure is autonomous with inventories greater than zero.

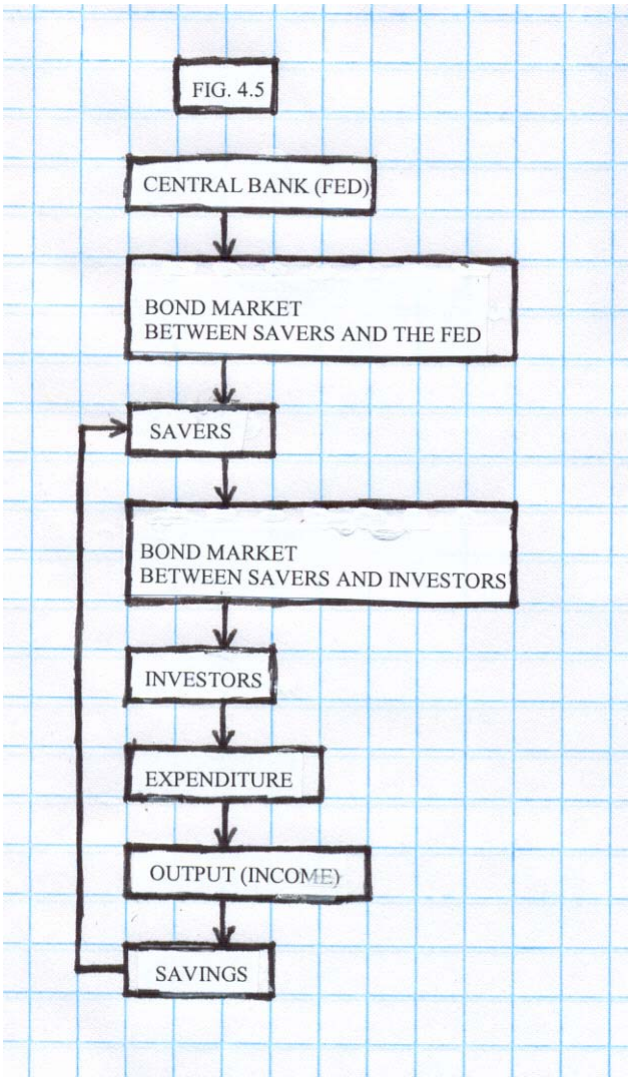
Relationship 3 is where our income-expenditure model begins and assumes we have not reached full employment. Consider relationship 2. People plan to spend more than their income, since firms inventories are zero, people cannot purchase more output than they have currently produced. Therefore, expenditure and the equilibrium level of income cannot increase beyond this point, but it can decrease or fluctuate below its current level. Here firms are late in recognizing the amount of output demanded and will increase output for the next period allowing equilibrium to increase. Firms will smarten up and increase their production next time around so as to not get stuck with inventory shortages. Unless of course the economy is at full employment. Here firms cannot increase production because all of the available resources of capital and labor are in use, and the production frontier has reached its limit. With autonomous expenditure and the economy at full employment, this situation is referred to as forced savings. In order to produce more capital goods, households must forego consumption, forcing an increase in savings.

Consider relationship 1. If expenditure is not autonomous, this means that households or firms cannot borrow funds, and or hold no monetary assets. Households or firms expenditure cannot exceed the income they have currently earned. The amount of inventories available is irrelevant if expenditure cannot be greater than income. Earlier when we derived the income-expenditure equations, we reduced this identity down to an equation between savings and investment as S=I. Therefore, if we say that expenditure cannot exceed income, it would be the same to say, in terms of savings and investment, that investment cannot be greater than savings.

Obviously, if investment depended on savings, income would not be able to increase. This must be an incorrect relationship and leads to circular logic. We must know which activity comes first, savings or investment. This is much like the chicken or the egg question of which came first. In the income-expenditure model, investment comes first and savings depends on autonomous investment. This is what allows equilibrium income to reach higher and higher levels. Therefore, the important observation about the income-expenditure model is that increases in equilibrium income depend on autonomous expenditure. This model's assumptions differ from those of classical growth theory, which states that the factors of production determine the amount of real output and changes in expenditure only changes the nominal value of that output.

So, what exactly allows expenditure to become autonomous and greater than income? When discussing investment demand, we stated that savings is limited to the amount of income households receive and the amount they spend on consumption. Savers can allocate their savings into bonds and/or they may hoard it into speculative balances. The amount that savers allocate to bonds is the amount of funds investors receive for investment expenditure. If the economy is in equilibrium where S=I, and investors want more funds than savers have devoted to bonds making I>S, those funds can come from two sources. Those funds can come from saver's speculative balances, or from the central bank (Fed). In our circular flow model, it is possible for the Fed to buy bonds directly from investors, but it is standard procedure to assume that the Fed buys previously saved bonds from savers, who then turn around and buys bonds from investors. When the Fed buys any bonds, it increases the money supply and this is called a monetary expansion. When savers purchase more bonds than their income and savings will allow, this is called dissavings. Dissavings adds to expenditure. Through dissavings, savers can reduce the amount of funds they are holding in speculative balances and buy bonds, or savers can liquidate previously purchased bonds to the Fed (orginally bought from investors in previous periods of savings) and buy new bonds from investors at more favorable rates. Remember savings is a yearly flow, while bonds may be accumulated from previous years. When savers liquidate previously purchased bonds, the Fed buys those bonds and savers may very well earn capital gains. This purchase from the Fed increases the money supply and this money goes into savers speculative balances. If we assume that savers want to purchase bonds from investors instead of holding the extra money in speculative balances, savers will try to get rid of these excess money balances by buying bonds. So what limits the amount of additional bonds

savers can buy? This depends on the savers wealth, their accumulated assets of both bonds and speculative balances. Savers cannot purchase more bonds than their available resources will allow. So in summary, investors can attain additional funds greater than the funds savers devote to bonds from their incomes. Investment does not depend on savings. The sources of the funds come from the Fed by the process of a monetary expansion or from savers by the process of dissaving thier speculative balances. Fig. 4.5 shows how funds, starting with the Fed, get handed from one actor to another.



4.6 COORDINATING SAVINGS AND INVESTMENT

In the previous section we discussed autonomous investment. Investment is autonomous when investment is independent of the flow of savings. We made this statement because when investors want to increase investment spending beyond what savers have devoted to bonds (I>S),

investors can still secure these funds from the bank or from savers speculative balances, assuming we allow for savers to hold speculative balances. Speculative balances are a stock measure. Although we assume autonomous investment, investment spending in fact may not always be autonomous. Depending on the assumptions we make about banks and households, plus the decisions banks and households make, investment may very well depend on savings. For instance, if we assume our bank is the Fed and the Fed wants to hold the money supply constant and we also assume households do not hold speculative balances, then the only source of funds investors can secure are from household's savings. This makes investment no longer autonomous and I cannot be greater than S. In order for investment spending to be greater than savings, investment must be autonomous. Another situation arises when households want to increase thier speculative balances. For instance let's assume that the economy is in equilibrium, the Fed decides to hold the money supply constant and there is a change in the plans of the household's asset portfolio (holding the consumption function constant). If savers increase their demand for speculative balances, this will reduce the amount of funds they devote to bonds. With a change in household's asset portfolio, planned savings in bonds is now less than planned investment (assuming there is no change in the plans of investors). Now the funds available to investors are insufficient to make planned investments. This deficiency creates unsold output which must be added to unplanned inventories. So the equilibrium level of income must decrease until planned investment matches planned savings in bonds. The reason why investment depends on savings in this situation, is the fact that investors cannot secure funds from either the Fed or savers speculative balances to fill the gap between savings in bonds and planned investment. When savers received their income, they decided to hold more money in speculative balances, reducing the amount of funds they supply to the bond market. This action causes the demand for bonds curve to shift to the left. This action causes the interest rate to rise and reduces the amount of investment investors undertake. This reduction of funds from the bond market essentially draws money out of required transaction balances and increases the velocity of required transaction balances. Since velocity is required to be 1, there is not enough money in circulation to support all the transactions at the current level of income. Therefore, income must decrease to where velocity equals 1. Finally, firms make unplanned inventory and decrease production and the equilibrium level of income to where planned savings equals planned investment and velocity is equal to 1. This process of adjustment is summarized by the IS-LM model we will be building in

section 10.5 economic fluctuations. It is important to realize here, that when households want to increase their holdings of speculative balances, without a matching increase in the money supply buy the Fed, the increase in speculative balances will reduce equilibrium income and output. Therefore, if households want to add to their holdings of speculative balances year after year or period without a change in equilibrium income and output, the Fed must increase the money supply by buying bonds from investors an amount equal to the amount households decreased. This makes investment autonomous. To summarize, when investment depends on savings, the equilibrium level of income condition is met when: 1) planned savings equals planned investment, and 2) the velocity of money sufficiently lubricates the economy. In order for the economy to maintain equilibrium, savers must devote all of their savings to bonds and investors must not make unplanned inventory investments. Equilibrium is when bonds = bonds; Savers put all of their savings in bonds and investors plan on supplying all of the bonds savers demand. If savers devote a portion of their savings to speculative balances, this will cause the economy to be in disequilibrium. Equation (3) shows a disequilibrium equation of the components of savings and investment when savers decide to keep a portion of their savings in speculative balances. When households change their asset portfolio by demanding less bonds and increasing speculative balances, the components of savings become: bonds + speculative balances (Msp), which must equal the components of investment: planned bonds. Since savers bonds are now less than investors planned bonds, investors receive less funds and make unplanned inventory investment (UII); the disequilibrium equation becomes: bonds + Msp = bonds + UII (3). Now income will decrease and the new equilibrium will be found when S=I or when bonds = bonds again. The disequilibrium condition here is caused by a change in the plans of savers. Savers decided to keep a portion of their savings as speculative balances. This forced investors to make unplanned inventory investment. As we stated in section 3.0, investors do not borrow to make unplanned inventory investments. Unplanned inventory investments are counted as the firms purchase of inventory from itself. If the equation is such that bonds = bonds + UID, this happens as a result of a change in the plans of investors. Here investment is autonomous and investors increase their spending greater than output (I>S) and cause unplanned inventory disinvestment. This will increase the equilibrium level of income. If investors spending is less than output (S>I) this will cause unplanned inventory investment. The equation for this situation will be the same as equation 3. When savers withhold funds from investors (holding the money supply constant), it forces investors to

make unplanned inventory investment, when investors withhold bonds from savers it forces savers to hold speculative balances. Either way, there is unplanned inventory investment and equilibrium income will decrease. So, only when all of planned savings is in bonds and all of planned investment is in bonds (bonds = bonds) will there be an equilibrium level of income between savers and investors holding the money supply constant. When investors withhold bonds from savers, this forces savers to hold speculative balances. If savers do not want to increase their holdings of speculative balances, savers can exchange the excess balances for bonds supplied by the Fed. This exchange between the Fed and savers will reduce the money supply in the economy. In conclusion, equilibrium income and output is determined by the decisions of all 3 actors in our economy and will be found where actual investment equals planned investment. Whether investment is autonomous or dependent on savings, depends on the decisions of our actors.

4.7 SAVINGS AND INVESTMENT IN THE OPEN ECONOMY

Throughout this lesson thus far, we have been analyzing a closed economy. However, most economies are open because they export and import goods and services and they borrow and lend in world financial markets. Like the closed economy, the open economy has accounting identities that reveal how the flow of goods and services across borders must match an equivalent flow of funds to finance these transactions. A key macroeconomic difference between an open and closed economy, is that savings and investment need not be equal at equilibrium in an open economy. Just as an individual household's savings and investment may not necessarily be equal in the closed economy, a nation's savings and investment may not necessarily be equal in the world economy. In other words, a disequilibrium level of income in a closed national economy may be an equilibrium level of income in an open national economy. In an open national economy, equilibrium is determined by the equality of income and expenditure, not necessarily savings and investment. Therefore, the equality of savings and investment has no significance in the open economy like the closed economy. For an example of how savings and investment differ under an open economy condition, consider the income = expenditure equation: 13(S)+24(M)=20(I)+17(X). Where S is savings, M is imports, I is investment, and X is exports. Here the economy is in equilibrium at an income level of $37 billion. The trade balance favors imports of $7 billion because net exports (X-M) are -7, and investment is greater than savings by $4 billion. Now let’s increase savings. Suppose: 20(S)+17(M)=20(I)+17(X). Now if you notice, the economy is again in equilibrium, but savings and

investment are also equal. Notice what else is equal; net exports. Another way to write this equation is S=I+NX; 20=20+0. As you can see, when the economy is in equilibrium, savings and investment are equal only when net exports are 0, or the economy has balanced trade. In an open economy it is possible for savings and investment to be in equal when the economy is in disequilibrium, consider the income = expenditure equation: 20(S)+24(M)=20(I)+17(X). Here income is greater than expenditure. In an open economy, autonomous expenditure is supplemented by the inflow of foreign investment and inventories are supplemented by imports. When analyzing the open economy, we should note that world capital markets take the primary role of the source of funds when expenditure is greater than income, but each nations central banks play the ultimate role as the source of funds in the world economy. Who fills the gap when world investment is greater than world savings? This is the job of the world's combined central banks. Each central bank contributes to the world money supply. The ultimate source of output is inventories when world expenditure is greater than world income. Since there is no such thing as interplanetary trade yet, we can think of the world economy as one large closed economy, where equilibrium world savings and investment determine the world interest rate. In the open economy a capital inflow will stimulate imports and therefore will reduce income. This decrease in income happens only when all other factors are held constant. If there is an offsetting increase in the money supply or a decrease in the amount of speculative balances savers decide to hold, income may not fall and remain at the current level.

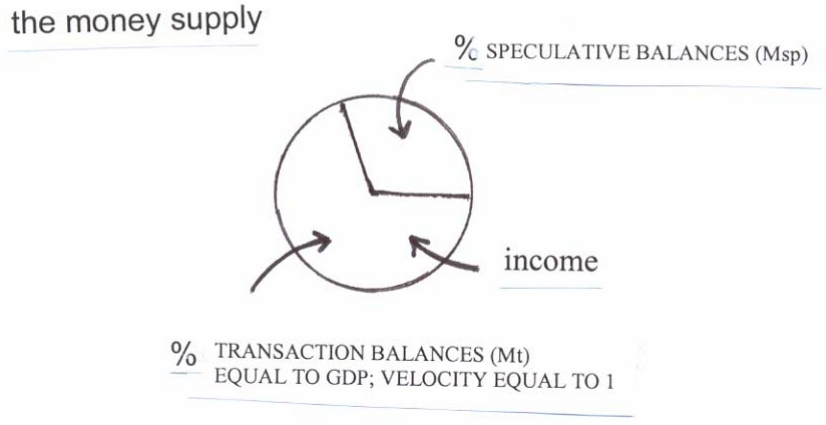
5.0 ASSET DEMAND

An asset is a type of property in which a person owns and stores his wealth. Whether it is in a savings account, stocks, bonds, land, houses or a yacht, there are many ways to store wealth. In our economy we use 3 generic types of assets of bonds, money, and GDP. Faced with the choice of whether to buy one asset over another, the individual must consider the following factors: 1) wealth, 2) liquidity, 3) risk, and 4) return. The demand for assets is affected mainly by increases in wealth and portfolio changes. When our wealth has increased, we have more resources available to purchase assets. Therefore, the quantity of assets we demand increase. However, the quantity demanded of some asset grows more rapidly with a rise in wealth than the quantity demanded of others. Portfolio changes also affect asset demand. For instance, if an asset becomes less risky and offers a higher return than others, the demand for that asset will increase relative to others in our portfolio even without an increase in wealth. Usually savvy savers hold many assets in their

portfolio rather than just one. The reason for this is because of diversification. Diversification reduces the over all risk a saver faces. Diversification is almost always beneficial except for in the case of when returns on all assets move in the same downward direction. Another factor that affects the demand for an asset is its liquidity. The most liquid asset is of course money. In fact liquidity is money. When we refer to the term liquidity, we are referring to how quickly and easily we can convert assets into cash without incurring large costs. A house is not a very liquid asset, because it may take a long time to sell in the market or it may have to be sold at a much lower price than the asking price. A change in ones portfolio must also involve liquidity. Suppose a saver is storing some of his wealth in a few acres of land and decides to sell this land because he wants to transfer that wealth into bonds since bonds are currently providing better returns. The steps involved require the land owner to exchange his land for money and then turn around and exchange that money for bonds. Therefore, money becomes a useful and desirable asset because of the liquid advantages it has relative to other assets. It is widely accepted and easily exchanged for other assets.

6.0 MONEY SUPPLY AND DEMAND

FIG. 6

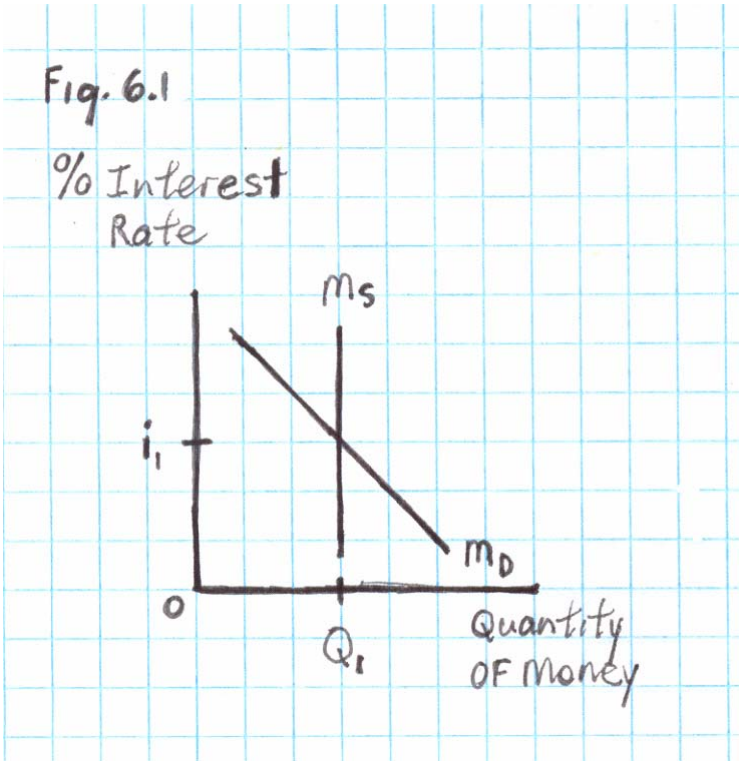


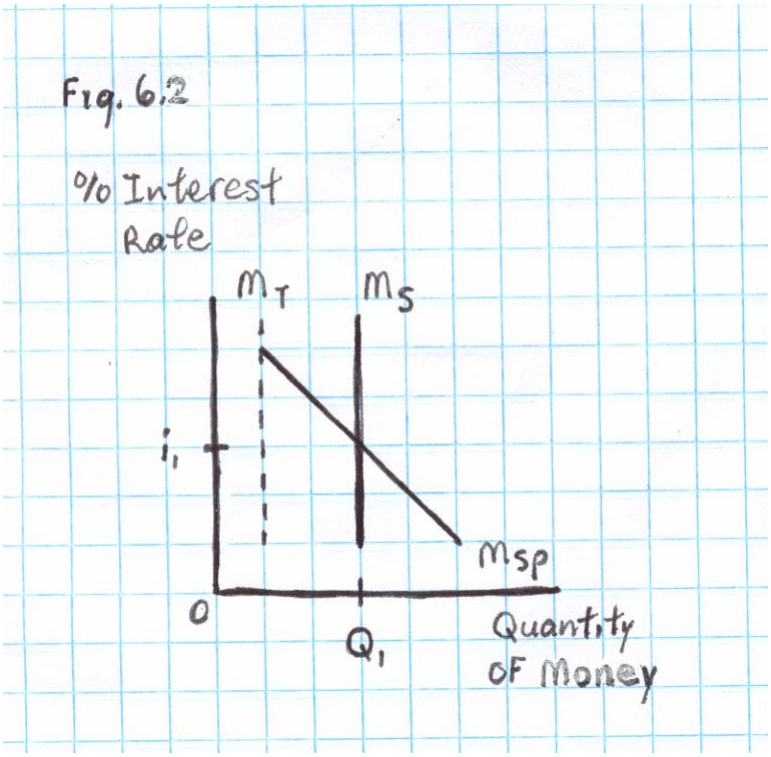
Just as individual savers have an asset demand for money, so too does the entire economy. Here we will look at the economy's demand for money. If we return to equation (1), we can use this equation again, this time to roughly determine money demand. When we rewrite the equation as: Md = GDP/V, this equation tells us that when velocity is constant, the amount of

income determines the amount of money people want to hold and use. To put it another way, the economy's demand for money is a function of income. As we saw in the asset demand section, as wealth grows, individuals need to store it by holding more assets, one of which is money. Likewise for the economy, as income grows, with velocity constant, money demand grows proportional to income. The quantity of money in our model is determined by the central bank (Fed). We will assume that the supply of money is completely controlled and determined by the Fed and that an increase in the quantity of money by the Fed will shift the supply curve for money to the right. The supply curve is vertical because the supply of money by the Fed does not depend on the interest rate. The ability of the Fed to increase or decrease the quantity of money in the economy depends on its ability to find buyers or sellers of bonds. Since the Fed does not try to make capital gains or avoid losses, the Fed is ready to pay higher prices to carry out its policy. This insures that there will be no shortage of buyers or sellers whatever the Fed's policy is. It is important to note that our model assumes only one bank; the Fed. In the real world the Fed is the bank for commercial banks. Commercial banks also have the ability to create money, and therefore also have an affect of the quantity of money in the economy.

The economy's demand for money is based on two functions: 1) money as a medium of exchange (which is related to velocity) that people can use to carry out transactions, and 2) money as a store of value (which is related to liquidity). Therefore, the money supply (or the quantity of money) can be divided into 2 sections; one called required transaction balances and the other called speculative balances; summarized by the simple equation: Ms = Mt + Msp. Once households are satisfied with their consumption of goods and services, any remaining income must be stored as wealth in either 2 forms, bonds or money. Speculative balances are when savers store money as wealth and speculate on the return of bonds. The money taken from speculative balances when used to purchase bonds turns into transaction balances because idle money now goes into circulation. Required transaction balances are the quantity of money needed to facilitate the transactions generated by income. Required transaction balances are determined by the financial technology available in an economy. For instance, the quantity of money needed to conduct transactions when people use charge accounts and credit cards would obviously be less than if the economy ran only on paper currency. The velocity of money would fall when an economy utilizes charge accounts than if it were using only paper currency. For our purposes we will assume that required transaction balances are equal to income. This will make: Mt=GDP and V=1.

Decisions about using money to store wealth as speculative balances, depends on the risk and expected returns of bonds. As we discussed in the sections on asset demand, a saver would want to hold bonds if their expected return is greater than the expected return from holding money. Since we assume in our model that the expected return on money is zero, at higher interest rates, savers are more likely to expect the return from holding a bond to be positive, thus exceeding the expected return from holding money. Savers will be more likely to hold bonds more than money, and the demand for money will likely be quite low relative to bonds. When savers expect interest rates to fall, they expect bond prices to rise and capital gains to be realized, and savers will store more wealth as money. Therefore, the demand for money is related not only to income, but also to interest rates and the demand for money is negatively related to the interest rate. But, even if the expected return on bonds exceeds the expected return on money, savers still might want to hold money as a store of wealth because it has less risk associated with its return than do bonds. Savers can reduce the total amount of risk in their portfolios by diversifying, thus by holding both bonds and money. Fig. 6 shows how the quantity of money may be divided between Mt and Msp. Notice that the total quantity of money is greater than income. Fig. 6.1 shows the standard market for money. The market for money shows the supply and demand for money between the Fed and savers along with investors. The money demand curve slopes downward because the demand for money is negatively related to the interest rate. The demand for money comes from savers and investors. The money supply curve is vertical because it is controlled by the Fed. The actions of the Fed do not depend on the interest rate because it does not seek to profit. Fig. 6.2, show a more detailed market for money when people hold speculative balances. Transaction balances are indicated by the vertical dotted line to the left of the Ms curve. This line represents the quantity of money that is required for transactions and is vertical because transaction balances do not depend on the interest rate. In our economy, transaction balances are equal to income and their velocity is equal to 1. The downward sloping demand curve represents speculative balances. Since speculative demand depends on the interest rate, the Msp curve slopes downward. When people hold speculative balances, the money supply must be greater than transaction balances. Therefore, the Ms curve is to the right and greater than the Mt curve.



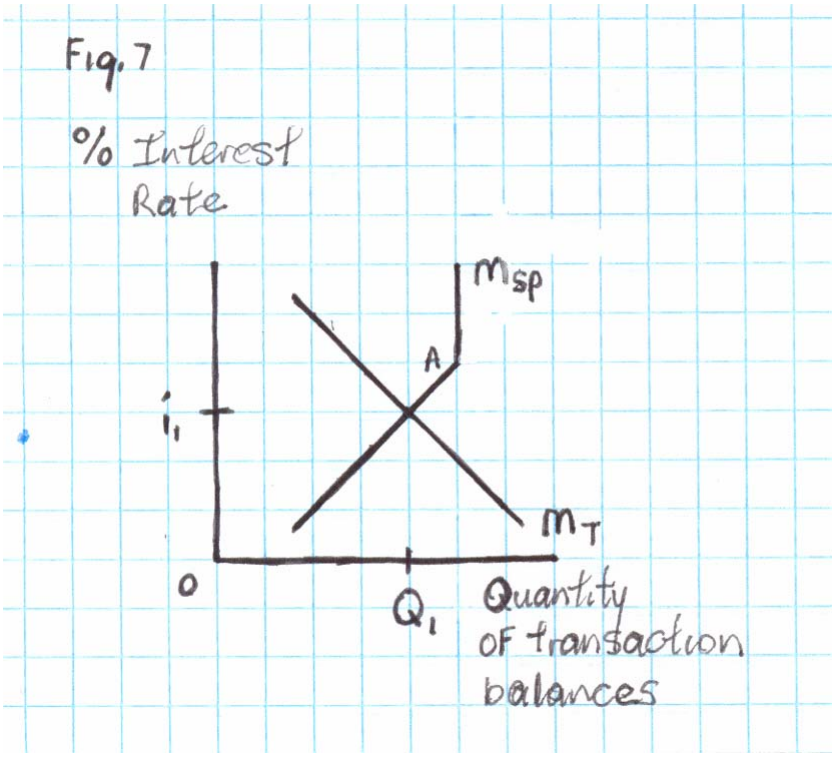


6.5 VELOCITY

When we hold the money supply constant, velocity becomes a function of transactions. If there is an increase in income or bonds there is and increase in transactions. An increase in transactions must increase

velocity. Like GDP, bonds can be a multiple of the money supply, indicated by MV=B, where V is the multiple. If we add together the left side (GDP) of the circular flow with the right side (bonds) of the circular flow from Fig. 1, divided by the money supply, we get an equation like equation (2) below. V = GDP + B/Mt + Msp. So, if transaction balances are $2 billion and speculative balances are $2 billion with GDP plus bonds at $20 billion, velocity is equal to 5: V = 20/2 + 2 = 5. Since transaction balances are the only dollars circulating, what is the velocity of transaction balances? V = 20/2 = 10. The velocity of transaction balances is 10. Therefore, the velocity of 5 is the average velocity of the money supply when people hold speculative balances. When speculative balances are zero, the money supply and transaction balances are equal. So if transaction balances are $4 billion and speculative balances are zero, with GDP plus bonds at $20 billion, velocity again is equal to 5: V = 20/4 + 0. With these observations we can see that the velocity of transaction balances fluctuate because of changes in income plus bonds and speculative balances. Fluctuations in average velocity come from changes in the amount of income plus bonds and the total amount of the money supply. These equations give us a more detail into what's going on within the money supply. From now on and throughout the rest of our analysis, we will assume that the velocity of required transaction balances' is 1. The reason we will be assuming a velocity of 1, is because this will make transaction balances equal to income and household will be able to hold all their income they earned in money. If the velocity of money were greater than 1, transaction balances would be less than income and households would be short of the money needed to hold all of their income in cash. Money would be circulating and like a game of musical chairs trying to fill too many empty chairs.

7.0 THE MARKET FOR BALANCES

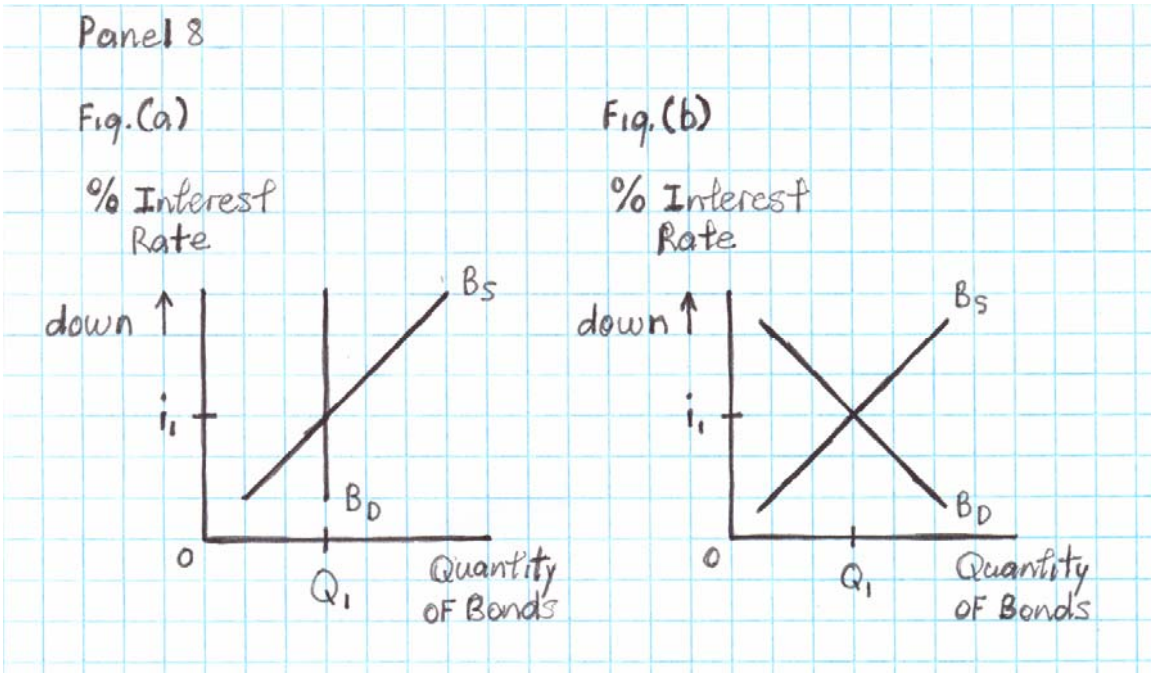


Earlier, when we derived the supply and demand in the market for money in fig. 6.1, we recognized the Fed as a major player in that market. The market for money shows us the supply and demand for money between the Fed and the public (savers and investors). We can also derive the supply and demand of money in a market for balances just between savers and investors. This market will give us an analysis of how money is supplied and demanded as transaction and speculative balances. Fig. 7 shows the market for balances. The Mt curve slopes downward because, when investors demand funds for investment they are demanding transaction balances. So like investment demand, the demand for transaction balances is negatively related to the interest rate. The Msp curve slopes upward because the supply of speculative balances are positively related to interest rates. At higher interest rates, savers are more willing to spurn idle cash (speculative balances) to hold bonds. When speculative balances are handed from savers to investors, speculative balances become transaction balances because the idle speculative balances go into circulation and circulate around the circular flow as active transaction balances. Where do speculative balances come from? Savers can attain speculative balances in two ways, they can liquidate some of their bonds or they can devote some of their savings to speculative balances. When the Fed wants to increase the money supply, the Fed may pay high prices to attain those bonds. Because of those prices, savers may decide to sell some of their bonds and hold that money in speculative

balances. Savers can also take speculative balances out of their incomes. Instead of devoting all their savings to bonds, they can keep a portion or all of their savings in speculative balances. Returning to the market for balances consider point A, in fig. 7, the Msp curve becomes vertical. This is because there is a limit to how many speculative balances savers can supply. Once savers are drained of speculative balances, the Msp curve becomes vertical. The Msp curve shifts when there is an autonomous demand for money. For instance, if savers decide to hold more money in speculative balances regardless of the interest rate, this will reduce their demand for bonds and the interest rate will rise. In the market for balances this would be indicated by a leftward shift in the Msp curve amounting to a reduction in the quantity of transaction balances. An opposite shift would occur if savers decreased the amount of speculative balances they wanted to hold. The Mt curve shifts when there is an autonomous demand for investment. If investment demand increases, investors will supply more bonds to the bond market causing the interest rate to rise. In the market for balances, this is indicated by a rightward shift in the Mt curve increasing the quantity of transaction balances. As long as either savers or investors are responsive to the interest rate, equilibrium will be found in the market for balances.

The link between the loanable funds market and the market for money is the bond market. Any changes in the IS or LM markets have an affect on one another and are settled in the bond market. The bond market is where all of our actors, the Fed, savers and investors come together to determine those changes in the IS-LM markets. In section 9 and 10, we will analyze how changes in investment, the quantity of money, money demand and a change in income affect the interest rate and income level. We will start from an equilibrium condition and with a play by play analysis we will see how the change in one factor affects another, by examining the effects in each market introduced so far. In the end, the IS-LM model will summarize all these markets into one and will enable us to immediately see how market forces move the economy toward a general equilibrium of the interest rate and income level.

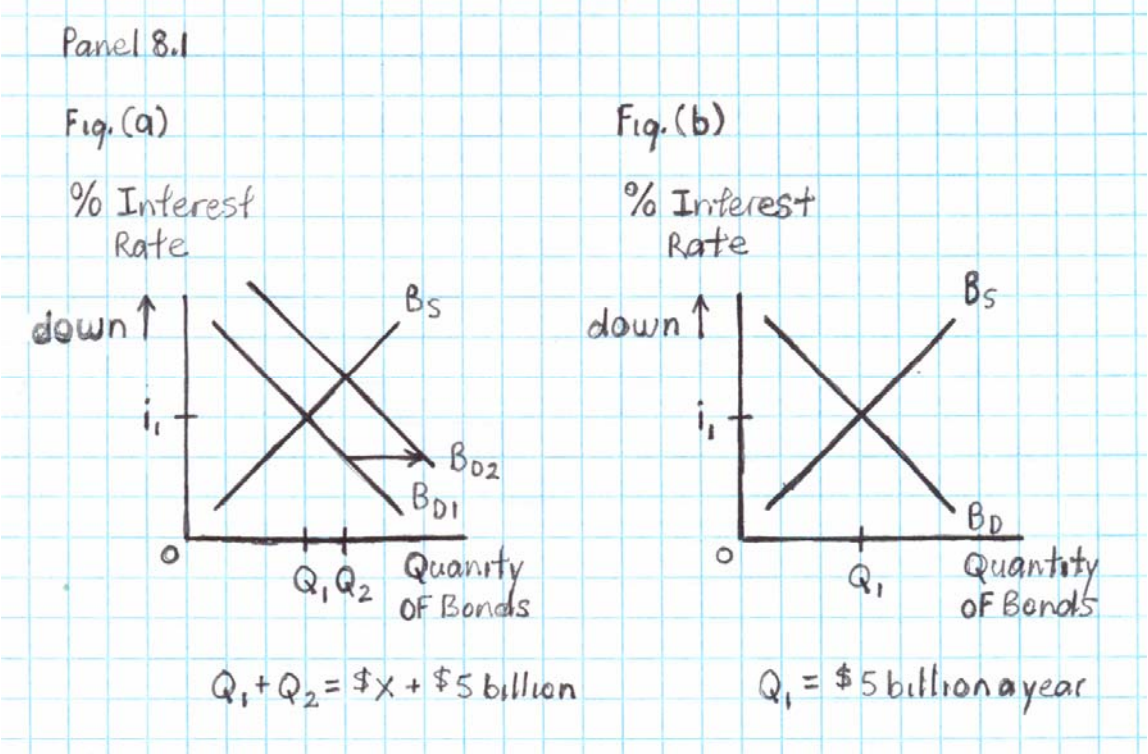
8.0 THE BOND MARKET



The participants in the loanable funds market are savers and investors. The participants in the bond market are the Fed, savers and investors. The fact that the bond market has three participants and that at any time anyone of these actors can be a supplier or demander of bonds, might make analysis in the bond market seem complex and difficult. And that may very well be true unless we make clear distinctions in who is shifting the appropriate supply and demand curves. The demand curve for bonds slopes downward because at higher interest rates the quantity of bonds demanded increases. The supply curve for bonds slopes upward because at lower interest rates the quantity of bonds supplied increases. With the bond market presented here, it is important to recognize that as we go up the left axis, the interest rate falls. And it is also important to note that the price of bonds are always negatively related to the interest rate on bonds. The demand curve for bonds shifts when income changes, or there is an autonomous demand for bonds by savers that does not depend on the interest rate. The theory of asset demand discussed in section 5.0 explains the reasons for an autonomous demand for bonds. The supply curve for bonds shifts to the right when investors want to expand their businesses and feel optimistic about future profits. The demand for bonds should warrant some further discussion. The demand for bonds depends mainly on income and speculative balances. An increase in the demand for bonds can come from an increase in income or a decrease in speculative balances. An increase in income will cause the bond demand curve to shift to the right. But here we want to focus on the movements along the demand curve, which is the same as an increase in the demand for

bonds that depends on the interest rate. It is important to examine the shape of the bond demand curve. Panel 8, shows the shape of two bond demand curves for a given level of income. Fig. (a) shows the demand for bonds when speculative balances are zero. Fig. (b) shows the demand for bonds when savers hold speculative balances. In fig. (a), the bond demand curve is vertical because savers do not hold speculative balances. In this instances it is assumed that savers prefer to hold all of their savings in bonds and do not prefer to hold money. As the interest rate increases, as indicated by a downward movement along the demand curve, that demand is limited by income when savers hold zero speculative balances. Therefore, savers cannot purchase more bonds than their income will allow. Since the demand for bonds in this case only depends on income, the demand for bonds does not depend on the interest rate. In fig. (b), the demand for bonds slopes downward. When savers hold speculative balances the demand curve is normal because savers can increase their demand for bonds beyond what their income will allow. When savers purchase bonds, some the money they use to make those purchases can come out of speculative balances. So, with the income level held constant, an increase in the demand for bonds that depends on the interest rate is a decrease in speculative balances.

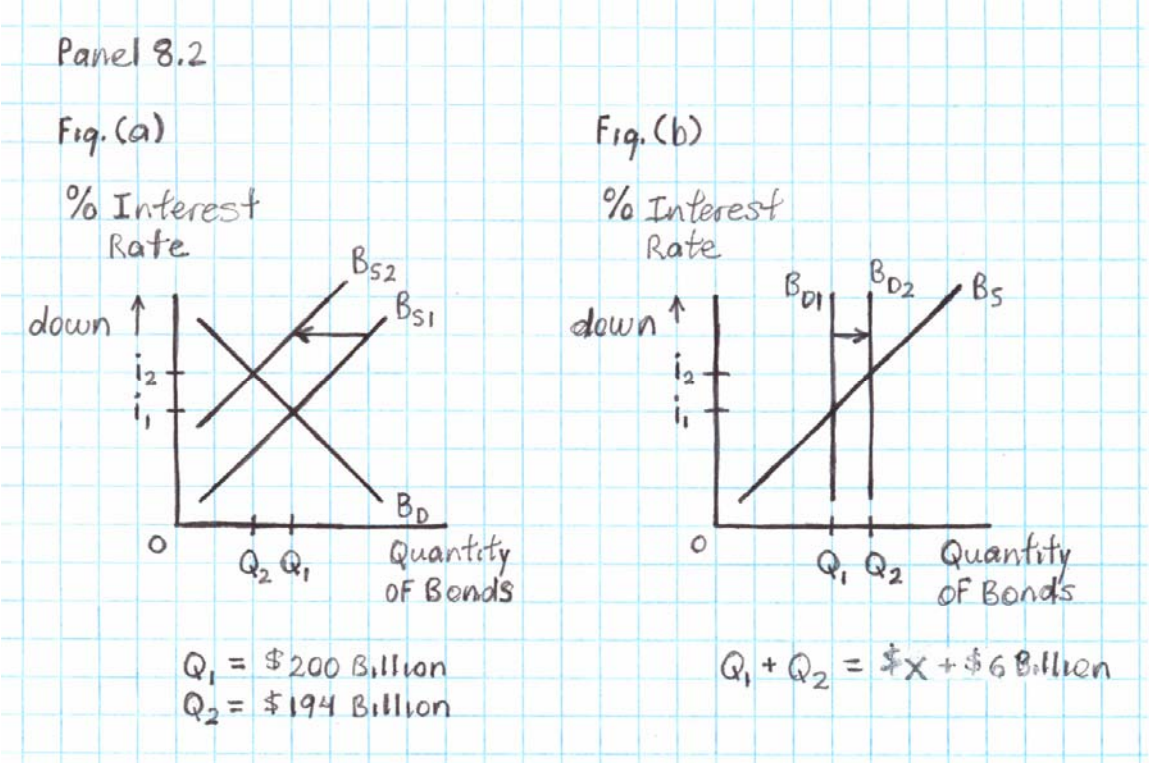
In section 3.0 we presented the market for loanable funds. The loanable funds market demonstrates the amount of planned savings and planned investment. Supply and demand analysis in the loanable funds market is conducted in terms of flows because it shows the yearly amount of loans to investors. To do supply and demand analysis in the bond market, we must first determine whether that analysis is to be conducted in terms of stocks or flows. The stock of bonds is the total quantity of outstanding debt which savers are holding. The flow of bonds is the yearly issue of bond debt by investors. Say for example savers are holding a total of $200 billion in bonds. When the economy is in equilibrium, let's say investors issue $5 billion bonds a year.



Panel 8.1 shows two bond markets. Both look identical but each reacts differently to changes. Fig. (a) shows the stock of bonds and fig. (b) shows the flow of bonds. These stocks and flows are related because the flow of $5 billion a year in bonds adds to the total stock of bonds. In fig. (a), a $5 billion increase of bonds would be indicated by a rightward shift in the bond demand curve. And that curve will shift every year. The reason we assume the bond demand curve shifts is because with income held constant there is no change in the yearly amount savers demand, the additional $5 billion of bonds to the stock of bonds causes the demand curve to shift. In fig. (b), the supply and demand curves do not change because the $5billion in bonds is the equilibrium level. In other words there is no increase in the rate of the yearly flow of bonds. Here we can clearly see that when we speak of an increase of bonds, we must clarify whether that increase or decrease for that matter, is in terms of stocks or flows. Therefore when someone speaks of the quantity of bonds, it is important to think about whether that quantity is in terms of stocks or flows. This distinction has important implications for the interest rate. Think about what happens with the interest rate in fig. (a). Each year the bond demand curve shifts to the right causing the interest rate to fall. If the interest rate were determined by the stock of bonds, then the interest rate would forever be falling as long as the economy is in equilibrium. Whereas, in fig. (b), the interest rate remains constant at equilibrium until there is a change in the flow of bonds. Therefore, the

interest rate of bonds is determined by the flow of bonds not the stock of bonds. To be more specific, the interest rate is determined by the flow of bonds between savers and investors. Another problem with the issue of stocks and flows is that a decrease in flows is still an increase in stocks. For example, suppose savers and investors reduce the yearly quantity of bonds from $5 billion to $3 billion. This reduction in flows still adds $3 billion a year to the total stock of bonds. Therefore, we need to build a bond market that indicates the proper direction in which the interest rate and the quantity of bonds should go.

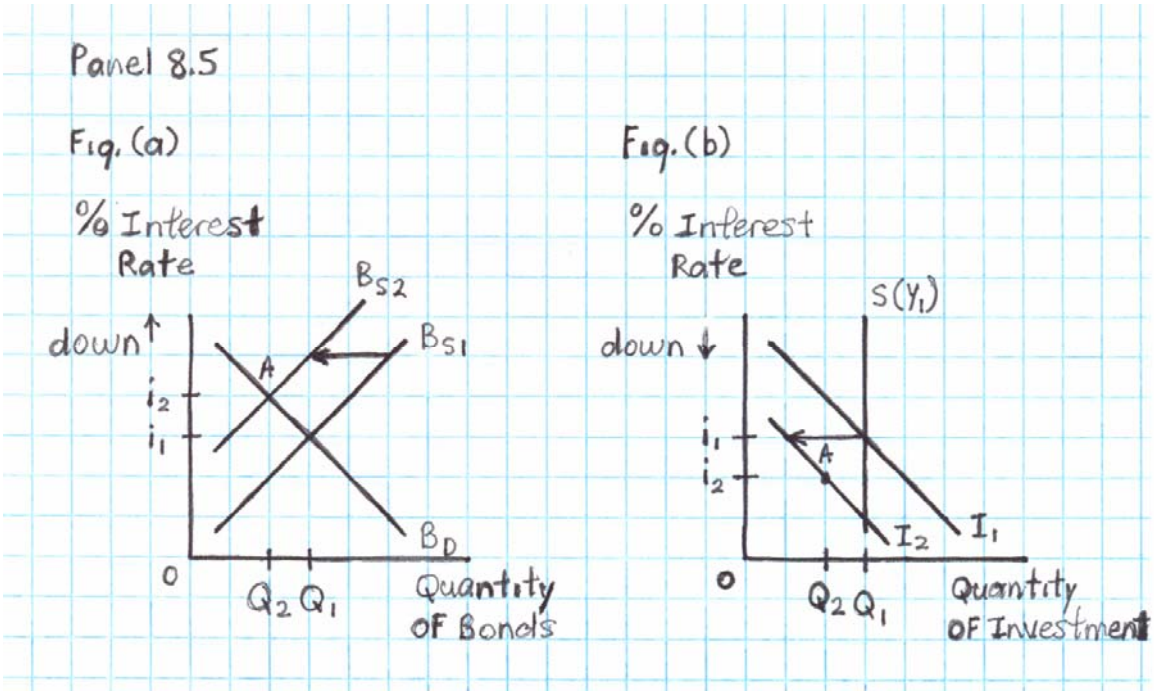
Further complicating the analysis of bonds is the fact that there are three participants in this market. The analysis in the bond market is not just between savers and investors, it includes the Fed. Earlier in section 4.5, we discussed briefly the process of dissavings. In that section we stated that it is possible for the Fed to buy newly issued bonds directly from investors, but it is standard procedure to assume that the Fed buys bonds from savers, who then turn around and buys bonds from investors. When the Fed buys bonds from savers, these bonds are old bonds issued from previous years. So therefore the exchanges in the bond market between the Fed and savers deal with the stock of bonds. Whereas the exchanges in the bond market between investors and savers are flows. With this distinction we can divide the bond market into two separate markets to make the analysis more clear. Let's see how the Fed injection discussed in section 4.5 would work through the bond market.

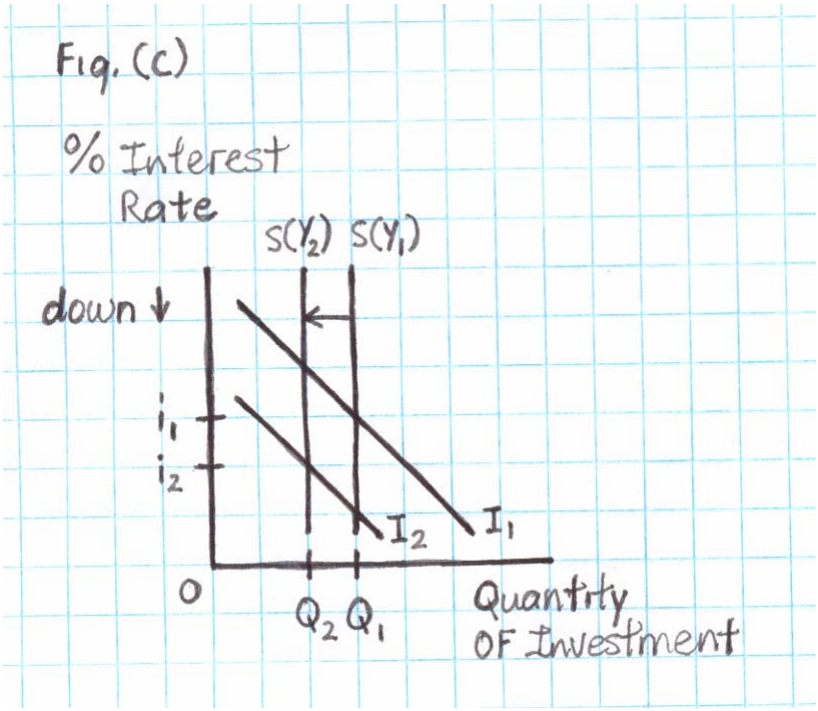


Panel 8.2, shows the same stock and flow bond markets as in Panel 8.1. In fig. (a), the bond market shows the stock of bonds in which the participants are the Fed and savers. The Fed controls the bond supply curve and savers control the bond demand curve. When the Fed purchases bonds from savers, the supply curve for bonds shifts to the left because the Fed reduces the stock and quantity of bonds in the economy from $200 billion to $194 billion. The Fed has purchased $6 billion worth of bonds from savers and increased the money supply. When savers receive this money they must decide, depending on the current interest rate, if they should hold some money in speculative balances or should purchase bonds from investors. Let's suppose that savers do not want hold speculative balances, and savers hold all of their savings in bonds. Why would savers sell bonds to the Fed and then turn around a buy bonds from investors? Unfortunately the textbooks won't tell us, so we need to set up differential interest rates. With differential interest rates the reason is capital gains. As the interest rate in fig. (a) falls, the price of bonds goes up. Savers can sell high to the Fed and buy low from investors. Fig. (b) shows the flow of bonds between savers and investors when speculative balances are zero. Savers control the bond demand curve and investors control the bond supply curve. When the Fed increased the money supply, this created an excess supply of money because savers do not want to hold speculative balances. Savers will get rid of these excess balances by buying bonds from investors. This will cause the bond

demand curve to shift to the right in fig. (b) and reduce the interest rate. The fall in the interest rate stimulates investment spending which in turn increases income. Savers buy bonds until the excess supply of money is eliminated. The flow and therefore the stock of bonds have increased by $6 billion. The quantity of bonds is now back to $200 billion with a new lower interest rate.

8.5 SAVINGS, INVESTMENT AND THE BOND MARKET

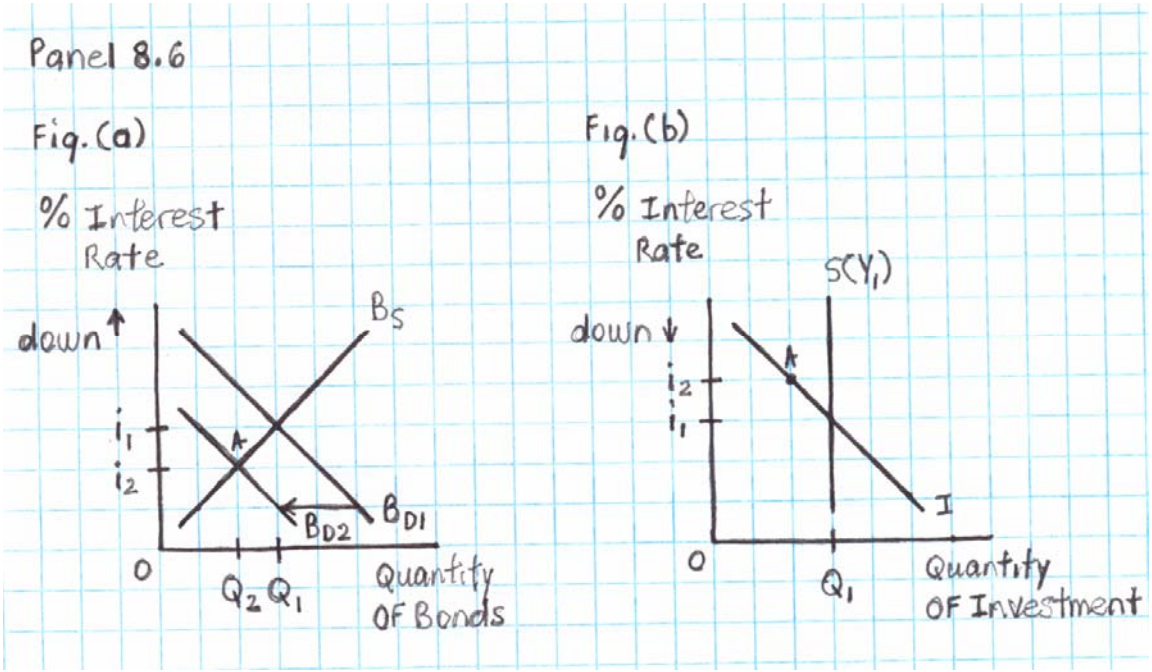


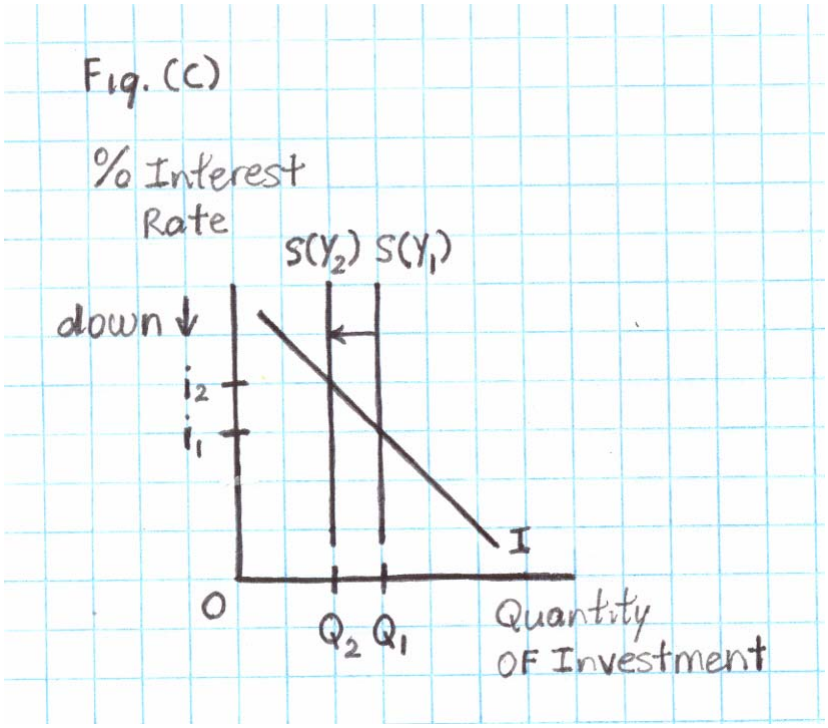


When an investor supplies a bond to the market he is demanding funds in return. Those funds usually come in the form of money. In this section we will demonstrate how flows in the loanable funds market are related to the flow of bonds in the bond market. Because both markets are interrelated, changes in one market will cause changes in the other. To examine the relationship between the loanable funds market and the bond market we start our analysis when both markets are in equilibrium. Panel 8.5, shows the bond market (flows) in fig. (a) and the loanable funds market in fig. (b). To see how a change in investment affects these markets, suppose there is a decrease of investment because of investors pessimistic business outlook for the future. The investment curve in fig. (b) shifts downward from I1 to I2. The savings curve is vertical because savings is limited by income and the consumption function is held constant. Changes in income cause shifts in the savings curve. The investment curve slopes downward because investment depends on the interest rate. When investors reduce their supply of bonds in fig (a), it forces savers to hold speculative balances. This reduction in the supply of bonds will reduce the interest rate (i) from i1 to i2 indicated by point A in both markets. At this point the economy is in disequilibrium because savings is greater than planned investment. This will have an affect on income and cause income to decrease until savings and investment are equal again. Because savings depends on investment, a change in investment will cause a change in savings. Fig. (c) shows the shift in savings as a result of the decrease in income. This figure shows how

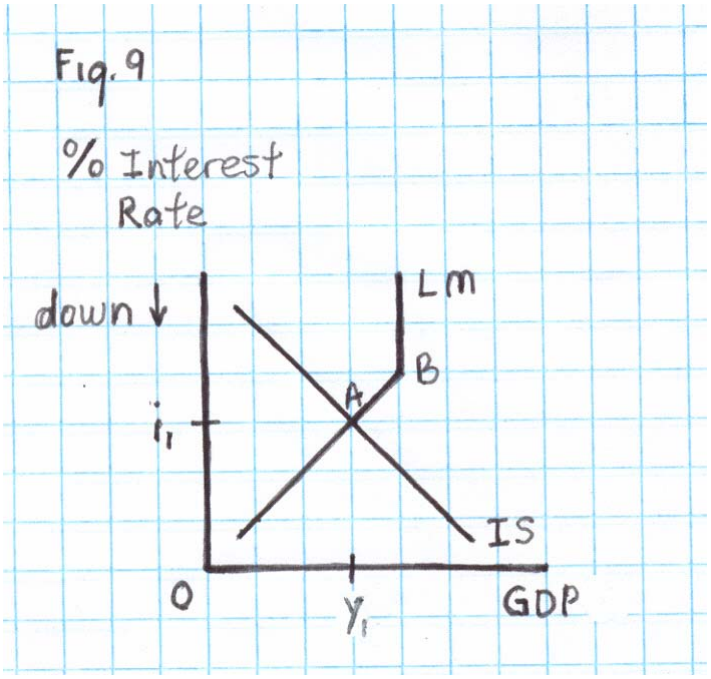
savings and investment adjust to the prevailing interest rate determined in the bond market. Fig. (b) shows the initial income level (Y1) and fig. (c) shows the new income level (Y2) as a result of the decrease of bonds by investors. These changes can be summarized as: Iv>iv>Yv>Sv. Where (v) is down, (>) is affects, (I) is investment, (i) is the interest rate, (Y) is income, and (S) is savings.

Now let's examine a change in the plans of savers. Suppose savers decide to reduce their demand for bonds perhaps because they want to hold more of their savings in speculative balances. Panel 8.6, shows the bond market in fig. (a), and loanable funds market in fig. (b). When savers reduce their demand for bonds, this increases the interest rate from i1 to i2 indicated by point A in both markets. At this point the economy is in disequilibrium because savings is greater than planned investment. This will have an affect on income and cause income to decrease until savings and investment are again equal. Fig. (c) shows the shift in savings as a result of the decrease in income. This figure shows how savings and investment adjust to the prevailing interest rate determined in the bond market. Fig. (b) shows the initial income level (Y1) and fig. (c) shows the new income level (Y2) as a result of the decrease of bonds by savers. These changes can be summarized as: Iv>i^>Yv>Sv. Where (v) is down, (^) is up, (>) is affects, (I) is investment, (i) is the interest rate, (Y) is income, and (S) is savings. Notice that the interest rate increase in this instance.





9.0 THE IS-LM MODEL



When prices are assumed to be fixed, changes in aggregate demand change the level of income. Fig. 9 shows the model of aggregate demand developed in this section called the IS-LM model. The IS-LM model shows how the interactions in the loanable funds market and the market for money

together determine the equilibrium interest rate and income level. The two curves that determine equilibrium are the IS curve and the LM curve. IS stands for investment and savings. LM stands for liquidity and money. The IS curve plots the relationship between the interest rate and equilibrium levels of income and the LM curve represents the equilibrium interest rate in the supply and demand for money at corresponding income levels. Because the interest rate influences both investment and money demand, it is the variable that links the two halves of the model together. At point A, the amount of aggregate output produced equals the amount demanded and the quantity of money demanded equals the quantity supplied. At any point other than A, one of these equilibrium conditions are not satisfied, and market forces move the economy toward A. At point A, we will assume that this level of equilibrium income is not at full employment. The negative slope of the IS curve indicates that a higher interest rate results in lower planned investment and a lower equilibrium level of income. The positive slope of the LM curve indicates that a higher equilibrium level of income increases the demand for money and thus raises the interest rate.

When we discussed the equation of exchange (equation 1), that equation stated that changes in the quantity of money determine the level of income because of the assumption that velocity was held constant. If we were to incorporate that equation into the IS-LM model, it would cause the LM curve to be a vertical line. With the LM curve as a vertical line, only changes in the quantity of money will change the equilibrium level of income. And since the Fed controls the quantity of money, the Fed is the only one who can change the equilibrium level of income. What explains the vertical LM curve? The implicit assumption behind the equation of exchange is that required transaction balances (Mt) are equal to the income level, the velocity of those balances are equal to 1, and households hold zero amount of money in speculative balances. As we discussed earlier, the only way that the income level can increase is when expenditure is greater than income and this requires an amount of autonomous expenditure. We stated that autonomous expenditure has two sources; autonomous expenditure can come from the Fed because it can create money, and from savers when they hold money in speculative balances. We also stated earlier that the interest rate is the incentive investors offer savers to forego money held in speculative balances and that the Fed's desire to increase or decrease the quantity of money does not depend on the interest rate. Therefore, since savers, under the assumptions of the equation of exchange, do not hold speculative balances and the Fed's policy does not depend on the interest rate, the LM curve is vertical. If investors were to increase investment and

therefore expenditure, they would fail, because the amount of money in the economy is just sufficient enough to cover all the transactions taking place at the original or equilibrium level of income. Since we are assuming Mt has a velocity of 1, an increase in income would require velocity to be greater than 1 and this breaks our V=1 rule. Also, if investors increase their investment, the economy's demand for money would exceed the supply; the requirement for transaction balances would be greater than actual transaction balances. Since an increase in the demand for transaction balances does not change the quantity of money, income cannot increase. Therefore, an increase in investment and expenditure cannot increase income without an increase in the quantity of money.

So how can we derive a more realistic upward sloping LM curve? This is where speculative balances come to the rescue. If we allow for savers to hold speculative balances that depend on the interest rate, we can have an increase in transaction balances without depending on the Fed to increase the quantity of money. If investors wanted to increase investment spending, the interest rate will increase, savers will lend out their speculative balances to investors, and expenditure and income will increase. The increase in the demand for transaction balances will be met by the savers lending of speculative balances and the velocity of Mt will remain at 1. These speculative balances are what allows the LM curve to slope upward, but only to a certain point indicated by point B. At point B, savers run out of speculative balances and the LM curve returns to its vertical shape. Now let's describe an upward movement along the LM curve. When investors desire to increase their amount of investment, this will in turn increase the level of income. A higher level of income calls for larger transaction balances. As investors increase their investment spending, the interest rate rises. The underlying process by which this rise in the interest rate takes place will be revealed in the next section, but for now the process involves the diversion of money from speculative balances to transaction balances. As people find that more money is needed to handle the greater volume of transactions accompanying a rise in income, investors sell bonds in order to secure the additional transaction balances needed. Because there is no change in the total money supply, the additional transaction balances can only come from speculative balances. This transfer will occur as the interest rate rises, which is a result of the increase in the supply of bonds offered in the market. A change in the level of income in response to some factor other than the interest rate, is indicated by a shift in either the IS curve or LM curve, or both. A change in the interest rate that affects the income level will only cause a movement along the IS or LM curve. Whereas only one factor

can cause the IS curve to shift, two factors can cause the LM curve to shift. A change in planned investment spending unrelated to the interest rate will cause the IS curve to shift. A change in the money supply influenced by the Fed will cause the LM curve to shift. Also, an autonomous change in the demand for speculative balances by savers will cause a shift in the LM curve. For instance, suppose bonds become a risky asset to save in. Savers will want to shift from holding bonds to holding money. The risk of bonds relative to money will increase the quantity of money demanded at any given interest rate, thus shifting the LM curve to the left.

Now let's examine the elasticity's of the IS-LM model. In order for the level of income to increase, money must pass through the bond market between savers and investors. When the IS curve is vertical no money passes through the bond market because the supply of bonds are limited and do not depend on the interest rate. Only an increase in the supply of bonds will allow income to increase. When the IS curve is horizontal, the interest rate on bonds and bond prices are constant. If the IS curve is horizontal and there is a monetary increase, all of the increase of the money supply goes through the bond market. In this instance an increase in the money supply will not reduce the interest rate. An increase in the money supply will only increase income. Assuming the interest rate is above liquidity trap levels, savers prefer to hold bonds rather than speculative balances. This is similar to a vertical LM curve except that the interest rate does matter to savers on whether to hold bonds or speculative balance. When the IS curve is downward sloping, the interest rate and prices on bonds determine the income level. When the LM curve is upward sloping, the interest rate and prices on bonds have an affect on the demand for speculative balances. When the LM curve is vertical, the demand for speculative balances are zero. Therefore bond prices and interest rates do not matter to savers. The only way the LM curve will shift is by an increase or decrease in the money supply. When the LM curve is horizontal, savers buy bonds from investors when the interest rate is above the LM curve (for instances when there is an upward shift in the IS curve) and savers sell bonds to the Fed at an interest rate below the LM curve. In this example with a horizontal LM curve, an increase in the money supply will only increase the amount of speculative balances savers hold and will not shift the LM curve and reduce the interest rate. Only a change in the autonomous demand for speculative balances and its counter part, the demand for bonds, will the LM curve shift. At equilibrium, if savers decide to spend some speculative balances on bonds, the interest rate will fall and the LM curve will shift downward. It should be noted that an increase or decrease in the money supply does not

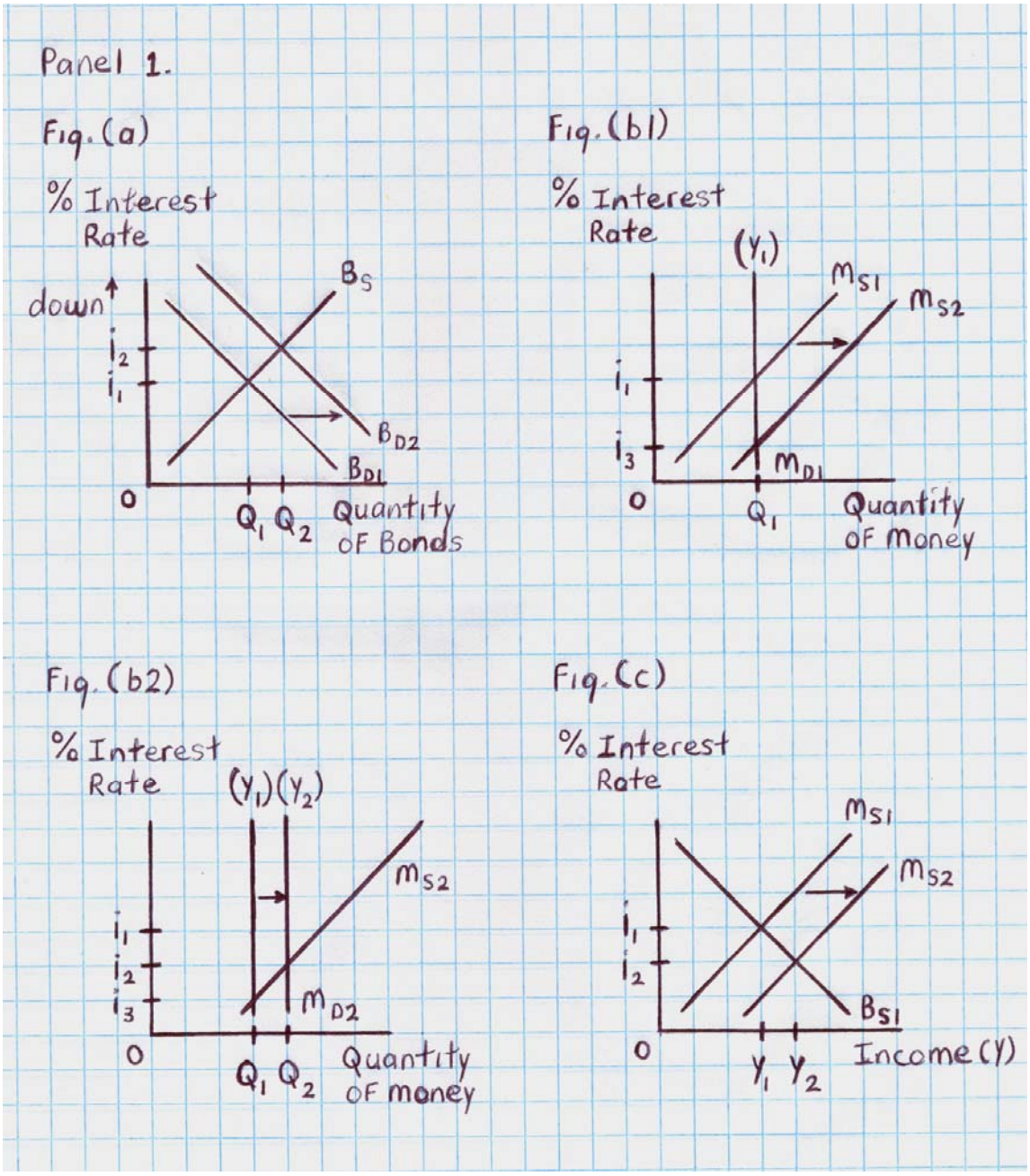
automatically shift the LM curve in any of the 3 elasticity's of the LM curve because for a change in the money supply to affect income, it must pass through savers. The LM curve shifts when savers have excess balances (which depend on the interest rate) or there is an autonomous change in savers speculative demand for money. Notice that it is the action of savers that cause the LM curve to shift not the Fed.

10.0 SIMPLE INTEREST RATE DETERMINATION

To determine a simple interest rate in one market, we must first discuss the assumptions from section 2.0. In this example the active players in our economy are the bank and the firm(investors). The households(savers) are passive. Households only purchase consumption goods and do not save money or buy bonds. They spend 100% of their income and do not hold any money. Since households don't save, banks do not act as intermediaries or safe keepers, banks only create money. We will assume a private profit seeking bank and the money supply depends on the interest rate. Firms borrow from the bank and spend funds only on labor, because we will assume capital and production capacity is plentiful. We will also assume that firms do not stock inventories. Later in section 11.0 economic fluctuations, we will assume the full functions of our actors during the analysis. Under these current assumptions, economic growth is considered "income led growth" as opposed to "expenditure led growth". The difference is that when firms borrow funds, the funds are automatically spent on labor to increase production and output. Rather than the funds getting spent on capital, which reduces inventories and signals firms to spend funds on labor and increase production and output. Basically, the firms are making the goods before they are purchased rather than depending on inventories. Income led growth is also what we assumed with our orange grove economy in the introduction. Now let's examine how a monetary injection by the bank will affect the interest rate in our simple economy.

Suppose the bank wants to increase the amount of loans it makes to investors. This will result in an increase in the demand for bonds by the bank. The bank will print up enough money it plans to spend on bonds in the bond market. This newly created money will increase the money supply in the economy and once received and spent by firms (investors) on labor, it will increase the circular flow of income. Panel 1 below shows us the markets in which the monetary transmission mechanism operates. Figures 1, 2 and 3 show the bond market and the market for money. The bond and money markets are each measured in stocks not flows. Fig. 4 shows the two markets combined into one. This figure gives us one interest rate in one

market with the added benefit of showing how the interest rate changes in relation to changes with the income level. Fig. 1 shows the increase in the demand for bonds by the bank. The demand curve shifts rightward from Bd1 to Bd2, lowering the interest rate from i1 to i2. Remember in the bond market,
as we go up the left axis the interest rate falls. The shift in the bond demand curve causes a simultaneous change in the money market. The monetary injection causes the money supply curve to shift downward from Ms1 to Ms2 in fig. 2, lowering the interest rate from i1 to i3. Since we are assuming that households spend 100% of their income and do not hold any money, the money demand curve in fig. 2 is vertical. This shows that the demand for money does not depend on the interest rate; it depends only on income. Fig. 3 shows us the effects of the money market after the change in income. When firms received the funds from the bond market, they spent those funds on labor to increase income and output. The increased output results in an increase in the demand for money. Thus in fig. 3, the demand for money curve shifts to the right from Md1 to Md2, raising the interest rate from i3 to i2. Fig. 4 summarizes these two markets and shows the changes in income and the interest rate in one step. Fig. 4 shows us the supply of money (Ms) and the supply of bonds (Bs). The money supply curve slopes upward because at higher interest rates banks are more willing to loan funds to firms (investors) which are then used to increase income and output. The bond supply curve slopes downward because at lower interest rates firms (investors) are more willing to borrow funds from banks which is then used to increase income and output. When the money supply curve shifts rightward from Ms1 to Ms2, it lowers the interest rate from i1 to i2 and increases income.



10.5 ECONOMIC FLUCTUATIONS

Panel 10

Fig. (a)

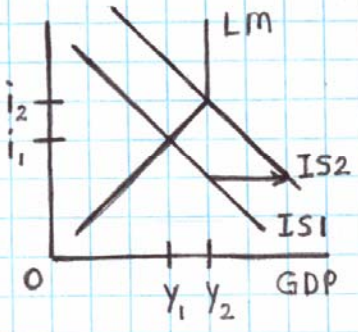


Fig. (b)

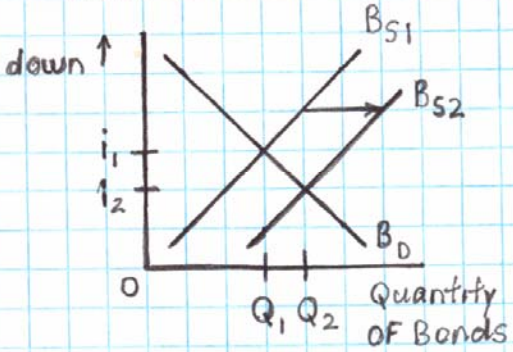


Fig. (c)

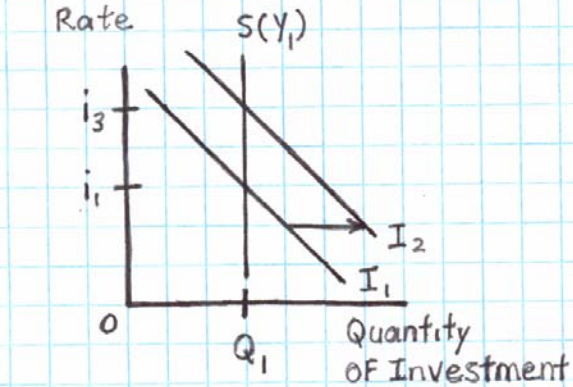
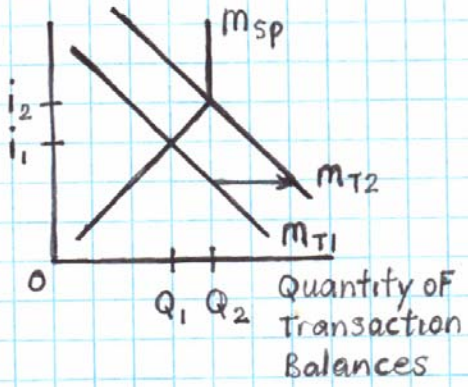
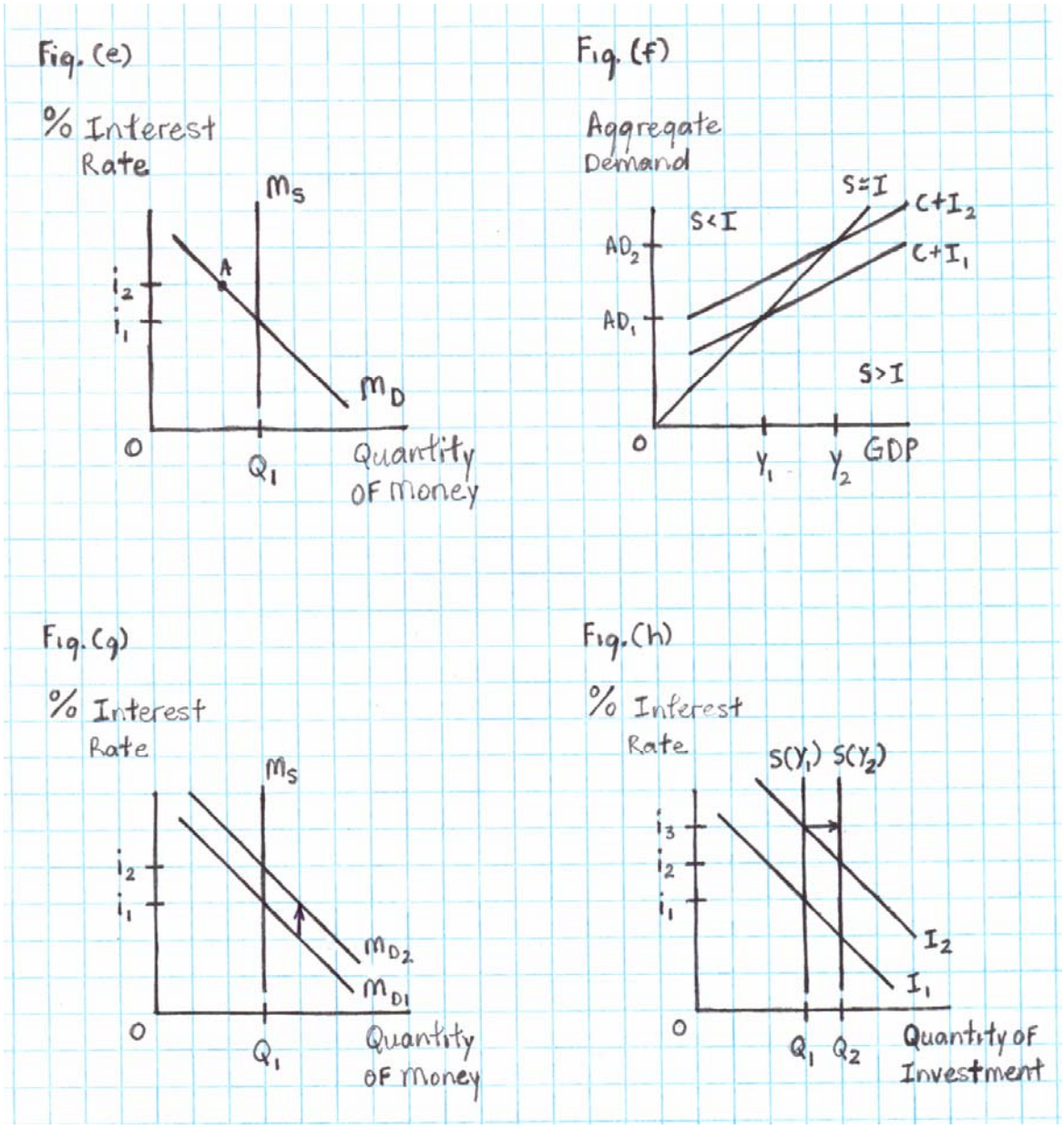


Fig. (d)





The IS-LM model shows how national income and the interest rate are determined in the short run. We can use this model to examine how changes in the plans of the Fed, savers and investors cause economic fluctuations in the level of income and the interest rate. A business cycle expansion, a monetary expansion, autonomous changes in money demand, and an application of new technology that causes an autonomous increase in income are just a few examples of economic fluctuations along with any combination of those examples. Each of these events cause economic fluctuations by shifting the IS curve or the LM curve. Here we will provide a detailed graphical analysis of a few of these examples. In a business cycle expansion, the amount of goods and services being produced in the economy

rises and national income increases. One of the reasons a business cycle expansion is likely to occur is because of an increase in investment spending. The more investors expect to profit from business opportunities, the more they will increase their investment spending regardless of the interest rate. This will cause the IS curve to shift to the right. Panel 10 presents the relevant markets which are affected by a change in investment. Fig. (a) shows the IS-LM market. The IS-LM market is a summary of the other markets presented in the panel and shows the end result of an increase in investment on the economy's income and interest rate. Here the shift in the IS curve from IS1 to IS2 causes an increase in both income and the interest rate. It is assumed in this example that savers are holding speculative balances because the LM curve slopes upward and is not vertical. Fig. (b) is the bond market and this is actually the starting point of the business cycle expansion. This is where investors increase their supply of bonds from Bs1 to Bs2. When investors increase the amount of their outstanding debt in order to finance their investments the interest rate rises. Remember that only in the bond market does the interest rate on the vertical axis rise as we go down the axis. Fig. (c) shows the increase in investment in market for loanable funds. Note that the interest rate in this market goes up to i3. This is because we are still at the income level of Y1, the investment spending has yet to increase income. So far we have only shown how the exchange of bonds and funds between savers and investors affect the interest rate. Fig. (d) shows the market for balances. The increase in investment causes the Mt curve to shift form Mt1 to Mt2. Because of the higher interest rate, savers are willing to give up some of their speculative balances and buy bonds. The quantity of transaction balances increase. Fig. (e) shows the market for money. Because the shift in the supply of bonds caused the interest rate to go up, the interest rate in the market for money is now at i2 (point A) and the market for money is in disequilibrium for now because the interest rate is higher than the equilibrium level for that market. Now we arrive at the affect of the increase in investment on the level of income. Fig. (f) shows the income-expenditure model. The increase in investment causes the aggregate demand curve to shift upward and the increase in aggregate demand changes income to a higher level from Y1 to Y2. Fig. (g) shows the income effect on the market for money. A higher level of income causes the demand for money to increase and the demand curve to shift upward. When the demand curve shifts upward, the interest rate rises from i1 to i2. The theory of asset demand tells us that when income is rising during a business cycle expansion, the demand for money will rise. People will want to hold more money as a store of wealth and people will want to carry out more

transactions using money. It is important to note here that transaction balances must be acquired by investors before the increase in income; the shift in the demand for money is shown after the increase in income, because the increase in income is what actually increases the amount of transactions. Fig. (h) shows the income effect on the market for loanable funds. The increase in income shifts the savings curve from S1 to S2 and the increase in savings reduces the interest rate from i3 to i2. Now all markets are in equilibrium with the interest rate at i2 and the income level at Y2. Again, this is summarized by the IS-LM market in fig. (a). As long as the economy remains in equilibrium, the flow of bonds supplied and demanded each period will be the same and the interest rate will remain at i2, as seen in fig. (b).

Monetary policy is the control of the interest rate and money supply by the Fed. In the short run the quantity of money affects the economy through changes in the interest rate. Monetary policy influences the interest rate which in turn affects the level of planned investment. In this example we will assume that savers do not want to hold speculative balances, so the LM curve will be vertical. The monetary transmission mechanism is the process by which changes in the quantity of money influences the level of income. A simple transmission mechanism can be expressed as: M^>iv>I^>AD^>Y^. Where an increase (^) in the quantity of money (M), reduces (v) the interest rate (i), the lower interest rate stimulates (^) investment spending (I), which leads to an increase (^) in aggregate demand (AD). The increase in aggregate demand causes income (Y) to rise (^). Suppose the Fed believes that the economy is operating below its potential and decides to stimulate output and employment by increasing the money supply.

Panel 10.1

Fig. (a)

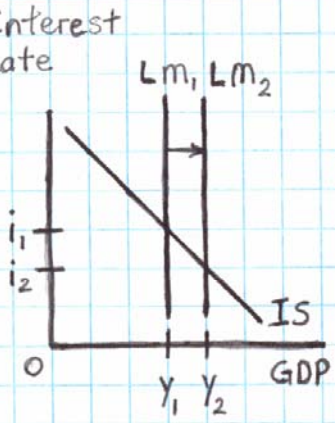


Fig. (b1)

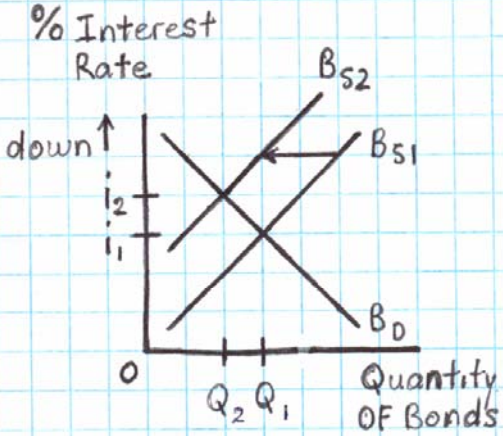


Fig. (b2)

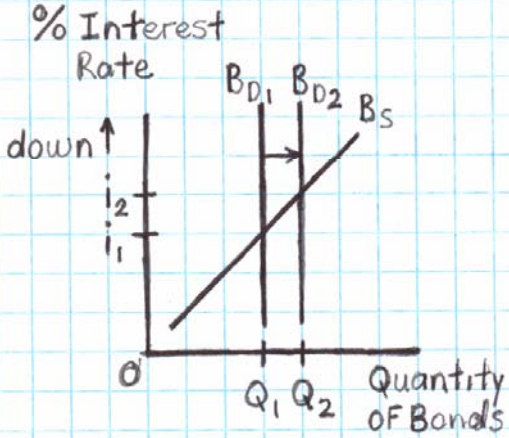
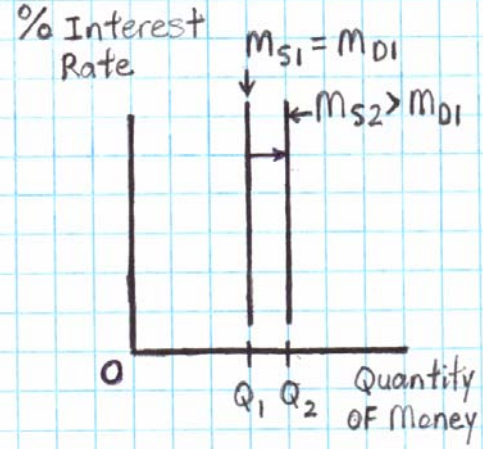


Fig. (c)



$Q_1 = M_{D1}$

$Q_2 = M_{S2}$

Fig. (d)

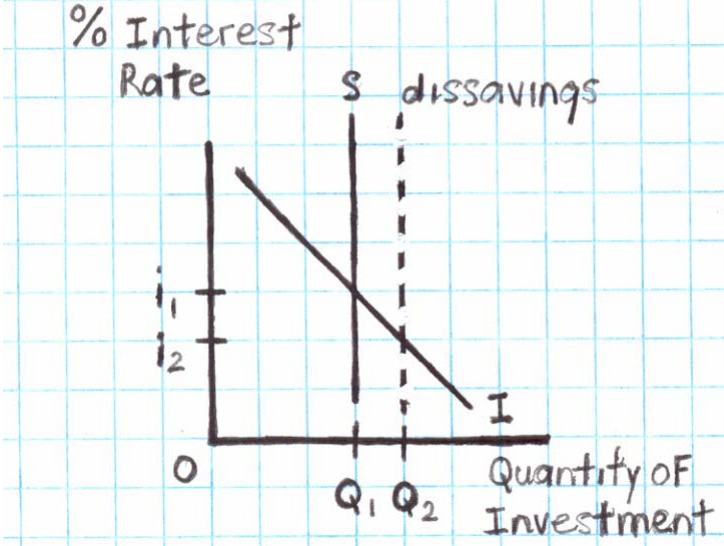
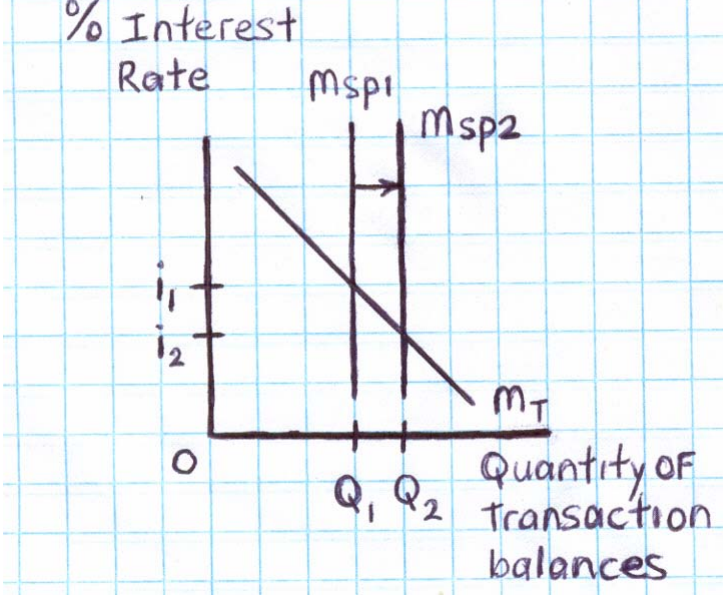
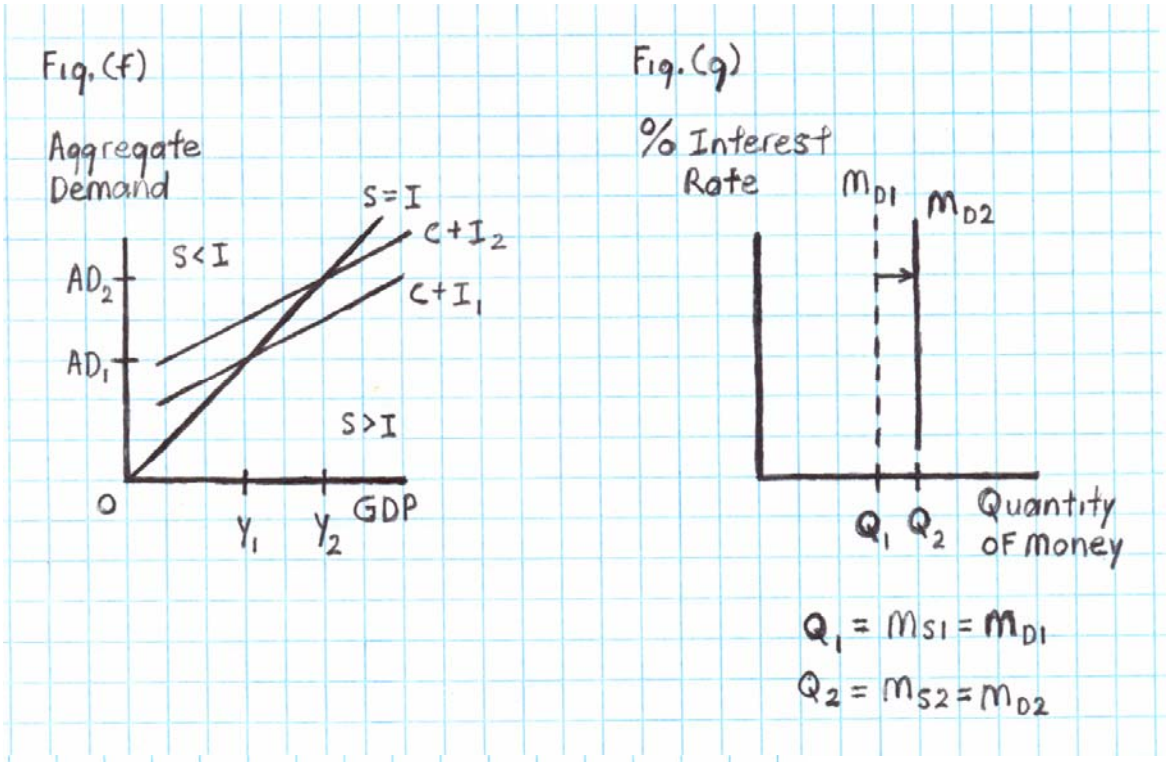
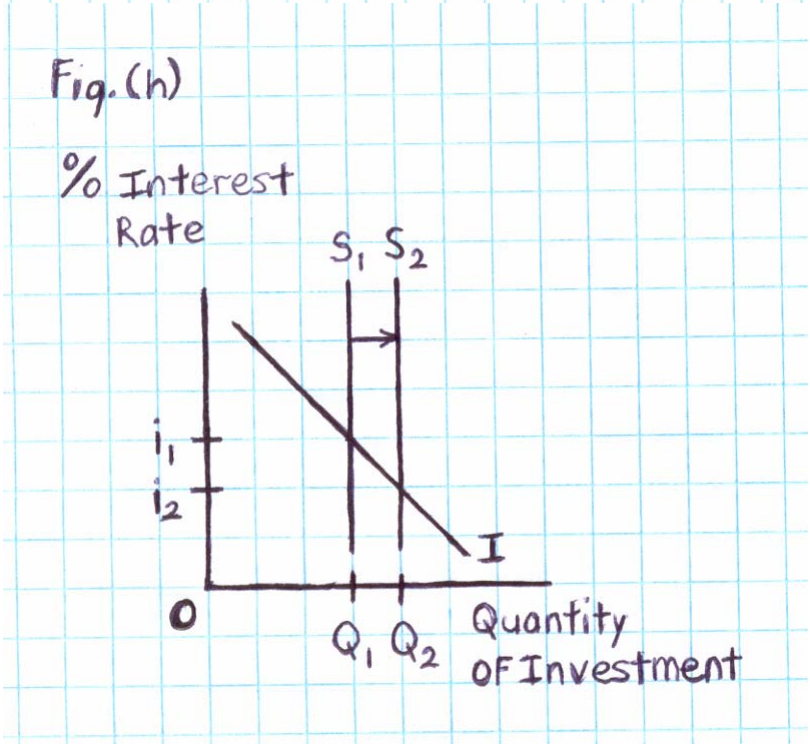

% Interest Rate
S
dissavings
i_1
i_2
I
O
Q_1 Q_2
Quantity OF Investment

Fig. (e)


% Interest Rate
Msp1
Msp2
i_1
i_2
m_T
O
Q_1 Q_2
Quantity OF transaction balances

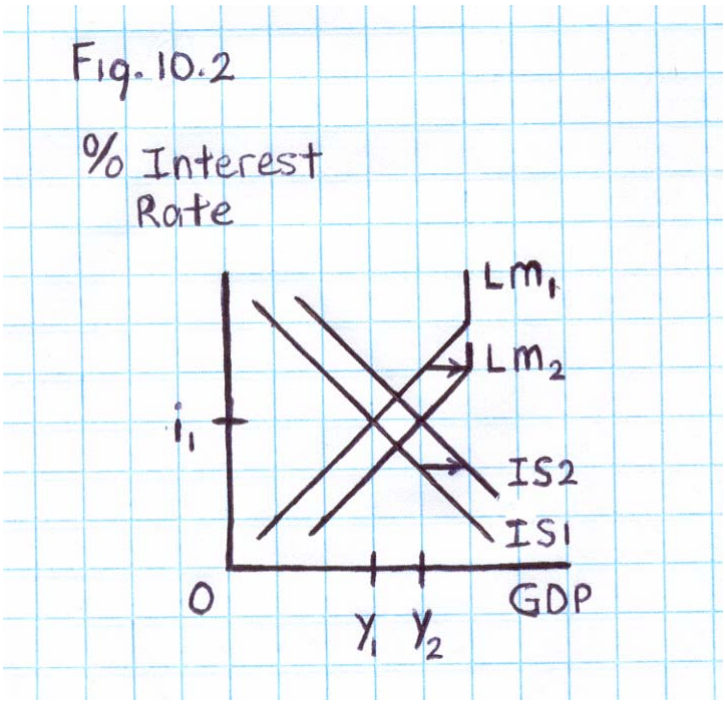




Panel 10.1 presents the relevant markets which are affected by the Fed's increase in the money supply when savers do not hold speculative balances. Fig. (a) shows the IS-LM market. The IS-LM market is a summary of the other markets presented in the panel and shows the end result of an increase in the money supply on the economy. Here the shift in the LM curve from

LM1 to LM2 causes an increase in income and a fall in the interest rate. Fig. (b) shows the bond markets involved and this again is the actual starting point of the monetary expansion. Fig. (b1) is the bond market of stocks between the Fed and savers, fig. (b2) is the bond market of flows between savers and investors. The action in these bond markets are virtually the same as the analysis of a Fed injection in section 8.2. When the Fed buys bonds from savers, the bond supply curve shifts to the left from Bs1 to Bs2. This reduces the quantity of bonds and increases the money supply. This action has a simultaneous affect in the market for money in fig. (c). In the market for money the increase of the money supply is indicated by a rightward shift of the money supply curve from Ms1 to Ms2. Notice here that the money supply is greater than money demand. The increase of the money supply increases savers speculative balances. Consequently, savers are holding more of their wealth as money in speculative balances than they would prefer at interest rate i1. So they try to exchange their excess balances of money for bonds. This shifts the bond demand curve to the right in fig. (b2), from Bd1 to Bd2. This causes the interest rate to fall from i1 to i2. This increase in the demand for bonds is a process called dissavings which is shown in fig. (d) of the loanable funds market by the dotted line. This market shows the increase in investment due to a lower interest rate. Notice that this market is now in disequilibrium because investment is greater than savings. In fig. (e), savers supply their excess balances to investors in the market for balances. The Msp curve shifts to the right and lowers the interest rate. The increase in investment leads to an upward shift in the aggregate demand curve and raises income from Y1 to Y2 in Fig. (f). Fig. (g) shows the affect of the higher level of income on the demand for money. The increase in income causes the money demand curve to shift from Md1 to Md2 and now the market for money is in equilibrium because the money supply equals money demand. When savers got rid of their excess balances, investors used that money to increase income, which also increased transactions, until the excess balances were eliminated. Fig. (h). Shows the income effect on the loanable funds market. The increase in income caused the savings curve to shift form S1 to S2 and the interest rate to fall to i2. Now all markets are in equilibrium with the interest rate at i2 and the income level at Y2. Again, this is summarized by the IS-LM market in fig. (a). As long as the economy remains in equilibrium the interest rate will settle and there will be no tendency for it to move any further. It is important to note here that the LM cure, the money demand curve, and the bond demand curve were all vertical because of our assumption that savers do not hold speculative balances. If they did, those curves would have been downward

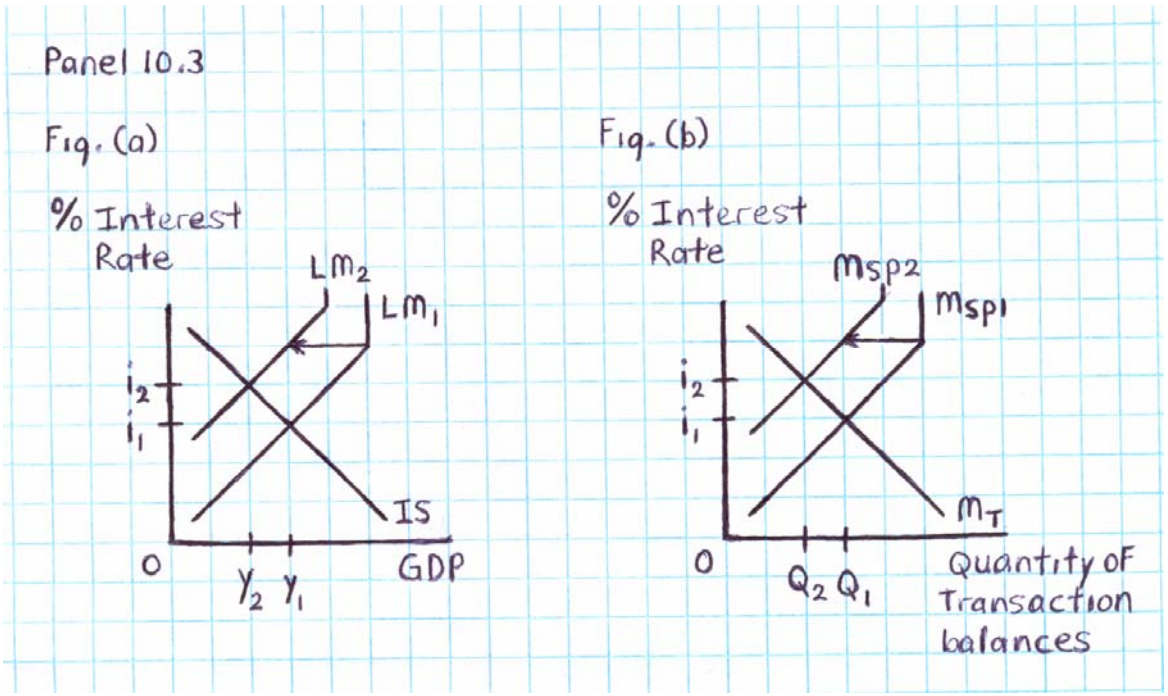
sloping for the bond and money demand curves and upward sloping for the LM curve. It is also important to note that, if savers had decided to hold the entire amount of the increase in the money supply as speculative balances, the Fed's monetary injection would have failed to increase income and employment. So for a quick summary of the Fed's monetary expansion, with fixed prices an injection may do nothing depending on savers demand for speculative balances, or it may have a direct affect on output by increasing output. With flexible prices, a monetary injection may just increase prices with no affect on output, or it may affect both prices and output having an increase in both.



Now suppose that an increase in investment and an increase in the money supply occur simultaneously. A rise in investment that does not depend on the interest rate will shift the investment demand curve to the right in the loanable funds market. This increase in investment causes the IS curve in fig. 10.2 to shift to the right from IS1 to IS2. An increase in the money supply will shift the money supply curve in the market for money to the right. In the IS-LM market, it moves the LM curve to the right as shown in fig. 10.2 from LM1 to LM2. The increase in investment causes a shift upward in the aggregate demand curve which raises income. The final result is that both the IS and LM curves shift and increase the equilibrium level of income but does not change the interest rate. An increase in investment spending with no change in the money supply raises the interest rate. The rise in the interest rate dampens the increase in income. If the money supply increases by just the amount necessary to prevent the rise in the interest rate,

the full expansionary effect of the increase in investment on income will be realized. Without a rise in the interest rate, the increase in income is larger, and this is what we find in fig. 10.2. If the appropriate monetary policy is pursued to prevent a rise in the interest rate, the increase in income will be larger than if no policy action were taken.

Now let's examine an autonomous increase in income. Imagine an application of a new technology that causes an autonomous increase in output by making the production process more efficient. An increase in income without a corresponding increase in expenditure will cause disequilibrium. When income is greater than expenditure, market forces will move the economy toward equilibrium. This means that income must decrease until it matches expenditure erasing the gains from the new technology and increase in income. The market forces that decrease income, stems from the fact that an increase in income is an increase in required transaction balances. Since the supply of transaction balances do no increase, income and transaction demand must decrease to where they equal the supply of transaction balances. For the increase in income to be sustained, there must be a matching increase in expenditure. Either the investors or the Fed or both must pay for the increase in income. If investors increase their expenditure, they must increase their supply of bonds (a shift in the bond supply curve to the right causing the interest rate to rise and drawing down savers speculative balances). This will cause the IS curve to shift to the right. When the Fed pays for the increase in income, the process of dissavings will cause the demand for bonds curve to shift to the right reducing the interest rate. This will allow the supply of transaction balance to increase to equal the required transaction demand. This will shift the LM curve to the right. If both the Fed and investors both pay for the increase in output, both the IS and LM curves will shift. The interest rate will remain unchanged, and only income will increase. If the Fed does nothing, the quantity of money in the economy remains unchanged and the interest rate rises because of the greater demand for transaction balances. Alternatively, the Fed can try to keep the interest rate at or below its initial level by increasing the supply of money. Which policy the Fed chooses to implement will depend on the Fed's target for the interest rate. If the economy is growing to fast, a higher interest rate will help slow the economy down. If the economy is growing to slow, a lower interest rate may help speed up the growth in income.



Now let's examine an autonomous demand for money. Panel 10.3, shows the IS-LM market and the market for balances. There are 3 assumptions to keep in mind. The money supply is constant, investment depends on savings, and the consumption function is constant. Fig. (a) shows the result of an autonomous demand for money in the IS-LM market. An autonomous demand for money raises the interest rate and decreases income indicated by the leftward shift in the LM curve. In order for the economy to remain at interest rate i1, savers must devote all of their savings to bonds. If savers devote a portion of their savings to speculative balances, these speculative balances must come out of transaction balances. A reduction in the quantity of transaction balances will decrease the level of income. The market for balances is indicated by fig. (b). An increase in the demand for speculative balances will decrease the supply of speculative balances in the market for balances and will also increase the interest rate. The shift of the Msp curve to the left decreases transaction balances. Panel 8.6, shows the corresponding actions in the bond and loanable funds markets. Savers can devote their savings to bonds each period and increase their assets of bonds, but savers cannot devote their savings to speculative balances each period and increase their assets of speculative balances without causing a decrease in the income level. This is because savers or investors cannot increase the money supply, but investors can and do increase the quantity of bonds each period. The money supply is controlled by the Fed. So, when investors demand transaction balances, this must reduce speculative balances. And when savers demand speculative balances,

this must reduce transaction balances. This becomes apparent when examining fig. 6. So, if savers want to devote a portion of their savings to speculative balances each period while maintaining equilibrium, the Fed must increase the money supply by an equivalent amount of the speculative demand.

Now let's examine a monetary expansion when savers hold speculative balances. Notice that the monetary transmission mechanism is still the same as in panel 10.1, but in this example, a portion of the monetary increase is kept in speculative balances as opposed to panel 10.1 where all of the monetary increase was spent on bonds. Remember that the financial sector in our economy consists of only a bond market. If we were to add a banking sector to our economy we would also need to analyze the monetary transmission mechanism through the banking sector and then combine that with our bond market analysis. Panel 10.4 shows the corresponding monetary flows and markets that produce a lower interest rate and increase in income.

Panel 10.4

Fig. (a)

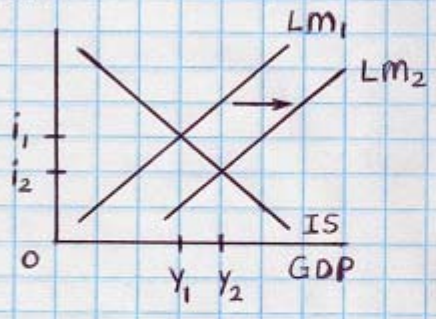


Fig. (b1)

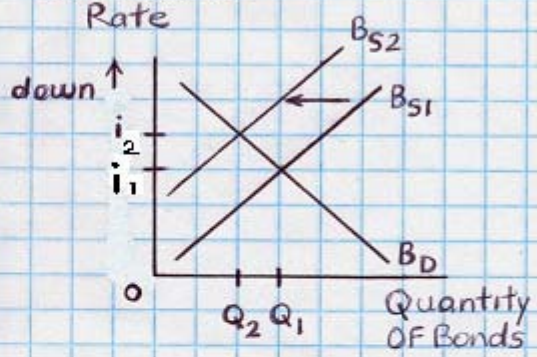


Fig. (b2)

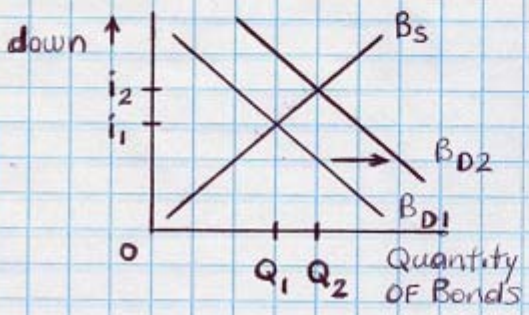


Fig. (c)

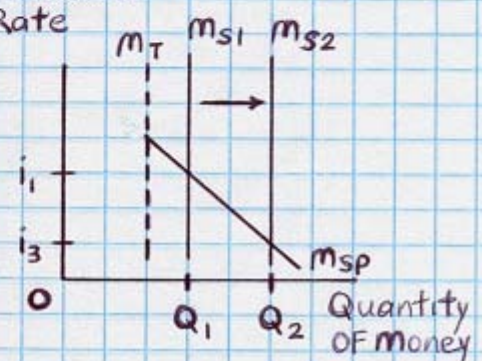


Fig. (d)

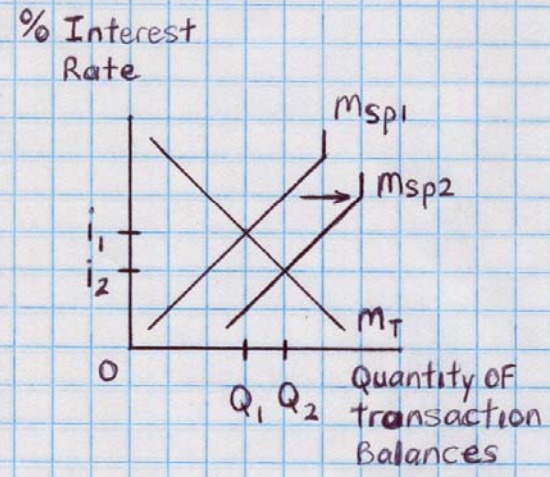


Fig. (e)

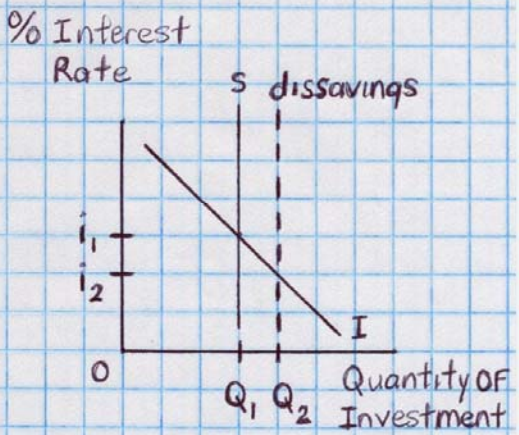


Fig. (f)

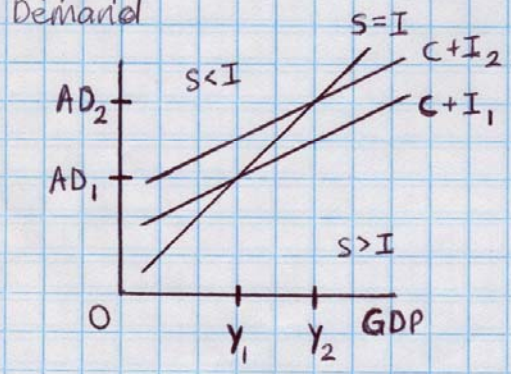
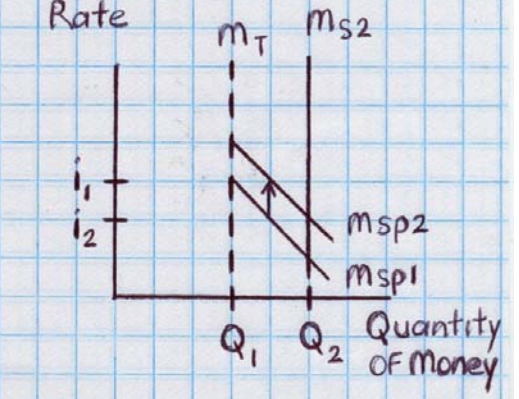
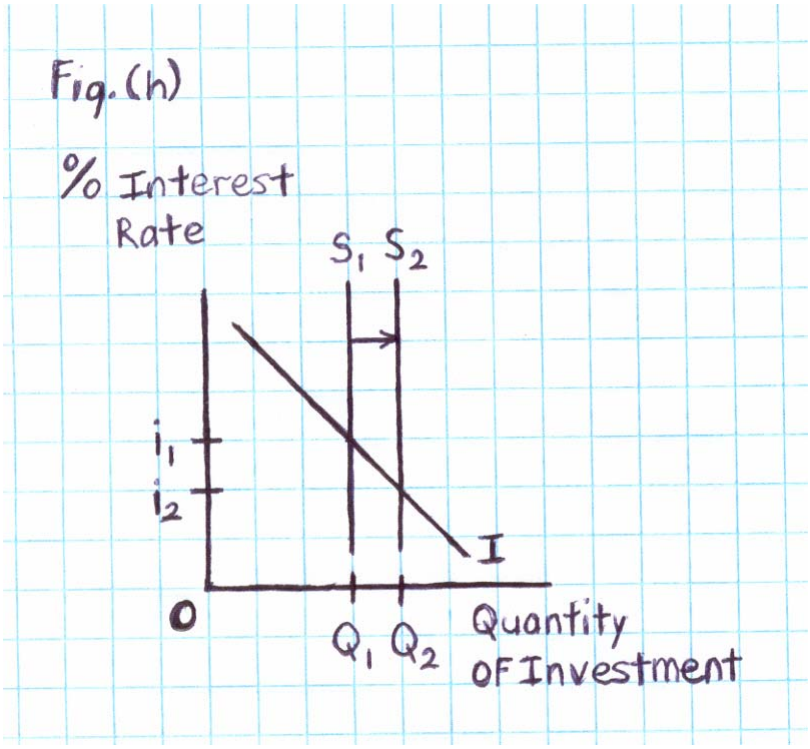


Fig. (g)





In fig. (b1), the Fed bought bonds from savers. This action increased savers speculative balances. At this poing savers must make a decision to hold more speculative balances or buy bonds from investors. If we assume all things are held constant including savers demand for speculative balances, then savers will immediately buy bonds from investors. This will have a direct impact on income; increasing income. Likewise, when the Fed decides to reduce the money supply, the interest rate in fig. (b1) will rise. Savers must decide wether to reduce their speculative balances or use the funds from their incomes to buy bonds from the Fed. If we again assume that all things are held constant including savers demand for speculative balances, then savers will use the funds from their incomes to buy bonds from the Fed. This will also have a direct impact on income because savers will reduce their demand for bonds from investors in fig. (b2) until the interest rate rises to match the interest rate in fig. (b1).

11.0 CONCLUSION

This course has focused on the "core" of a closed macroeconomic theory. The analysis of the bond market and the market for balances are what distinguishes this course from the material covered in leading textbooks known as modern macroeconomics. Most leading textbooks take the approach of starting economic analysis by building the market for loanable funds and the market for money and then they build the IS-LM market. From there they build a model of aggregate supply and demand for the short

run and long run. They then extend this model to include the government and forgiven sectors. Therefore, modern macroeconomics is an incomplete theory because it does not include an analysis of bonds and balances together. This would be similar to studying how the body works in a physiology course without ever studying the heart. Understanding changes in bonds and the money supply is at the heart of macro theory. By reducing the economy down to its bare essentials we can clearly see how changes in bonds and the money supply affect the economy. In such a small economy it is easy to see the direct effects of policy by the Fed on the economy. Our analysis lets us clearly see the quantity of bonds and the amount of money the Fed can manipulate to implement its policies. Our course was built on the assumption that prices were fixed and analyzed how shocks to the economy cause the interest rate and the level of income to deviate from equilibrium. Our course was basically an analysis of the money supply. We demonstrated how shocks to the economy affected the money supply and how the money supply affected output. While our analysis does not change the outcomes of monetary, fiscal and trade policy analysis in modern macroeconomics, it does make it more complete by including the markets for bonds and balances. The bond and balances markets help us better understand short run fluctuations in economic activity. It is hoped that this course will be used as a tool by professors for teaching introductory macroeconomics and that it will help give professional economists insight into macro theory. A useful application of this course would be to run this course as an experimental economy in a classroom. The instructor could act as the chairman of the Federal Reserve to control the money supply and interest rate. It would be interesting to find out how well the Fed could control the interest rate and growth in such a small economy.

12.0 MONEY AND BANKING

What is money? Most economies make transactions with a good that its sole purpose is to act as money. In simplistic terms, the U.S. has three goods that act as money: dollar bills, coins, and bank deposits. The first two are currency. These three goods are accepted as money and are what makes up the money supply. But that’s an oversimplified example. In reality with all the financial technology today, the government barely even knows what money is or how much of it we have. Therefore the government has to make a guesstimate, and to get an idea of the size of our money supply today, the government uses three measures of the money supply: M1, M2 and M3. For any economy, money serves three purposes. It serves as a store of value, a unit of account and a medium of exchange. Money makes indirect

transaction possible. In a complex modern economy, trade is often indirect and requires the use of money. What gives this money its value? Originally dollar bills were just a receipt that could be exchanged for gold. Our money was backed by gold and the bills had vale because of the amount of gold they could be exchanged for. Today the gold standard has been abolished and there is nothing that backs our dollar bill. The dollar bill has no intrinsic value and when it is not accepted for goods and services dollar bills become worthless. Our economy's money is called fiat money because it was established as money by a government decree when the government decided not to back the dollar bill with gold. If business all decided overnight that they would only accept the Euro, any amount of wealth that you are holding in dollar bills would be worthless and if the situation was bad enough you may not even be able to exchange them for euros. This means that if you had a $10,000 in savings in cash, it would be totally wiped out. People value the dollar bill because we expect everyone else to value it and our government requires that we pay our taxes in dollars.

How is money created? The Federal Reserve has the power and authority to create an unlimited amount of money. The Fed is responsible for printing dollar bills and the treasury of the U.S. government has the responsibility of minting coins. Commercial banks also have the power to create money with a limit controlled by the Fed. Banks create money by making a computer entry when they create checking and savings accounts. Money is created by printing, minting and entering. This is an extremely over simplified explanation. To get a more realistic view of how our modern economy creates money, the Federal Reserve's website provides plenty of information on the specifics. Mishkin's text also covers the subject very well. But a simple analogy will suffice to get the point.

How do banks increase the money supply? It is often thought that banks need people savings in money to make loans to people who want to borrow money. Theoretically this is not true. In fact banks do not need your money at all and should charge you to hold your money. Just as a storage place charges you to store your furniture. The reason banks accept and loan out savers money is because of the oversight and controls by the central bank. In our country the Fed requires banks to hold reserves. The reason the Fed requires banks to hold reserves is because the Fed wants to limit how much money banks can create thus having some control over how much the money supply can expand. Another reason the Fed imposes limits on banks is because of efficiency. In simplistic terms, if a saver has some available funds which he can loan out, there is no sense in letting a bank create those funds when the bank could utilize the funds of savers to loan out to

borrowers. This ensures that the bank only creates money when it is necessary. As stated earlier, all that a bank has to do to create money is to make a computer entry. This means that banks can create money out of thin air! So realistically banks don't need your dollar to make a loan, all they have to do when a business man comes in to take out a loan is to create him a checking account. And that's what a bank might do if there where no reserve requirements, but the Fed requires that the bank use the funds of savers as a base for creating money. The rules for bank reserves are such that every dollar that savers deposit into the bank, banks are allowed to make a multiple of loans based on those dollar deposits. Therefore, the more dollars that savers deposit, the more loans that the bank can make. It is because of the reserve requirements that banks actively seek and pay for savers deposits. The bank makes a profit on the difference between what the bank pays the saver and what the borrowers pays the bank. In other words the banks income is the difference between the interest earned on the loans it makes and the interest it pays to depositors. Since loans are a multiple of deposits, the amount the bank pays depositors is just a fraction of what the bank earns on loans. When the bank creates money it increases the money supply because it adds checking accounts to the money supply in addition to the existing dollar bills in circulation. If the multiple on the reserve requirement is 10 that means if you give your bank one dollar, by the end of the day lets say, that one dollar increases the money supply by $10. So if the money supply consisted initially of just your one dollar bill, when you give it to the bank the bank gives you a one dollar checking account. The bank also gives 9 other people one dollar checking accounts. So now the money supply is $10 consisting of only checking accounts. The bank keeps your one dollar in its reserve. When someone else brings the bank a dollar, the same process will happen again. If people decided they wanted cash instead of bank deposits, the bank would have to make an order for bills from the Fed so it could exchange the bank deposits for cash. Banks make more money when the economy expands, and less money when the economy contracts. It should be noted here that although checking account money is accepted and is just as good as dollar bills, it is not legal tender like the dollar bill. Dollar bills are official because the Fed printed this saying on the U.S. dollar: "This note is legal tender for all debts paid public and private". Although the system of reserve banking creates money, it does not create wealth. When a bank makes loans based on its reserves it increases the money supply. But the borrowers of this money are taking on bank debt, so the loan does not make them wealthier. Therefore, the creation of money by banks increases the economy's liquidity, but it does not add to the economy's

net wealth. In Australia, banks do not have reserve requirements. These banks have some freedom to regulate themselves and maintain efficiency. If banks create too much money and expand the money supply beyond what the economy's needs, it could have disastrous consequences. Hyperinflation is when banks create too much money and expand the money supply excessively.

What is hyperinflation? In the long run, an increase in the money supply will result in higher prices. A long term increase in prices is called inflation. A very high rate of inflation is called hyperinflation. If the Fed prints money excessively and government spends that money at a high rate, it causes hyperinflation. Why would the Fed print an excessive amount of money? There are 3 main reasons: a financial panic, government spending and or both. If the government wanted to increase it spending, it can finance this spending in three ways. It could raise taxes, it could borrow from the public by selling government bonds, or it could sell government bonds directly to the Fed. When the government sells its bonds to the Fed, the Fed will print the money needed to buy these bonds. This process of the government earning revenue raised through printing money is called seigniorage. Most hyperinflations begin when the government has inadequate tax revenues to pay for its spending and there are not enough funds available in financial markets. To cover this deficit, the government depends on seigniorage. During the American Revolution, the U.S. government printed fiat money to pay for the war. Because of the problems caused by hyperinflation, most countries today have laws that limit the amount of bonds governments can sell directly to their central bank. Seigniorage allows the government to increase its budget deficit and allows the government to spend an excessive amount of money. The actual rise in prices comes from excessive spending by the government. As prices rise the purchasing power of the public’s money decreases and loses value. The purchasing power of money is the rate at which it exchanges for goods and services. The higher the price level, the less each dollar is worth and the less it can purchase in goods and services. The purchasing power of each dollar over time varies inversely with the price level, so the purchasing power of money falls.

How does the Fed change the money supply? The Federal Open Market Committee (FMOC) makes decisions on monetary policy and conducts open market operations. Open market operations are the purchase and sale of U.S. government bonds held by the public. The purchase or sale of government bonds increases or decreases the money supply and interest rates. The Fed has a variety of tools in which the Fed can regulate the money

supply. They are: open market operations, the discount rate, and the reserve requirements for member banks. The discount rate is the interest rate the Fed charges on loans to member banks. When the Fed purchases government bonds from the public it becomes the Fed's asset. This asset earns interest which is the Fed's income. After covering its operating costs, any remaining income is profit. But this profit earned by the Fed is turned over to the U.S. Treasury for government purposes.

13.0 THE NATURE OF DEBT

A debt is a contractual agreement by the borrower to pay the holder of the contract a fixed dollar amount until a specified date when the debt will be repaid. The holder is usually entitled to claims on the borrower’s future income as interest usually expressed as a percentage a year. The interest rate on the debt is the cost of borrowing. In our circular flow model in fig. 1, investors issued debt by direct finance to raise funds in financial markets as opposed to indirect finance which involves the activities of financial intermediaries such as banks. Banks are just like any other business. Their product is money and their motive is profit. Banks sell money in the form of loans and other financial products. In our circular flow model there are no banks and the Fed acts like a non profit organization. To learn how banks affect the money supply and the economy consult Mishkin's textbook. Debt is a stock measure. The amount of debt in our economy equaled the total amount of bonds held by the public. But this measure does not represent the total amount of debt issued because the Fed is holding some bonds which it bought from the public. So the actual total amount of bonds should include the amount the Fed is holding and what the public is holding. The amount of bonds the Fed is holding should be equal to the money supply held by the public because we started our analysis by assuming there was zero amount of money in our economy. We can now make a distinction about debt. Bank debt is the amount of bonds the Fed is holding (the amount of debt between the Fed and the public), and private debt is the amount of bonds held by savers (the amount of debt between savers and investors). The private debt can be a multiple of the money supply because every year at equilibrium the amount of bonds increases while the money supply remains the same. When the money supply increases the Fed's holding of bonds increase because when one demands bonds he must supply money.

Although we discussed interest rates in our economy, we did not address the issue of banking and its interest earnings. Let's suppose that we replaced the Fed in our economy with a private bank and that it is motivated to profit. Bonds and bank loans are equivalent in this example and there are

no reserve requirements. Savers and the bank both buy bonds from investors. When savers buy bonds from investors they must go through the bank. This means that the bond market is ran by the bank. When savers seek to buy bonds they supply their funds to the bank. The bank is an intermediary and matches the savers with investors. The bank shares the interest of the bonds from investors with savers. The amount of bonds savers are holding is still in a sense private debt, and the amount of bonds the bank buys and holds from investors is bank debt. When savers do not have enough funds to purchase the amount of bonds investors are willing to supply (when investment is greater than savings), the bank buys the bonds from investors. When the bank buys bonds from investors, the money supply increases. Let's further assume that the interest rate is held constant and the prices of bonds don't fluctuate. Some writers argue that the interest earned on bank loans (bonds in our example) is a time bomb (An entire book on this argument is called the debt virus). This stems from the fact that when you (investor) take out a loan from (sell bonds to) the bank you must pay back the principal plus the interest. In essence the bank demands that you pay back more money than they lent you. When the bank makes loans (buys bonds) it creates money. More specifically it only creates the principal on the loan and not the amount need for the interest payment. The debt virus authors argue that since the money created through bank lending is only sufficient to pay the principal, additional borrowing must take place to pay the interest on the current loans. This means that the interest rate on the debt owed to banks must be growing at a compounded rate. This growing compound interest rate will eventually blow the economy up. And since all money in circulation is created with a corresponding amount of bank debt, and because it was borrowed from the bank if not by you, by someone else, then if everyone decided to pay their bank debt off at the same time there would be no money left in circulation. This alarmist and doomsday claim is just a way to draw attention to their thesis which is theoretically possible but highly unlikely because it leaves out an important analysis of money flows. Phrasing their argument in this way, by leaving out an important aspect of monetary flows, the authors are just trying to demonstrate the character of debt in our economy. So, where do you get this extra money to pay the interest on the loan? Imagine a simple economy with only three people starting with a zero money supply. If the bank loans person A $100 and charges 10% interest, the money supply becomes $100, but the total indebtedness is $110. As a result, the only way person A can repay the interest on his loan is to capture a portion of person B's loan principal through the process of trade. So when person B gets a $100 loan at 10% interest, the money supply is now $200. And the total

indebtedness is $220. If person A captures enough of person B's loan principal to pay off his loan plus interest, the money supply becomes $90. The income the bank receives is the interest he earns on loans. The banks income from person A is $10. The bank can do two things with this income, he can spend it on goods and services from person A or B, or he can save it and add it to his capital for loans. If the bank spends this money, the money supply becomes $100 and person B is now short $10 to pay off his loan. The only way person B can pay of his principal and interest is to capture the principal of person C's debt and so on and so on.

As we see here there is a cycle, and under our current debt based monetary system, interest can never be paid off completely and can only be shifted from one person to the next under these theoretical conditions. Therefore the outcome of this money creation process is that money becomes a zero sum game. The more of a positive net money balance person A has the more of a negative balance person B has. One way to ease or control this increasing debt when the money supply increases is for there to be debt free spending that increases the money supply when needed. New money could be spent or given into circulation instead of loaned into circulation, it also would be interest free. Here we do not mean inflationary printing and spending. We just mean replacing a portion of debt based monetary growth with a portion of debt free monetary growth. This would allow a portion of the money supply to be debt free and remain in circulation. This of course would also decrease bank profits. The bank of course wants to increase their loans which are an increase in the money supply. The larger the money supply the more interest they earn. So we can see why the Fed and the government regulate the banking sector; to have control over the money supply. The problem with the debt virus thesis is that, although it is theoretically possible, in reality there is debt free spending by the Fed and government, and the banking sector spends a large portion of their interest earnings back into the economy rather than save it and add it to the banks capital. So if the Fed and government did not spend any money into the economy debt free and the banks always saved their interest earnings and add it to capital, a debt time bomb may be more likely to happen. But all three organizations still have to pay expenses such as employee wages, operating costs, purchase of new facilities, they write off bad loans and pay depositors and dividends. All of these expenses return funds to the non bank public. One of the main ways the Fed spends debt free money into circulation is when the price of bonds have increased. If bonds appreciate while savers are holding them and the Fed decides to buy them at high prices, then the bond depreciate and the Fed sells them back to savers,

savers have made capital gains and there is a net increase in the money supply. For these reasons many economists say that the debt virus is a fallacy. Theory and reality are not always the same. While the debt virus theory is sound, the empirical evidence indicates there is no impending time bomb on the horizon.

14.0 CRITICAL THINKING

A famous quote from British economist Joan Robinson is "The purpose of studying the subject of economics is not to acquire a set of ready made answers to economic questions, but it is to learn how to avoid from being deceived by economists". Critical thinking does not blindly accept arguments and conclusions. Rather it examines assumptions, discerns hidden values and then assesses conclusions. One of the best uses for critical thinking is to examine power and control in economics. For instance, does the American Economic Association control what is taught in university economic programs? Is that information biased? Why is one theory to be taught chosen over another? Many times values are hidden. Not by teaching incorrect information, but by what they don't teach. In other words programs may teach certain theories and not teach others because they don't want you to know about those other theories and the ones they are teaching are the ones that serve their agenda. The ones we teach and like are the so called "correct" theories. For instance, if economic programs have a capitalist bias, they certainly will not teach any theories from Karl Marx. If the program has a big business bias, they will not teach any labor or trade theories that criticize big business. If the program favors classical economics or is free market they will minimize Keynesian theories. Unlike many other subjects, economics is not skeptical of itself and does not critically examine its own theories in a social context. As long as the theory in economics is mathematically sound and can support for the most part a big business bias, it is taught like religious doctrines. For instance, using simple examples, there are three common economic conclusions found in virtually every textbook. They are: without government intervention, the invisible hand will promote the general welfare; resources are scarce; market equilibrium is determined by supply and demand. By using some critical thinking we arrive at some different conclusions: The invisible hand cannot function properly without government; resources are artificially scarce; and market equilibrium can be manipulated. According to the invisible hand of markets, if everyone is able to pursue their own self interest without government intervention by maximizing profit, income will be distributed such as by an invisible hand to where the greatest and most efficient level of output is

promoted for the general welfare of all those involved. For instance in a barter economy, if you sell oranges and your neighbor sells apples and you would like to purchase apples, by acting in your self interest you would want to maximize your production of oranges. By producing more than you can eat, you can trade the surplus oranges for apples. This will maximize your profit in apples. If your neighbor also maximizes production of apples to trade for oranges, the total amount of apples and oranges produced are maximized and the general welfare of you and your neighbor is greater than if you only produced enough for your own consumption. The missing assumption that economists don't consider behind this thesis is that there is a trade ethic or a government to ensure the rules of trade are followed. What keeps your neighbor and his workers from ridding over on their horses and raping, robbing, and taking over your orchard? Hopefully a government. Likewise what keeps your neighbor from selling you fake apples and from ripping you off or polluting your orchard with herbicides. Only when you can look your neighbor in the eye, give a firm hand shake and your neighbor doesn't lie, does the invisible hand work.

On the issue of scarcity, we know that we can produce more than enough food to feed everyone in the world, and there is definitely enough work for everyone to do, but there is clearly not enough money to pay for it all. When the wealthy amass and increase their ownership of productive resources others are left to be workers for the owners of production. Many producers try to monopolize their market by eliminating their competition creating scarcity and unemployment. When owners create value and price their product so where others cannot afford it, they create scarcity. Fear of scarcity creates greed and hoarding, which in turn creates more scarcity. People who don't own any resources to sell can starve and die. If a single company monopolized and owned all the drinking water in the country and wanted to price it as a luxury item people would die of thirst. The only reason why the air and sea water is still free is because someone doesn't own it yet. The ownership of resources creates scarcity. It is true that market equilibrium is determined by supply and demand. But textbooks rarely look beyond supply and demand to identify what factors affect supply and demand from a social context. Textbooks do identify neutral shocks to supply and demand, like a new discovery of resources, a disaster like the Black Death, or a change in taxes. Rarely will you find a discussion of the economic impact of a successful lobbing campaign of politicians by big business. Wage rates in the labor market are determined by the supply and demand for labor. If government intervenes and raises the wage rate above the equilibrium level then there will be unemployment and that would be

bad according to textbooks. But what if big business intervenes? First of all that is never mentioned, so the text can never say if that is bad or good. Big business can manipulate the wage rate in the labor market by lobbing politicians successfully for immigration. This of course would increase the supply of labor and reduce the wage rate. This would decrease the factor costs of production and increase the business profit. The text will tell us that a decrease in wages will increase employment. But this makes a big assumption that the business owner believes that expanding his business with his increase in profit will create more revenue in the future. And it makes another assumption that the business owner will hire more labor instead of labor saving capital. The business owner may not hire anymore workers at all and the demand curve may be vertical. Another famous doctrine economists spout as if it were fact is that when the government prints money it causes inflation or possibly hyperinflation. Printing money is just printing money, and until it is spent in the economy it will not have an effect on the economy. Whether the newly created money will cause inflation or not depends on the rate of that spending. So governments could print and spend without causing inflation if the rate of spending is at an extremely slow rate over time.

The two major powers that have the greatest affect and control over the economy is big business or the government. When people advocate for government to stay out or to leave its hands off of the economy, what they are advocating is that they prefer that big business be in control of the economy. And depending on your view of big business, that could be good or bad. But one thing is for sure, they will be acting in their self interest trying to maximize profits. Whereas, ideally government is supposed to represent the public. Unfortunately, the relationship between government personnel and corporate leadership is an intimate one. When big business attempts to undermine the common good of trade by manipulating prices and driving down wages often government actively helps business. In 1973, the FTC charged eight petroleum companies with monopolizing oil production. The oil companies worked together to inflate profits on crude oil and to drive independent companies out of business. The U.S. oil companies blamed the Arab nation’s slow production causing oil and gas to be scarce. In reality, the U.S. had only been importing about three percent of its petroleum from Arab nations, and our domestic supplies were greater than they had been years earlier. Never the less, the public accepted these false claims. These actions by big oil companies caused long lines at the pumps, higher prices for gas, and a massive inflationary effect on the economy. Perhaps because of financial contributions from these companies to

government, government has nearly eliminated corporate taxes on these companies and government has allowed the companies to go unregulated. Big business can more easily use their wealth and power to unscrupulously promote their own self interest and profits, while the interests of the public is subordinated. The economic effects of such practices would make a great case study in economic textbooks. Using economic analysis we could learn how these big oil companies can actually manipulate markets and affect prices. But of course we will never see that in an economic textbook, perhaps because big business has some control over the information presented and edited in textbooks.