Money Banking and the Financial System 3rd edition Hubbard Solutions Manual

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Chapter 2
Money and the Payments System

■ Brief Chapter Summary and Learning Objectives

2.1 Do We Need Money? (pages 245–27)
Analyze the inefficiencies of a barter system.

- Money reduces the transactions costs of exchange as well as other inefficiencies of a barter system.

2.2 The Key Functions of Money (pages 27–32)
List and describe the four key functions of money.

- Money serves four key functions in the economy: It acts as a medium of exchange, a unit of account, and a store of value, and offers a standard of deferred payment.

2.3 The Payments System (pages 32–37)
Explain the role of the payments system in the economy.

- The efficiency of the payments system has increased over time as new instruments have reduced the cost of settling transactions.

2.4 Measuring the Money Supply (pages 37–39)
Explain how the U.S. money supply is measured.

- There are currently two measures of the money supply in the United States, M1 and M2.
- M1 includes liquid assets that can directly be used as a medium of exchange, while M2 includes short-term assets that are less liquid but can readily be converted to currency and be used as a medium of exchange.

2.5 The Quantity Theory of Money: A First Look at the Link Between Money and Prices (pages 40–47)
Use the quantity theory of money to analyze the relationship between money and prices in the long run.

- The quantity theory of money helps to explain the long-run relationship between the growth of the money supply and inflation.

■ Key Terms

Barter, p. 26. A system of exchange in which individuals trade goods and services directly for other goods and services.

Checks, p. 33. A promise to pay on demand money deposited with a bank or other financial institution.

Payments system The mechanism for conducting transactions in the economy.

Quantity theory of money, p. 40. A theory about the connection between money and prices that assumes that the velocity of money is determined mainly by institutional factors and so is roughly constant in the short run.

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Commodity money, p. 26. A good used as money that has value independent of its use as money.

E-money, p. 34. Digital cash people use to buy goods and services over the Internet; short for electronic money.

Fiat money, 29. Money, such as paper currency, that has no value apart from its use as money.

Hyperinflation, p. 43. Extremely high rates of inflation, exceeding 50% per month.

Legal tender, p. 29. The government designation that currency is accepted as payment of taxes and must be accepted by individuals and firms in payment of debts.

M1, p. 37. A narrow definition of the money supply: The sum of currency in circulation, checking account deposits, and holdings of traveler's checks.

M2, p. 38. A broader definition of the money supply: all the assets that are included in M1, as well as time deposits with a value of less than $100,000, savings accounts, money market deposit accounts, and noninstitutional money market mutual fund shares.

Medium of exchange, p. 28. Something that is generally accepted as payment for goods and services; a function of money.

Monetary aggregate, p. 37. A measure of the quantity of money that is broader than currency; M1 and M2 are monetary aggregates.

Money, p. 25. Anything that is generally accepted as payment for goods and services or in the settlement of debts.

Specialization, p. 27. A system in which individuals produce the goods or services for which they have relatively the best ability.

Standard of deferred payment, p. 29. The characteristic of money by which it facilitates exchange over time; a function of money

Store of value, p. 28. The accumulation of wealth by holding dollars or other assets that can be used to buy goods and services in the future; a function of money.

Transactions cost, p. 26. The costs in time or other resources that parties incur in the process of agreeing and carrying out an exchange of goods and services.

Unit of account, p. 28. A way of measuring value in an economy in terms of money; a function of money.

Wealth, p. 29. The sum of the value of a person's assets minus the value of the person's liabilities.

■ Chapter Outline

The Federal Reserve: Good for Main Street or Wall Street – or Both?
Most candidates in the 2016 presidential race agreed that changes were needed in the operations of the Federal Reserve System ("the Fed"). Fewer than half of members of Congress had a favorable view of the Fed. The source of dissatisfaction with the Fed seemed to lie with its actions during the 2007-2009 financial crisis, because some of those actions were different from its normal policies. Some critics argued that the Fed had used its independence to pursue policies that favored "Wall Street" financial firms rather than "Main Street" households and small businesses. Congress granted the Fed its independence because of the effect of changes in the money supply, which the Fed controls, on the inflation rate. But high rates of inflation hit households and small businesses harder than they hit financial firms. Therefore, Main Street, as well as Wall Street, has a large stake in good central bank policy.

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Teaching Tips

For most students, Sections 2.1, 2.2, and 2.4 on the functions and definitions of money should be a review of material they learned in their principles class. This material be covered briefly with well-prepared students. Section 2.3 discusses the payments system—a term that may be unfamiliar to many students—including electronic funds and blockchain payment technology, which are topics not often covered in principles classes.

Section 2.5 contains material on the quantity theory that is likely to be less familiar to students. Given the debate over the likely outcome of monetary policies that have resulted in large increases in the money supply, students are often interested in this material. For this reason, the authors cover it early in their classes. The material on hyperinflation is interesting to most students and may help to reinforce the discussion of the quantity theory. Nevertheless, if you are pressed for time, the material can be omitted. Similarly, the background on the quantity theory and hyperinflation helps motivate the last section on central bank independence, although discussion of this material can be postponed to later in the course.

2.1 Do We Need Money? (pages 25–27)

Learning Objective: Analyze the inefficiencies of a barter system.

A. Barter

Barter is a system of exchange in which individuals trade goods and services directly for other goods and services. Sources of inefficiency for barter include (1) the time and effort spent looking for trading partners; (2) each good having many prices (in terms of all other goods with which it can be exchanged); (3) a lack of standardization of the products being traded; and (4) difficulty in accumulating wealth (people need to store various products).

B. The Invention of Money

Money reduces transactions costs as well as other inefficiencies of barter. Money allows for specialization, a system in which individuals produce the goods or services for which they have relatively the best ability.

2.2 The Key Functions of Money (pages 26–29)

Learning Objective: List and describe the four key functions of money.

A. Medium of Exchange

Medium of exchange describes the role of money as a generally accepted payment for goods and services.

B. Unit of Account

Unit of account is the function of money in which money can be used to measure value in an economy.

C. Store of Value

Money is a store of value in that it allows for the accumulation of wealth by holding dollars or other assets that can be used to buy goods and services in the future.

D. Standard of Deferred Payment

Money is considered a standard of deferred payment in that it facilitates exchange over time.

E. Remember That Money, Income, and Wealth Measure Different Things

Money, like other assets, is a component of wealth, which is the sum of the value of a person's assets minus the value of the person's liabilities. A person's income is equal to his or her earnings over a period of time.

F. What Can Serve as Money?

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An asset is suitable to use as money if it is (1) acceptable to (that is, usable by) most people; (2) standardized in terms of quality, so that any two units are identical; (3) durable, so that it does not quickly become too worn out to be usable; (4) valuable relative to its weight, so that amounts large enough to be useful in trade can be easily transported; and (5) divisible, because prices of goods and services vary.

G. The Mystery of Fiat Money

Money, such as paper currency, that has no value apart from its use as money is called fiat money. The most important reason why paper currency circulates as a medium of exchange is the confidence of consumers and firms that if they accept paper currency they will be able to pass it along when they need to buy goods and services.

2.3 The Payments System (pages 32–37)

Learning Objective: Explain the role of the payments system in the economy.

A. The Transition from Commodity Money to Fiat Money

Centuries ago, people had difficulty transporting large numbers of gold coins to settle transactions and also ran the risk of having their gold robbed. To get around this problem, beginning around the year A.D. 1500 in Europe, governments and private firms—early banks—began to store gold coins in safe places and issue paper certificates. In modern economies, central banks issue fiat money.

B. The Importance of Checks

It can be expensive to transport paper money to settle large commercial or financial transactions. Checks are promises to pay on demand money deposited with a bank or other financial institution.

C. New Technology and the Payments System

Breakthroughs in electronic telecommunication have improved the efficiency of the payments system, reducing the time needed for clearing checks and for transferring funds. Examples of computerized payment-clearing devices include debit cards, Automated Clearing House (ACH) transactions, automated teller machines (ATMs), and e-money.

D. E-Money, Bitcoin and Blockchain

The use of e-money, digital cash used to buy goods and services over the Internet, has increased in recent years. The Fed does not control e-money, so it is essentially a private payments system. One type of e-money is bitcoin, which is a product of a decentralized system of linked computers. To produce bitcoin, people perform calculations necessary to ensure that purchases made with bitcoin are legitimate. Bitcoins can be bought with dollars and other currencies and stored in "digital wallets" on smartphones. Unlike credit card purchases, no record is made of transactions that use bitcoins. Some retailers prefer bitcoin to credit card transactions because bitcoin purchases have lower processing costs. However, some firms question whether bitcoin software can handle large numbers of transactions. Some policymakers fear that investors might manipulate the prices of bitcoins and other virtual currencies. Despite these problems the technology underlying bitcoin, known as blockchain, has the potential to increase the speed, efficiency and security of the payments system. Blockchain and other new payments technologies have led some commentators to predict a coming "cashless society." But an entirely cashless society may be difficult to achieve. One problem is the high cost of the infrastructure needed for an e-payments system. Another problem is the concern many households and firms have about the potential for computer hackers to violate the privacy of an electronic system.

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Teaching Tips

Ask students if they have bought items on eBay. Next, ask how many still would have bought those items if they could not have used PayPal. The discussion that follows should help them to understand how money evolves over time and how increased efficiency of the payments systems allows for increased economic activity.

2.4 Measuring the Money Supply (pages 37-39)

Learning Objective: Explain how the U.S. money supply is measured.

A. Measuring Monetary Aggregates

M1 is a narrow definition of money that includes traditional mediums of exchange: currency, traveler's checks and checking deposits. M2 is a broader definition of money that includes short-term investments that can be easily converted to currency including time deposits valued under $100,000, savings deposits, money market deposits held at banks, and noninstitutional money market shares.

B. Does it Matter which Definition of the Money Supply We Use?

M2 has grown more over time as people increase their holdings of money market mutual fund shares and CDs. M1 has been more volatile, soaring during the recession years of 1990–1991, 2001, and 2007–2009 as investors desired the safety of liquid assets. The strengths and weaknesses of each measure will be discussed in future chapters.

Teaching Tips

There has been much discussion about how the Fed "printed money" and more than doubled the size of the money supply during the financial crisis. As a result, some commentators have predicted that the United States will experience hyperinflation. Have students look at Figure 2.2 on page 39 (both panel (a) and panel (b)) to see how much the money supply has really grown since the start of the crisis in fall 2008 (pay particular attention to M2). You can use this figure to reinforce the meaning of the money supply and the limits to the Fed's ability to increase it (though you should save the discussion of the difference between the monetary base and the money supply for a future chapter). Though M1 displays a couple of bursts of growth, neither was sustained. The growth of M2 does not differ much from its historical behavior.

2.5 The Quantity Theory of Money: A First Look at the Link between Money and Prices (pages 36–43)

Learning Objective: Use the quantity theory of money to analyze the relationship between money and prices in the long run.

A. Irving Fisher and the Equation of Exchange

The velocity of money is defined as the number of times a dollar is used to purchase a good or service in GDP or $V = PY/M$, where V is the velocity of money; Y is real GDP, P is the price level (so $P \times Y$ is nominal GDP), and M is the money supply. Rearranging terms, we obtain the equation of exchange, $M \times V = P \times Y$ (which is true by definition). Irving Fisher assumed that the velocity of money is constant to develop the quantity theory of money. Therefore, if the money supply (M) increases more quickly than real GDP (Y), the difference is inflation (P).

B. The Quantity Theory Explanation of Inflation

We can rewrite the equation of exchange in percentage terms as: the percentage change in M plus the percentage change in V equals the percentage change in P plus the percentage change in Y. Because V is assumed to be constant, the percentage change in V is 0. Therefore, if the money supply (M) increases more quickly than real GDP (Y), there will be an increase in the percentage change of the price level, which is inflation.

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C. How Accurate Are Forecasts of Inflation Based on the Quantity Theory?

Because velocity can move erratically in the short run, we would not expect the quantity equation to provide good forecasts of inflation in the short run. Over the long run, however, there is a strong link between changes in the money supply and inflation.

D. The Hazards of Hyperinflation

When there is hyperinflation, prices rise so rapidly that a given amount of money can purchase fewer and fewer goods and services each day. Households and firms may refuse to accept money at all, in which case money no longer functions as a medium of exchange. When economies do not use money, the degree of specialization necessary to maintain high rates of productivity breaks down.

E. What Causes Hyperinflation?

The quantity theory indicates that hyperinflation is caused by the money supply increasing far more rapidly than the real output of goods and services. The ultimate cause of hyperinflation is usually governments spending more than they collect in taxes, which results in government budget deficits. If private investors are not willing to purchase government bonds and the government controls the central bank, the government will sell the bonds to the central bank. The central bank increases the money supply to buy the bonds, resulting in monetizing the debt.

F. Should Central Banks Be Independent?

Research has shown that countries with highly independent central banks have lower inflation rates than countries whose central banks have little independence. The more independent a central bank is of the rest of the government, the more it can resist political pressures to increase the money supply, and the lower the country's inflation rate is likely to be. Policymakers continue to debate whether Congress and the president should change the law to reduce the Fed's independence, although historically, curtailing the independence of a central bank has resulted in higher inflation rates.

Teaching Tips

Have students consider the implications of Figure 2.4 on page 46 regarding the independence of the Federal Reserve. Discussion can involve what would likely happen to inflation in the United States if Congress reduced the independence of the Fed.

■ Solutions to the End-of-Chapter Questions, Problems, and Data Exercises

2.1 Do We Need Money?

Learning objectives: Analyze the inefficiencies of a barter system.

Review Questions

1.1 Barter is a system of exchange in which individuals trade goods and services directly for other goods and services. The costs of a barter system include the transactions cost of searching for trading partners (as a result of the need for a double coincidence of wants), the many prices for each good in terms of every other good it might be exchanged for, a lack of standardization of goods being exchanged, and the difficulty of accumulating wealth by storing goods.

1.2 Commodity money is a good used as money that has value independent of its use as money. Cigarettes and gold are two examples of commodity money.

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1.3 Specialization is a system in which individuals produce the goods or services for which they have relatively the best ability. Specialization increases productivity. By specializing, people as a whole are far more productive than they would be if they tried to produce all the goods and services they consume themselves.

Problems and Applications

1.4 From the point of view of an individual, a $20 Federal Reserve Note is more convenient than a $20 gold coin because it has a higher value relative to its weight. From the point of view of the government, a $20 Federal Reserve Note is more desirable because it has a lower cost to produce relative to its face value.

1.5 The primary difference would be that using a deerskin as money incurs a much larger transaction cost because it is bigger/heavier than paper money. In addition, deerskins are not of uniform quality, which is a drawback to using them as money.

1.6 The packs of cigarettes should be considered money because they had displaced the official currency (rubles) as the money used by Moscow taxi drivers and possibly other merchants.

1.7 Cigarettes must have been acceptable to most people (because so many people smoked cigarettes in the World War II period), they have a fairly standard quality (although there would have been some differences across brands), they are relatively durable, they are light (although bulky compared to paper currency), and they are divisible by individual cigarette. Until people put their faith into the new currency, commodity goods with universal value (cigarettes) are a logical replacement as money. Anyone would have been willing to use cigarettes as money, not just people who smoked, as long as they knew they could use cigarettes to buy other goods and services.

2.2 The Key Functions of Money

Learning objective: List and describe the four key functions of money.

Review Questions

2.1 To serve as money, dollar bills and personal checks must generally be accepted as means of payment. Various circumstances might cause you or a business to be reluctant to accept a dollar bill as money, such as the example of Apple in 2010 wanting to keep track of anyone attempting to buy more than the two of the newly released iPads or a convenience store not willing to receive large denomination bills in order to lessen the risk of robbery. You or a business may not want to accept personal checks if you do not want to bear the cost of receiving bad checks.

2.2 The four main functions of money are to serve as a medium of exchange (generally accepted means of payment), unit of account (all prices expressed in monetary terms), store of value (transferring purchasing power over time), and standard of deferred payment (unit of account for exchange over time).

2.3 No, the store-of-value function is not unique to money. Houses, bonds, and stocks are other examples of stores of value. Money must be a reasonable store of value to function as a medium of exchange. People will not accept money for long if it loses value rapidly.

2.4 Commodity money has value beyond its use as currency; fiat money has no intrinsic value.

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Problems and Applications

2.5 a. Milk can be difficult to transport, milk containers can break or leak, and milk can sour if not properly refrigerated.

b. Each good could be listed in terms of the amount of milk required to exchange for a particular good. However, the value of milk would vary depending on the supply and demand for milk. These fluctuations would make prices in terms of milk unstable.

c. Storing milk is difficult, and it can sour. This would make milk a poor store of value.

d. Future milk can be promised in exchange for present goods and services. However, changes in the value of milk due to changes in the supply and demand would mean that its future value would be unpredictable.

2.6 a. Wealth increases

b. Income increases

c. The form you are holding your wealth in changes from cash to an iPad, but the value of your wealth does not change.

2.7. People who hold a lot of cash and those who wanted to be anonymous when they buy products would gain. Firms such as Apple would lose, as they would not be able to keep track of who bought newly-released products with long waiting lists, such as iPads in 2010; this would make it possible for these buyers to resell the products at higher prices. Other firms that have reasons not to accept paper currency as payment—for instance, automobile dealers—would also lose because their transactions costs would rise.

2.8. People in emerging markets might use U.S. currencies rather than the currencies issued by their governments because of soaring inflation rates in their domestic economies which dramatically decrease the purchasing power of their currencies. They may also be using U.S. currencies to conduct illegal activities across country borders. The demand for $100 bills exceeds the demand for lower-denomination bills because $100 bills make it easier to conduct large cash transactions that involve illegal activities.

2.9 a. You may or may not have used a $100 bill to buy something. The $100 bill derives its popularity from making it easier to conduct large cash transactions, including for illegal activities.

b. By making large cash transactions easier to conduct, the $100 bill may facilitate illegal activities. The Federal Reserve may stop issuing $100 bills to discourage illegal activities.

2.3 The Payments Systems

Learning objective: Explain the role of the payments system in the economy.

Review Questions

3.1 If the payments system becomes less efficient, there would be an increase in the cost of trade and credit. The five desirable outcomes for the payments system are speed, security, efficiency, smooth international transactions, and effective collaboration among participants in the system.

3.2 It was expensive to transport gold and silver coins. Paper currency lowered the cost of transactions.

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3.3 Blockchain is technically a distributed ledger, or an online network that registers ownership of funds, securities, or any other good, including movies and songs. Blockchain allows individuals and businesses around the world to settle transactions instantly and securely on encrypted sites. It is likely that more transactions in the United States will be cashless in the future, but it is unlikely that cash will be eliminated. First, the infrastructure for an e-payments system is expensive to build, and second, many people want the option to use cash for privacy purposes. Finally, lower-income people may lack the means to carry out electronic transactions and may have to continue to use cash.

Problems and Applications

3.4 As the stones were destroyed, the value of each remaining stone would increase because there would be fewer stones relative to goods and services. As a result, prices would fall and the economy would experience deflation. If someone found a quantity of new stones, the value of stones would fall because there would be more of them relative to goods and services. As a result, prices would rise and the economy would experience inflation.

3.5 a. Coinage becomes debased when amounts of less valuable metals are mixed in with gold and silver coins.

b. Money is only as good as the confidence a person has in its value. Citizens need to trust that money the government creates has exchange value and will be accepted by others.

c. "In kind" means to pay for a service or good with another service or good. Paying in kind would increase the cost of trade and other economic activity, and thereby decrease specialization and the level of real income in the empire.

3.6 Blockchain technology refers to an online network that can register ownership of funds, securities, and other goods, including movies and songs. Blockchain allows individuals and businesses around the world to settle transactions instantly and securely on encrypted sites. The ability to direct transactions through blockchain could eliminate banks and other intermediaries, potentially greatly reducing transactions costs.

3.7 Competitors to PayPal would need to have enough merchants and households using their electronic payments system to make the system work and would need enough business to spread the overhead costs of setting up the competing electronic payments system. Economists use the phrase "network externalities" when referring to the lower costs that a firm like PayPal has relative to potential entrants to its market. The more merchants and households that use PayPal, the more desirable using the system becomes for other merchants and households, the lower PayPal's cost are, and the more difficult it becomes for new entrants to compete with it.

3.8 a. The benefits to the bank would be the reduction in cost from eliminating ATMs and cash withdrawals and deposits, and the reduced likelihood of a bank robbery. The costs would be the loss of customers who prefer using cash, such as older people, people with vision problems, low-income people, and people with privacy concerns. The bank could gain new customers if the reduction in costs allowed it to handle other transactions more quickly and cheaply.

b. The bank could measure the benefits from eliminating ATMs and cash withdrawals and deposits by calculating the cost savings from purchasing and maintaining less capital equipment and from hiring fewer workers. The bank could measure the costs by estimating the loss of customers who prefer using cash. It could examine the demographics of its customers and determine how many are older people, people with vision problems, or have low incomes, and make a forecast of how many of these customers would switch to other banks.

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3.9 a. The benefits to the store would be the reduction in cost from eliminating cash registers and the handling of cash, and the reduced likelihood of being robbed. The costs would be the loss of customers who prefer using cash.

b. As with the bank in the previous problem, the store could measure the benefits from eliminating cash registers and the handling of cash by calculating the cost savings from purchasing and maintaining cash registers and (possibly) from hiring fewer workers. The store could measure the costs by examining its customer base to determine how many are older people, people with vision problems, or people with low incomes.

2.4 Measuring the Money Supply

Learning objective: Explain how the U.S. money supply is measured.

Review Questions

4.1 The assets in M1 are more liquid. M1 is the narrow definition of the money supply and includes currency in circulation, traveler's checks, and checking account deposits, all assets that are highly liquid. M2 is a broader measure of the money supply and includes M1, time deposits with a value of less than $100,000 each, savings accounts, money market deposit accounts, and non-institutional money market mutual fund shares.

4.2 M2 has grown more rapidly. Certificates of deposit, money market mutual fund shares, and other assets that are included only in M2 have grown faster than currency in circulation or checking accounts. The growth of M2 has been more stable than the growth of M1, although as Figure 2.2, panel (b) on page 39 shows, there have been substantial swings in the growth rates of both measures of the money supply.

Problems and Applications

4.3 Liquidity indicates the ease with which an asset can be converted to money. Ranking from most to least liquid: dollar bill, checking account, savings account, money market mutual fund, corporate stock, gold bar, and house.

4.4 The M1 measure of the money supply includes the assets that are easily used as a medium of exchange and households and firms can easily use checking accounts to buy goods and services.

4.5 a. Both M1 and M2

b. Only M2

c. Only M2

d. Both M1 and M2

4.6 Gold is not used as money in the United States today, so it is not included in either the M1 or M2 definition of the money supply.

4.7 M1 will decrease and M2 will stay the same. M2 includes both the checking account deposit (because M2 includes M1) and the certificate of deposit.

4.8 Credit cards are not a form of money, because they are a debt that is owed to the issuer of the card. A transaction using a credit card is completed only when the credit card debt is paid off - typically using a check.

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4.9 The rate of M1 growth could increase rapidly while the rate of M2 growth decreases if people transfer funds from certificates of deposit, savings accounts, money market deposit accounts, and noninstitutional money market mutual funds into checking account deposits (which would increase M1) and into other assets such as stocks and bonds not included in the measures of the money supply (which would decrease M2).

2.5 The Quantity Theory of Money: A First Look at the Link Between Money and Prices

Learning objective: Use the quantity theory of money to analyze the relationship between money and prices in the long run.

Review Questions

5.1 The equation of exchange relates the quantity of money, M, the velocity of money, V, the price level, P, and the level of real GDP, Y as $M \times V = P \times Y$. With the velocity of money defined as $(P \times Y)/M$, the equation of exchange is an identity, not a theory. A theory is a statement about the world that might possibly be false.

5.2 The quantity theory of money is a theory about the relationship between money and prices that assumes that the velocity of money is constant (or at least stable). The theory is based on the equation of exchange identity: $M \times V = P \times Y$. Assuming that velocity (V) is constant, increases in the money supply that exceed increases in real GDP lead to inflation.

5.3 Large increases in the money supply cause hyperinflation. Historically, the large increases in the money supply resulting in hyperinflation were ultimately caused by large government budget deficits, which were paid for by the central bank buying government bonds, thereby increasing the money supply.

5.4 Pro: The central bank will be independent from direct political influence. For example, in the United States, the independence of the Federal Reserve means that Congress has no direct control over monetary policy. Typically, inflation is lower when a central bank is independent. Cons: A central bank may have too much power without the checks and balances that come from being overseen by elected members of the government. In addition, the independence of the central bank may make it more difficult for the government to coordinate monetary and fiscal policy.

Problems and Applications

5.5 Rearranging the quantity equation in terms of percentage changes: $\% \Delta V = (\%\Delta P + \%\Delta Y) - \% \Delta M$ or $1 = (2 + 3) - 4$. The value of velocity in 2018 would have increased by 1%.

5.6 This statement is not true. If total production refers to nominal GDP, then an increase in the money supply need not increase nominal GDP (P x Y) if velocity falls more than the money supply rises. If total production refers to real GDP, then an increase in the money supply even if velocity does not change, could lead to an increase in the price level, not real GDP.

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5.7 The money supply falling, the velocity of money falling, or the money supply increasing more slowly than real GDP—with velocity remaining constant—can all cause a deflation. It is not necessary for the quantity of money to decline for a deflation to occur. Although there is a strong link between money supply and prices, prices can fall without the money supply falling. For example, if velocity is constant, while real GDP increases by 4%, then a 3% increase in the money supply would result in a 1% decline in the price level. During the late nineteenth century in the United States, the money supply increased most years, although the rate of increase was small.

5.8 Inflation reduces the value of money. Fewer transactions using money will occur if inflation is high. At very high rates of inflation, households and firms tend to use barter to exchange goods and services because they fear that holding money even for brief periods will cause them to suffer losses as the purchasing power of the money rapidly declines.

5.9 Statistical evidence shows a strong relationship between the growth rate of the money supply and the inflation rate in the long run. The link is stronger in the long run than in the short run, because changes in the growth rates of velocity and real GDP are greater in the short run.

5.10 a. Zimbabwe abandoned its own currency, the Zimbabwean dollar, because it was experiencing hyperinflation that had destroyed the purchasing power of the currency, leading to sharp declines in production and employment.

b. Using the U.S. dollar gave Zimbabwe a stable currency, eliminating the ruinous effects of hyperinflation.

c. Zimbabwe can no longer use monetary policy because it no longer has control over the currency households and firms are using.

5.11 Ending the hyperinflation was better news for lenders to the extent that the hyperinflation was unanticipated and resulted in borrowers paying back their loans in money that had less purchasing power than anticipated. Because the hyperinflation had caused banks to sharply reduce the number of loans granted, however, the end of the hyperinflation was also good news to many borrowers.

5.12 The war reparations left Germany with unrealistic debt obligations. To meet these debt obligations, Germany printed money. Printing large amounts of money caused hyperinflation, which resulted in a collapse in the purchasing power of money and created economic turmoil. As we have seen in this chapter, when money is no longer used as a medium of exchange, an economy revert to barter, with a resulting decline in specialization and income. In addition, people with savings accounts, bonds, and other financial assets payable in currency will have some, perhaps all, of their wealth wiped out. It is in the context of this economic turmoil and discontent that the Nazi party eventually gained power. Had there not been economic turmoil in post-WWI Germany, it could be argued Adolf Hitler might not have been able to seize power.

5.13 The Federal Reserve was designed to be independent of Congress and the president in order for the Federal Reserve to make monetary policy decisions in an apolitical way. The more independent a central bank is of the rest of government, the more it can resist political pressures to increase the money supply, and the lower the country's inflation rate is likely to be.

5.14 a. "The appearance of and the fact of the independence of the Federal Reserve" refers to the Federal Reserve making monetary policy decisions independent of Congress and the president.

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b. A president discussing details of monetary policy with a Fed chair might be seen as the president influencing monetary policy decisions. The president does appoint the Fed chair to renewable 4-year terms. The appearance of Fed independence being undermined would influence market expectations of economic policy, particularly inflationary expectations.

Data Exercises

D2.1 For September, 2016: M1 Money Stock = $3,317.9 billion, Currency Component of M1 = $1,402.1 billion, Total Checkable Deposits = $1,913.5 billion, and Travelers Checks Outstanding = $2.2 billion. Total Checkable Deposits are the largest component of M1 and Travelers Checks Outstanding are the smallest.

D2.2 a.

Date	M1	M2	M1/M2
2016-09	$3,317.9 billion	$13,060.9 billion	0.254
2011-09	$2,128.6 billion	$9,518.6 billion	0.224
2006-09	$1,362.5 billion	$6,907.0 billion	0.197

b. M1 as a proportion of M2 increased from September 2006 to September 2016. The rise in M1 as a proportion of M2 may be due to the historically low interest rates on short-term financial assets such as savings accounts, money market deposit accounts, small time deposits, and money market mutual funds.

D2.3 a. Using the equation of exchange ($M \times V = P \times Y$), $M = (P \times Y)/V$. $P \times Y$ equals nominal GDP. See the table below for the data and the calculations of M1 and M2.

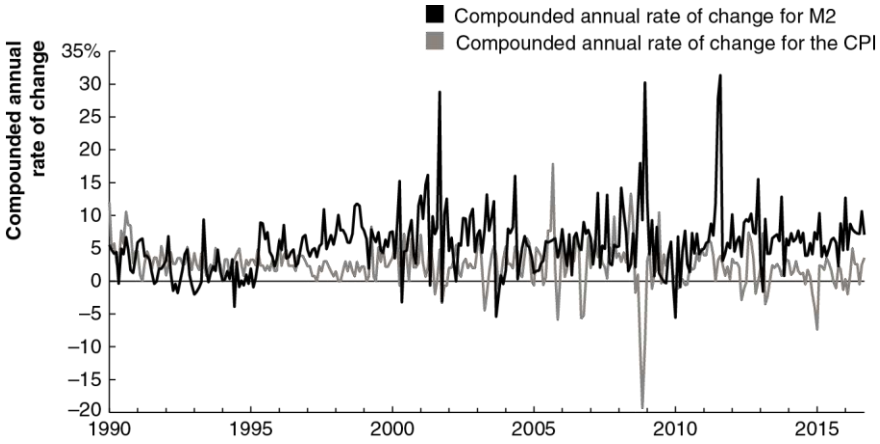
Year/Quarter	Nominal GDP (billions)	Velocity of M1	Velocity of M2	M1 (billions)	M2 (billions)
2016/3rd	$18,651.2	5.677	1.437	$3,285.4	$12,979.3
1985/3rd	$4,394.6	7.371	1.799	$596.2	$2,442.8

b. Both the velocity of M1 and the velocity of M2 declined from 1985 to 2016.

D2.4 The compound annual rate of change of M2 and the percentage change in the CPI tend to move together, though not perfectly; M2 was considerably more volatile.

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