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Money

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MONEY

a commodity accepted by general consent as a medium of economic exchange. It is the medium in which prices and values are expressed, as currency it circulates anonymously from person to person and country to country, thus facilitating trade, and it is the principal measure of wealth.

The subject of money has fascinated people from the time of Aristotle to the present day. The piece of paper labeled one dollar, 10 euros, 100 yuan or 1,000 yen is little different, as paper, from a piece of the same size torn from a newspaper or magazine, yet it will enable its bearer to command some measure of food, drink, clothing, and the remaining goods of life while the other is fit only to light the fire. Whence the difference? The easy answer, and the right one, is that modern money is a social contrivance. People accept money as such because they know that others will. This information, or common knowledge, makes the pieces of paper valuable because everyone thinks they are, and everyone thinks they are because in his or her experience they always have been accepted in exchange for valuable goods or assets. At bottom money is, then, a social convention, but a convention of uncommon strength that people will abide by even under extreme provocation. The strength of the convention is, of course, what enables governments to profit by inflating the currency. But it is not indestructible. When great increases occur in the quantity of these pieces of paper --- as they have during and after wars --- they may be seen to be, after all, no more than pieces of paper. The social arrangement that sustains money as a medium of exchange breaks down. People will then seek substitutes—like the cigarettes and cognac that for a time served as the medium of exchange in Germany after World War II. New money may substitute for old under less extreme conditions. In many countries with a history of high inflation, such as Argentina, Israel, or Russia, people use the U.S. dollar to quote prices because the dollar has more stable value than the local currency, and they accept the dollar as a medium of exchange because it is well-known and more stable in purchasing power than local money.

FUNCTIONS OF MONEY

The basic function of money is to enable buying to be separated from selling, thus permitting trade to take place without the so-called double coincidence of barter. In principle, credit could perform this function, but before extending credit, the seller would want to know about the prospects of repayment. That requires much more information about the buyer and imposes costs of information and verification that the use of money avoids.

If a person has something to sell and wants something else in return, the use of money avoids the need to search for someone able and willing to make the desired exchange of items. The person can sell the surplus item for general purchasing power --- that is, "money" --- to anyone who wants to buy it and then use the proceeds to buy the desired item from anyone who wants to sell it.

The importance of this function of money is dramatically illustrated by the experience of Germany just after World War II, when paper money was rendered largely useless because of price controls that were enforced effectively by the American, French, and British armies of occupation. Money rapidly lost its value. People were unwilling to exchange real goods for depreciating currency. They had to resort to barter or to inefficient money substitutes. Price controls reduced incentives to produce. The result was to cut total output of the economy in half. The German "economic miracle" just after 1948 reflected partly a currency reform by the occupation authorities that
replaced depreciating money with money of stable value and, at the same time, eliminated all price controls, thereby permitting a money economy to replace a barter economy.

Separation of the act of sale from the act of purchase requires the existence of something that will be generally accepted in payment — this is the "medium of exchange" function of money. But there must also be something that can serve as a temporary store of purchasing power, in which the seller holds the proceeds in the interim between the first sale and the subsequent purchase, or from which the buyer can extract the general purchasing power with which to pay for what is bought. This is the "asset" function of money.

VARIETIES OF MONEY

Anything can serve as money that habit or social convention and successful experience endow with the quality of general acceptability, and a variety of items have so served — from the wampum (beads made from shells) of American Indians to cowries (brightly colored shells) in India, to whales' teeth among the Fijians, to tobacco among early colonists in North America, to large stone disks on the Pacific island of Yap, to cigarettes and liquor in post-World War II Germany. The wide use of cattle as money in primitive times survives in the word pecuniary, which comes from the Latin _pecus_, meaning cattle.

Metallic Money

The use of metals as money has occurred throughout history. As Aristotle observed, the various necessities of life are not easily carried about, and hence people agreed to employ in their dealings with each other something that was intrinsically useful and easily applicable to the purposes of life, for example, iron, silver, and the like. The value of the metal was at first measured by size and weight but, in time, governments or sovereigns put a stamp upon it, to save the trouble of weighing and to make the value known at sight.

The use of metal for money can be traced back to Babylon more than 3000 years before the birth of Christ, but there were earlier standards. Standardization and certification in the form of coinage, as referred to by Aristotle, did not occur except perhaps in isolated instances until the 7th century. Historians generally assign to Croesus, King of Lydia, a state in Anatolia, priority in using coined money. The first coins were made of electrum, a natural mixture of gold and silver, and were crude, bean-shaped ingots bearing a primitive punchmark certifying to either weight or fineness, or both.

The use of coins enabled payment to be by "tale," or count, rather than weight, greatly facilitating commerce. But this in turn encouraged clipping (shaving off tiny slivers from the sides or edges of coins) and sweating (shaking a bunch of coins together in a leather bag and collecting the dust that was thereby knocked off) in the hope of passing on the lighter coin at its face value. Gresham's law (that "bad money drives out good" when there is a fixed rate of exchange between them) came into operation, and heavy, good coins were held for their metallic value, while light coins were passed on to others. The coins became lighter and lighter, and prices higher and higher. Then payment by weight would be resumed for large transactions, and there would be pressure for recoinage. These particular defects were largely ended by the "milling" of coins (making serrations around the circumference of a coin), which began in the late 17th century. A more serious matter was the attempt by the
sovereign to benefit from the monopoly of coinage. In this respect, Greek and Roman experience offers an interesting contrast. Though Solon, on taking office in Athens in 594 BC, did institute a partial debasement of the currency, for the next four centuries, until the absorption of Greece into the Roman Empire, the Athenian drachma had an almost constant silver content (67 grains of fine silver until Alexander, 65 grains thereafter) and became the standard coin of trade in Greece and in much of Asia and Europe as well. Even after the Roman conquest, the drachma continued to be minted and widely used.

The Roman experience was very different. Not long after the silver denarius, patterned after the Greek drachma, was introduced in about 212 BC, the prior copper coinage (aes, or libra) began to be debased until, by the time the empire began, its weight had been reduced from one pound to half an ounce. The silver denarius and the gold aureus (introduced about 87 BC) suffered only minor debasement until the time of Nero (54 BC), when almost continuous tampering with the coinage began. The metal content of the gold and silver coins was reduced, and the proportion of alloy was increased to three-fourths or more of its weight. Debasement in Rome (as ever since) used the state's profit from money creation to cover its inability or unwillingness to finance its expenditures through explicit taxes. But the debasement in turn raised prices, worsened Rome's economic situation and contributed to the collapse of the empire.

Paper Money

The history of money shows repeated innovations that changed the objects used as money. Carrying large sums in gold, silver, or other metal was inconvenient and risked loss or theft. China was the first to use paper money, more than 1000 years ago. By the late 18th and early 19th centuries, paper money and bank notes spread widely. The bulk of the money in use came to consist not of actual gold or silver but of fiduciary money --- promises to pay specified amounts of gold and silver. These promises were initially issued by individuals or companies as bank notes or as the transferable book entries that came to be called deposits. Although deposits and bank notes began as claims to gold or silver on deposit at a bank or with a merchant, this later changed. Knowing that everyone would not claim his or her balance at once, the bank or merchant could issue more claims to the gold and silver than the amount held in safekeeping. It could invest the difference or lend it at interest. In periods of distress, when borrowers did not repay their loans or in case of overissue, the bank might fail.

Gradually, the government assumed a supervisory role. It specified legal tender, defining the type of payment that legally discharged a debt when offered to the creditor and that could be used to pay taxes. It set the weight of coins and their metallic composition. Later, it replaced fiduciary paper money promising to pay gold or silver with fiat paper money --- that is, notes that are issued on the "fiat" of the sovereign government, are specified to be so many dollars or pounds, or yen, and are legal tender but are not promises to pay something else. The first large-scale issue in a Western country occurred in France in the early 18th century. The French revolutionary government issued paper money in the form of assignats from 1789 to 1796. The American colonies and later the Continental Congress issued bills of credit that could be used in making payments. These early experiments gave fiat money a deservedly bad name. The money was overissued, and prices rose drastically until the money became
worthless or was redeemed in metallic money (or promises to pay metallic money) at a small fraction of its initial value.

Subsequent issues of fiat money in the major countries during the 19th century were temporary departures from a metallic standard. In Great Britain, for example, the government suspended payment of gold for the outstanding bank notes during the Napoleonic Wars (1797-1815). To finance the war, the government issued fiat paper money. Prices in Great Britain doubled as a result, and gold coin and bullion became more expensive in terms of paper. To restore the gold standard at the former gold price, the government deflated the price level by reducing the quantity of money. In 1821, the gold standard was restored. Similarly, in the United States during the Civil War, the government suspended convertibility of Union currency (greenbacks) into specie, and resumption did not occur until 1879. At its peak in 1864, the greenback price of gold, nominally equivalent to $100, reached more than $250.

Episodes of this kind, repeated in many countries, convinced the public that war brings inflation, and the aftermath of war brings deflation and depression. This sequence is not inevitable. It reflected nineteenth century experience under metallic money standards. Typically, wars required increased government spending and budget deficits. Governments suspended the metallic (gold) standard and financed their deficits by borrowing and printing paper money. Prices rose.

The end of wartime spending and inflation left the price of gold far above its pre-war value. To restore the metallic standard at the prewar price of gold in paper money, prices quoted in paper money had to fall. The alternative was to accept the increased price of gold in paper money by devaluing the currency. After World War I, Great Britain and the United States deflated, but many other countries devalued their currencies against gold. After World War II, all major countries accepted the higher price level and most devalued to avoid deflation and depression.

Since the cost of producing paper money is far below its exchange value, forgery is common. The development of copying machines made forgery easier, necessitating changes in paper, use of metallic strips and other devices to make forgery more difficult. The use of machines to identify, count, or change currency increases the need for tests to identify genuine currency.

STANDARDS OF VALUE

In the Middle Ages, when money consisted primarily of coins, silver and gold coins circulated simultaneously. As governments came increasingly to take over the coinage, and especially as fiduciary money was introduced, they specified their nominal monetary units in terms of fixed weights of either silver or gold. Some adopted a national bimetallic standard, with fixed weights for both gold and silver based on their relative values on a given date, for example 15 ounces of silver equal one ounce of gold. As the prices changed, Gresham's law assured that the bimetallic standard degenerated into a monometallic standard: if the quantity of silver designated as the monetary equivalent of one ounce of gold (15 to 1) was less than the quantity that could be purchased in the market for one ounce of gold, (say 16 to 1), no one would bring gold to be coined. Holders of gold found it was better to buy silver in the market, receiving 16 ounces for each ounce of gold, then take 15 ounces of silver to the mint to be
coined and accept payment in gold. Continuing this profitable exchange drains the gold from the mint, and leaves
the mint with silver coinage. Silver, the cheaper metal in the market, "drove out" gold and became the standard.
This happened in most of the countries of Europe, so that by the early 19th century all were effectively on a silver
standard. In Britain, on the other hand, the ratio established in the 18th century, on the advice of Sir Isaac Newton
then serving as master of the mint, overvalued gold and therefore led to an effective gold standard. In the United
States a ratio of 15 ounces of silver to one ounce of gold was set in 1792. This ratio overvalued silver, so silver
became the standard. In 1834 the ratio was altered to 16 to one, which overvalued gold, so gold became the
standard.

The Gold Standard

The great gold discoveries in California and Australia in the 1840s and 50s produced a temporary decline in
the value of gold in terms of silver. This price change, plus the dominance of Britain in international finance, led to
a widespread shift from a silver standard to a gold standard. Germany adopted gold in 1871-73, the Latin Monetary
Union (France, Italy, Belgium, Switzerland) in 1873-74, the Scandinavian Union (Denmark, Norway, and Sweden)
and The Netherlands in 1875-76. By the final decades of the century, silver remained dominant only in the Far East
(China, in particular). Elsewhere the gold standard reigned.

The early 20th century was the great era of the international gold standard. Gold coins circulated in most
of the world; paper money, whether issued by private banks or by government, was convertible on demand into gold
coins or gold bullion at an official price (with perhaps the addition of a small fee); and bank deposits were
convertible into either gold coin or paper currency that was itself convertible into gold. In a few countries, a minor
variant prevailed --- the so-called gold-exchange standard, under which a country's reserves included not only gold
but also currencies of other countries that were convertible into gold. Currencies were exchanged at a fixed price
into the currency of another country (usually the British pound sterling) that was itself convertible into gold.

There was, in effect, a single world money called by different names in different countries. A U.S. dollar,
for example, was defined as 23.22 grains of pure gold (25.8 grains of gold 9/10ths fine). A British pound sterling
was defined as 113.00 grains of pure gold (123.274 grains of gold 11/12ths fine). Accordingly, one British pound
equaled 4.8665 U.S. dollars (113.00/23.22) at the official parity. The actual exchange rate could deviate from this
value only by an amount that corresponded to the cost of shipping gold. If the price of the pound sterling in terms of
dollars rose to a considerably higher value than this in the foreign exchange market, someone in New York City who
had a debt to pay in London might find that, rather than buy the needed pounds on the market, it was cheaper to get
gold for dollars at a bank or at the U.S. subtreasury, ship the gold to London, and get pounds for the gold from the
Bank of England. This set an upper limit to the exchange rate. Similarly, the cost of shipping gold from Britain to
the United States set a lower limit. These limits were known as the gold points.

Under such an international gold standard, the quantity of money in each country was determined by this
mechanism, known as the price-specie-flow adjustment mechanism and analyzed by 19th-century economists. If,
for whatever reason, the quantity of money in a country rose unduly, this would tend to raise prices in that country
relative to prices in other countries; the rise in prices would have the effect of discouraging exports and encouraging
imports. The decreased supply of foreign currency from the sale of exports plus the increased demand for foreign currency to pay for imports would tend to raise the price of foreign currency in terms of domestic currency. As soon as this price hit the upper gold point, gold would be shipped out of the country to other countries. The decline in the amount of gold would produce in turn a reduction in the total amount of money—because banks and government institutions, seeing their gold reserves decline, would want to protect themselves against further demands by reducing the claims against gold that were outstanding. This would tend to lower prices at home. The influx of gold abroad would have the opposite effect, increasing the quantity of money there and raising prices. These adjustments would continue until the gold flow ceased or was reversed.

Precisely the same mechanism that operates within a unified currency area. That mechanism determines how much money there is in Illinois compared to how much there is in other states or how much there is in Wales compared to how much there is in other parts of the United Kingdom. In the early 20th century, most of the commercial world was a unified currency area, so the gold standard functioned throughout the world. Its great advantage was that—if permitted to operate—it would greatly limit the power of any national government to engage in irresponsible monetary expansion. This was also its great disadvantage. In an era of big government and of full-employment policies, a real gold standard would tie the hands of governments in one of the most important areas of policy.

The Decline of Gold

World War I ended the real international gold standard. Most belligerents suspended the free convertibility of gold. The United States, even after its entry into the war, maintained convertibility but embargoed gold exports. For a few years after the end of the war, most nations had inconvertible national paper standards—inconvertible in that paper money was not convertible into gold or silver. The exchange rate between any two currencies was a market rate that fluctuated from time to time. At the time, this was regarded as a temporary phenomenon, like the British suspension of gold payments during the Napoleonic era, and the U.S. suspension during the Civil War greenback period. The great aim was a restoration of the prewar gold standard. Since price levels had increased in all countries during the war, countries had to choose deflation or devaluation to restore the gold standard. This effort dominated monetary developments during the 1920s. Britain, still a major financial power, chose deflation. Winston Churchill, Chancellor of the Exchequer in 1925, decided to follow prevailing financial opinion and adopt the prewar parity (i.e., to define a pound sterling once again as equal to 123.274 grains of gold 11/12ths fine). This produced exchange rates that, at the existing prices in sterling, overvalued the pound and so tended to produce gold outflows, especially after France chose devaluation and returned to gold in 1928 at a parity that undervalued the franc. By 1929 the important currencies of the world, and most of the less important ones, were again linked to gold.

The gold standard that was restored, however, was a far cry from the prewar gold standard. The establishment of the Federal Reserve System in the United States in 1913 introduced an additional link in the international specie-flow mechanism. That mechanism no longer operated automatically. It operated only if the
Federal Reserve chose to let it do so, and the Federal Reserve did not so choose; to prevent domestic prices from rising, it offset the effect on the quantity of money of an increase in gold. (It "sterilized" the monetary effect.)

France made a similar choice. With the franc undervalued, gold flowed to France. The French government sold the foreign exchange for gold, draining gold from Britain and other gold standard countries. The two countries receiving gold, the United States and France did not permit gold inflows to raise their price levels. Countries that lost gold had to deflate. Thus, the gold exchange standard forced deflation and unemployment on much of the world economy. By the summer of 1929, Canada had left the gold standard and recessions were underway in Great Britain and Germany. In August, the United States joined the recession that became the Great Depression.

In 1931, Great Britain left the gold standard followed by the Scandinavian countries and many of the countries in the British Empire. The United States followed in 1933, restoring a fixed—but higher—dollar price for gold in January 1934, at $35 an ounce but barring U.S. citizens from owning gold. France, Switzerland and members of the Latin Union left the gold standard in 1936. Although not clear at the time, that was the end of the gold standard.

The Bretton Woods System

During World War II, Great Britain and the United States planned the postwar monetary system. Their plan, approved by more than 40 countries at Bretton Woods, New Hampshire in July 1944, aimed to correct the perceived deficiencies of the gold exchange standard. These included the volatility of floating exchange rates, the inflexibility of fixed exchange rates and reliance on an adjustment mechanism for countries with payment surpluses or deficits that often required recessions and deflation in deficit countries and expansion and inflation in surplus countries. Countries joined an International Monetary Fund, paid a subscription to start the Fund, and agreed to a system of fixed but adjustable exchange rates. Countries with payments deficits could borrow from the Fund, and countries with surpluses would lend. If deficits or surpluses persisted, the agreement provided for changes in exchange rates. The dollar price of gold was fixed at $35 an ounce. The U.S. agreed to maintain that price by buying or selling gold.

Postwar recovery, low inflation, growth of trade and payments and the build up of international reserves in industrial countries permitted the new system to come into full operation at the end of 1958. Although a vestigial tie to gold remained and the gold price stayed at $35 an ounce, in practice the Bretton Woods system put the market economies of the world on a dollar standard. The U.S. dollar served as the world's principal currency, and countries held most of their reserves in interest bearing dollar securities.

The dollar was the most widely used currency in international trade, even in trade between countries other than the United States. It was the unit in terms of which countries expressed their exchange rate. Countries maintained their "official" exchange rates by buying and selling U.S. dollars and held dollars as their primary reserve currency for that purpose. The existence of a dollar standard did not mean that other countries could not change their exchange rates, just as the gold standard did not mean that they could not "devalue" or "appreciate" in terms of gold. Many countries devalued or revalued including major countries, Great Britain in 1967 and Germany and France in 1969, as the System neared its end. In practice, however, the United States was not free to determine
its own exchange rate or its balance of payments position. Monetary expansion in the United States provided reserves for other countries; monetary contraction absorbed reserves. Central banks could convert dollars into gold, and they did, especially in the early years. As the stock of dollars held by central banks outside the United States rose and the U.S. gold stock dwindled, the United States could not honor its commitment to pay gold for dollars. The Bretton Woods System of fixed exchange rates appeared doomed. Governments and central banks tried for years to find a way to extend its life, but they could not agree. The end came on August 15, 1971, when President Nixon announced that the United States would no longer sell gold.

After Bretton Woods

The breakdown of the fixed exchange rate system ended countries' obligation to maintain a fixed price of their currency against gold or other currencies by buying when the exchange rate fell and selling when it rose. National currencies floated; the exchange rate rose or fell with market demand. If the exchange rate appreciated, buyers received fewer units in exchange for a unit of their own currency. Purchasers of local (home) goods and assets faced higher prices. Conversely, if the currency depreciated, home goods and assets became cheaper for foreigners. Countries heavily dependent on foreign trade disliked the frequent changes in price and costs under floating rates. Governments or their central banks often intervened to slow nominal (market) exchange rate changes. These interventions have been effective only against temporary changes.

In the long-run, a country's exchange rate depends on such fundamental factors as relative productivity growth, opportunities for investment, the public's willingness to save, and monetary and fiscal policies. These fundamental factors are at work whether the country has a fixed or a floating exchange rate and whether the authorities intervene to adjust the exchange rate or slow its changes. As long as markets for goods, services, assets and foreign exchange remain open, the country must adjust.

The principal difference between adjustment under fixed and floating exchange rates is how the country adjusts. With fixed exchange rates, adjustment occurs mainly by changing costs and prices of the myriad commodities that a country produces and consumes. Under floating exchange rates, the adjustment occurs mainly by changing the nominal exchange rate. For example, if Brazil's monetary policy increases Brazilian inflation, domestic prices of shoes, cocoa and most everything else rise. With a fixed exchange rate, the price rise deters exports and purchases by foreigners. Demand shifts from Brazil to other countries, lowering demand and reducing payments for its products that lower Brazil's money stock. The reduction in money, and the fall in demand, slow the Brazilian economy and reduce Brazilian prices. With a floating exchange rate, the adjustment comes about by reducing the demand for Brazilian currency, depreciating the exchange rate, thereby reducing the prices paid by foreigners.

Adjustment comes in many other ways. Brazilians may decide to invest more abroad, or foreigners may decide to invest less in Brazil. The long-run outcome will be the same. The reason is very basic: buyers and sellers do not care about the nominal exchange rate. What matters is the so-called real exchange rate -- the nominal exchange rate adjusted by prices at home and abroad. The buyer of Brazilian shoes in England cares about the local
cost in U.K. pounds. The Brazilian price of shoes is multiplied by the exchange rate to get the U.K. price. Under floating exchange rates, the exchange rate adjusts to keep a country's commodities competitive.

Most countries allowed their currencies to float in 1971, but that soon changed. Generally, small countries with relatively large trade sectors disliked floating rates. They wanted to avoid the often transitory, but sometimes large, changes in prices and costs arising in the foreign exchange market. Many of the smaller Asian countries, and countries in Central America and the Caribbean, fixed their exchange rates to the U.S. dollar. Countries like the Netherlands and Austria, with much West German trade, soon fixed their exchange rates to the German mark. These countries gave up independent central bank policy. When West Germany's central bank, or the U.S. central bank, changed interest rates, countries that fixed their exchange rate changed their interest rates also.

A country on a fixed exchange rate sacrifices independent monetary policy. But, a small country that is open to external trade has little scope for independent monetary policy. It cannot influence most of the prices at which its citizens buy and sell. If it inflates, its currency depreciates to bring its home prices back to equivalent world market prices. Even a large country cannot maintain an independent monetary policy if its exchange rate is fixed and its capital market remains open to inflows and outflows. With reduced reliance on capital controls, in the 1980s, many countries abandoned fixed exchange rates to preserve some control over domestic monetary policy.

Large economies such as the United States, Japan, and Great Britain continue to float. Switzerland and Canada are relatively small economies that prefer to retain some influence over domestic monetary conditions, so they too float. Hong Kong made the opposite choice. Although it was a British colony at the time and, later, a part of China, it chose to fix its exchange rate to the U.S. dollar. The method it revived is a nineteenth century system known as a currency board. There is no central bank. The exchange rate is fixed. Local banks increase the number of Hong Kong dollars only when they receive additional U.S. dollars, and they must reduce the stock of Hong Kong dollars, when U.S. dollar holdings decline. Hong Kong’s experience with its currency board encouraged a few other, mainly small, countries to follow its lead.

Some countries went a further step away from autonomous policy by adopting the U.S. dollar as their domestic currency. The most notable change of this general type is the decision by principal European countries to surrender their local currencies in exchange for a new common currency, the Euro.

The Euro

Western European countries have a considerable share of their trade with each other. Soon after the breakdown of the Bretton Woods System, some of these countries experimented with fixed exchange rates for their group. Before 1997, all such attempts failed within a few years.

European economic integration continued, however. After the founding of the European Union, committed to free exchange of goods, labor, and finance, fifteen governments agreed in 1991 to the Maastricht Treaty calling for a decade of adjustment to a single currency for member countries. Exchange rates were fixed "permanently and irrevocably" for twelve participating countries.

On January 1, 1999 the system began operation. The European Central Bank, in Frankfurt Germany, received a mandate from member governments to maintain price stability. The governments named the new
currency the euro. At first, values of debts, assets, and prices of goods and services were expressed in euros, usually with the local currency price given also. During this transition, the Euro was a unit of account but not a medium of exchange. After three years, in January 2002, euro notes and coins circulated, replacing individual country currencies such as French francs, German marks or Italian lira. The treaty did not provide for countries' withdrawal from the system. The euro floated against all non-member currencies.

Member countries receive a seat on the board of the European Central Bank. For small countries such as Holland, Belgium, and Austria, the new arrangements provided increased opportunity to determine policy. Germany sacrificed its dominant role in European monetary policy. Three of the fifteen member states of the European Union, -- Denmark, Sweden, and the United Kingdom -- decided either to remain outside or delay entry into monetary union.

MODERN MONETARY SYSTEMS

Domestic monetary systems are today very much alike in all the major countries of the world. They have three levels: (1) the holders of money (the "public") --- individuals, businesses, governmental units; (2) commercial banks (privately or governmentally owned), which borrow from the public, mainly by taking their deposits, and make loans to individuals, firms, or governments; and (3) central banks, which have a monopoly on the issue of certain types of money, serve as the bankers for the central government and the commercial banks, and have the power to determine the quantity of money. The public holds its money as: (1) currency (including coin) and (2) bank deposits.

Currency

In most countries the bulk of the currency consists of notes issued by the central bank. In the United Kingdom these are Bank of England notes; in the United States, Federal Reserve notes; and so on. It is hard to say precisely what "issued by the central bank" means. In the United States, for example, the currency bears the words "Federal Reserve Note," but these notes are not obligations of the Federal Reserve Banks in any meaningful sense. The holder who presents them to a Federal Reserve Bank has no right to anything except other pieces of paper adding up to the same face value. The situation is much the same in most other countries.

The other major item of currency held by the public is coin. In almost all countries this is token coin, worth as metal much less than its face value.

In countries with a history of high inflation, the public may choose to use foreign currency as a medium of exchange and standard of value. The U.S. dollar is chosen most often. Although the dollar is not the currency with lowest average rate of inflation in the years after World War II, it compensates by having lowest costs of information or recognition. Society agrees on the use of dollars, not by a formal decision but from knowledge that others recognize the dollar and accept it as a means of payment. Estimates suggest that as much as two-thirds of the dollars in circulation are outside the United States. They can be found in Russia, Argentina, and many other Latin American and Asian countries.
Bank Deposits

Bank deposits are counted also as part of the money holdings of the public. In the 19th century most economists regarded only currency and coin, including gold and other metals, as "money." They treated deposits as claims to money. As deposits became more and more widely held, and as a larger fraction of transactions came to be effected by check, economists started to include not the checks, but the deposits they transferred, as money on a par with currency and coin.

The definition of money has been the subject of much dispute. The chief point at issue is which categories of bank deposits to call money and which to regard as near money. Many economists include as money only deposits transferable by check (demand deposits). Others include nonchecking deposits, such as "time deposits" in commercial banks. Still others include deposits in other financial institutions, such as savings banks, savings and loan associations, and so on.

The term deposits is highly misleading. It connotes something deposited for safekeeping, like currency in a safe-deposit box. Bank deposits are not like that. When one brings currency to a bank for "deposit," the bank does not put the currency in a vault and keep it there. It may put a small fraction of the currency in the vault as "reserves," but it will lend most of it to someone else or buy an investment—-that is, a bond or some other security. As part of the inducement to depositors to lend it money, it provides facilities for transferring demand deposits from one person to another by check.

The deposits of commercial banks are assets of their holders but liabilities of the banks. The assets of the banks consist of "reserves" --- currency plus deposits at other banks (including the central bank) --- and "earning assets" --- loans plus investments in the form of bonds and other securities. The banks' reserves are only a small fraction of the aggregate deposits. Initially, in the history of banking, the amount of reserves held was determined by each bank separately in terms of its judgment of the likely demands for withdrawal of deposits. The growth of deposits enabled the total quantity of money (including deposits) to be larger than the total sum available to be held as reserves. A bank that received, say, $100 in gold might add (25%) $25 to its reserves and lend out $75. But the recipient of the $75 loan would spend it. Some of those who received gold this way would hold it as gold, but others would deposit it in a bank. For example, if two-thirds was redeposited, on average, some bank or banks would find $50 added to deposits and to reserves. The receiving bank would repeat the process, adding (25%) $12.50 to its reserves and lending out $37.50. When this process worked itself out fully, total deposits would have increased by $200, bank reserves would have increased by $50, and $50 of the initial $100 deposited would have been retained as "currency outside banks." There would be $150 more money in total than before (deposits up by $200, currency outside banks down by $50). Although no individual bank created money, the system as a whole did. This multiple expansion process lies at the heart of the modern monetary system.

Credit and Money

The history of money is a story of repeated innovations that changed the ways in which the public transacted. Credit cards, debit cards, and automatic transfers are among the many innovations in the years after World War II.
A credit card is not money. It provides an efficient way to obtain credit at a bank or financial institution. It obviates the seller's need to know about the credit standing and repayment habits of the borrower. For a fee that the merchant pays the bank, the bank that issues the credit card makes a loan to the buyer and pays the merchant promptly. The buyer then has a debt that it settles by making payment to the credit card company. Instead of carrying more money, or making credit arrangements with many merchants, the buyer makes a single money payment for purchases from many merchants, at the end of the month. Or, the buyer can pay a fraction of the total debt with interest on the remaining balance.

Before credit cards existed, a buyer could arrange a loan at a bank. The bank would credit the buyer's deposit account. The buyer could then pay for his or her purchases by writing checks. The merchant would bear more of the costs of collecting payment and the costs of acquiring information about the buyer's credit standing. With credit cards, the credit card company, often a bank, bears many of these costs.

A debit card differs from a credit card in the way the debt is extinguished. The issuing bank deducts the payment from the customer's account at the time of purchase. The loan is paid immediately. The merchant receives payment in the same way as with the use of a credit card. Electronic transmission of information permits the bank to refuse payment if the buyer's deposit balance is insufficient.

Electronic Money

Items used as money in modern financial systems have some combination of attributes that reduce costs or increase convenience. Units of money are readily divisible, easily transported and transferred, and recognized instantly. Legal tender status guarantees final settlement. Currency protects anonymity, avoids record keeping, and permits lower costs of payment. But currency can be lost, stolen or forged, so it is used most often for relatively small transactions or where anonymity is valued highly.

Information processing reduces costs of transfer, record keeping, and acquiring information. "Electronic money" is the name given to several different ways in which the public and financial and non-financial firms use electronic transfers as part of the payments system. Since most of these transfers do not introduce a new medium of exchange (money), electronic transfer is a more appropriate name than electronic money.

Three very different types of transfer can be distinguished. First, depositors can use electronic transfers to withdraw currency from their accounts using automatic teller machines (ATM). This works like a debit card. Or, they can use the ATM to deposit checks to their accounts or repay bank loans. The ATM machine accepts these transactions on weekends, holidays, and at any time of the day. It makes money more available and more convenient to use, but it does not replace the assets used as money.

Second, "smart cards" contain a computer chip that records the balance on the card and can make and receive payments. Users buy the smart card with currency or deposits and can use the card in place of currency. The issuer holds the balance (float) and thus earns interest that may pay for maintaining the system. Most often, the cards have a single purpose or use such as making telephone calls, paying parking meters, or using urban transit systems. They retain the anonymity of currency, but they are not "generally accepted" as a means of payment beyond their dedicated purpose. There has been considerable speculation that smart cards will replace currency and
bring in the "cashless society," but there are several obstacles. Either users will have to purchase many special 
purpose cards or producers will have to find a way to record and transfer balances from many users to many payees. 
Further, maintaining the generalized transfer system is more costly than using the government's currency.

The automated clearinghouse is an alternative means of making deposits and paying bills. These systems 
transfer existing deposit balances, avoid the use of checks, and speed payments and settlement.

Third, many large payments to settle securities or foreign exchange transactions between financial 
institutions now use electronic transfer systems that net payments and receipts and transfer central bank reserves or 
clearinghouse deposits for net settlement. Some transactions between creditors and debtors give rise to claims 
against commodity or financial assets. These may at first be barter transactions that are not settled promptly by 
paying conventional money. Such transactions economize on cash balances and increase the velocity, or rate of 
turnover, of money.

Central Banking

Modern banking systems hold fractional reserves against deposits. If many depositors choose to withdraw 
their deposits as currency, the size of the banking system shrinks. A run on the bank -- a sudden withdrawal of 
deposits as currency or, in earlier times, as gold or silver -- can cause banks to run out of reserves and be forced to 
close. Bank panics of this kind occurred many times. After 1866 in Great Britain, but not until 1934 in the United 
States, government learned to use the central bank, or some other government institution, to prevent bank runs.

The Bank of England was the first modern central bank, serving as the model for many others. It was 
established as a private bank in 1694 but by the mid 19th century had become largely an agency of the government. 
In 1945, the U.K. government nationalized the Bank. The Bank of France was established as a governmental 
institution by Napoleon in 1800. In the United States, the 12 Federal Reserve Banks, together with the Board of 
Governors in Washington, D.C., constitute the Federal Reserve System. The Reserve Banks are technically owned 
by their member commercial banks, but this is a pure formality. Member banks get only a fixed annual percentage 
dividend on their stock and have no real power over the bank's policy decisions. To all intents and purposes, the 
Federal Reserve is an independent, governmental agency.

The notes issued by a central bank (or other governmental agency) plus deposits at the central bank are 
called monetary base. When held as bank reserves, each dollar or pound or euro becomes the base for several 
dollars or pounds or euros of commercial bank loans and deposits. Earlier in monetary history, the size of the 
monetary base was limited by the amount of gold or silver owned. There is no longer a formal limit to the amount 
of notes and deposits that a central bank may have as liabilities.

The way in which a central bank increases or decreases the monetary base is, typically, by making loans 
(discounting) or by buying and selling government securities (open-market operations) or foreign assets. If, for 
example, the Federal Reserve System purchases $1,000,000 of government securities, it pays for these securities by 
a check on itself, adding $1,000,000 to its assets and $1,000,000 to its liabilities. The seller can take the check to a 
Federal Reserve Bank, which will exchange it for $1,000,000 in Federal Reserve notes. Or the seller may deposit 
the check at a commercial bank, and the bank will in turn present it to a Federal Reserve Bank. The latter "pays" the
check by making an entry on its books increasing that bank's deposits by $1,000,000. The bank may, in turn, transfer this sum to a borrower, who again will convert it into Federal Reserve notes or deposit it.

The important point is that these bookkeeping operations simply record a process whereby the central bank has created, out of thin air as it were, additional base money — the direct counterpart of printing Federal Reserve notes. Similarly, if the central bank sells government securities, it destroys base money. (See also government economic policy: Monetary policy.)

The total quantity of money at any time depends on the stock of base money and on the preferences of the public as to the relative amounts of money it wishes to hold as currency and as deposits and on the preferences of the banks as to the ratio they wish to maintain between their reserves and their deposits. The reserve ratio is, of course, dominated by legal reserve requirements, where they exist. Banks hold Treasury bills and other short-term assets to provide additional liquidity, but they also hold some reserves in the form of currency to cash checks or pay withdrawals from their automated teller machines (ATM).

It follows that, by controlling the amount of the monetary base and by other, less important means, a central bank can vary the total nominal, quantity of money as it wishes within broad limits. The major problem of modern monetary policy is how the central bank should use this power.

Money has an internal and external price. The internal price is the price level of domestic goods and services. The external price is the nominal exchange rate. The principal responsibility of a modern central bank differs with the choice of monetary standard. If the country has a fixed exchange rate, the central bank buys or sells foreign exchange on demand to maintain stability in the exchange rate. When sales by the central bank are too brisk, growth of the monetary base, and the quantity of money and credit, slows and interest rates increase. The rise in interest rates attracts foreign investors and deters local investors from investing abroad. Also, the increase in interest rates slows domestic expansion and reduces upward pressure on domestic prices. When the central bank's purchases are too brisk, money growth increases and interest rates fall inducing domestic expansion and stimulating an increase in prices.

If the country has a floating exchange rate, it must choose a policy to go with the floating rate. At times in the past, many countries expected their central bank to pursue several different objectives. Eventually, countries recognized that this was an error because it focussed the central bank on short-term goals at the expense of longer-term price stability. After the high inflation of the 1970s, in Europe and the United States, and the hyper-inflations in Latin America and Israel, many central banks and governments recognized an old truth: the main objective of a central bank under floating rates should be to stabilize the domestic price level, thereby maintaining the internal value of money.

Increased awareness of this primary responsibility led to lower rates of inflation in the 1980s and 1990s, although central banks continued to be concerned about employment and recession in addition to price stability. Several adopted rules or procedures to control money growth by adjusting interest rates in response to both inflation and deviations of output from its long-term growth rate. Following New Zealand and Great Britain, several countries adopted inflation targets, one or two year's ahead, and adjusted current policy to reach the target.
Economic theory distinguishes between real and nominal values, between values stated in current dollars, pounds, or euros and the same quantities adjusted by the price level. The latter is a real value, the (real) quantity of goods, services and assets that money will buy, or the real purchasing power of the money stock.

The relation between money and what it will buy has always been a central issue of monetary theory. Economists have generally held that the level of prices is determined mainly by the quantity of money. But precisely how the quantity of money affects the level of prices, and what the effects are of changes in the quantity of money, have been conceptualized in different ways at different times. There are two principal issues. First, what determines the demand for money -- the amount of money that the public willingly holds? Second, how do changes in the stock of money affect the price level and other nominal values?

The Demand for Money

The government or its central bank determines the nominal quantity of money that circulates and is held. The public determines money's real value. If the central bank provides more money than the public wants to hold, the public spends the excess on goods, services, or assets. The additional spending cannot reduce the nominal money stock, but the spending bids up the prices of non-money objects; too much money chases the limited stock of goods and assets. The rise in prices lowers the real value of the money stock until the public holds the desired real value. Conversely, if the central bank provides less money than the public desires to hold, spending slows. Prices fall, thereby raising the level of the real stock.

The amount of desired real balances is not a fixed number. It depends on the opportunity cost of holding money, the direct return to holding money, and income or wealth. A short-term, interest rate is the usual measure of the opportunity cost of holding money, but money holders operate on many different markets, so other relative prices may include other relevant opportunity costs. Inflation raises market interest rates and, thus, the opportunity cost of holding money. In countries experiencing rapid inflation, the real value of the money stock shrinks because people choose to hold less of their wealth in this form. Ending inflation causes a jump down in opportunity cost and a jump up in real balances.

Currency pays no interest, and checking deposits typically receive relatively little interest return. Most of the direct return to money balances takes the form of transaction services and convenience. Innovations in the payments system change the demand for money, reducing the amount held, but also increase the service yield of the remaining units. Deflation also raises the return to holding money by giving each nominal unit greater command over goods and assets.

Income, wealth, or some measure of transactions volume also influences the amount of money that people willingly hold. As the real value of these measures increase so, too, does the amount of real balances.

Transmission of Monetary Impulses

From the very earliest systematic work on economics, observers have noted a relation between the stock of money and the price level. Often, the relation was one of proportionality; the price level rose in direct proportion to
the increase in money. By the middle of the 18th century, systematic observers recognized that changes in money affect output first, but this effect vanishes once prices adjust fully.

The quantity theory of money was an early formulation of that insight. Central to this theory is the distinction between the nominal quantity of money and the real quantity of money. The nominal quantity is expressed in whatever units are used to designate money—talents, shekels, pounds, euros, dollars, yen, and so on. The real quantity is expressed in terms of the volume of goods and services that the money will purchase. The quantity theory assumes that what ultimately matters to holders of money is the real rather than the nominal quantity. If this is so, then—whatever factors may determine the nominal quantity of money—it is the holders of money who determine the real quantity and, in the process, the price level.

The following is a hypothetical example. In a certain community the quantity of money in existence is $1,000,000, and the total income of the community is $10,000,000 a year. On the average, each member of the community holds an amount of money equal in value to one-tenth of a year's income, or to 5.2 weeks' income. Put differently, the income velocity of circulation is equal to 10 per year; that is, each $1 on the average is paid out 10 times a year. For the sake of simplicity there are no business enterprises; the members of the community buy and sell services from and to one another.

The quantity of money is somehow then doubled, but in such a way that no one expects the quantity to change again. Each member of the community will regard himself as better off. Each now has 10.4 weeks' income in the form of cash instead of the previous 5.2 weeks'. If everyone were to hold onto the extra cash, nothing further would happen. But people will try to spend it to reduce the amount of wealth held as money. One person's spending, however, is another's receipts. All the people together cannot spend more than all the people receive. The attempt of each to do so is bound to be frustrated. In the attempt to spend more than they receive, people will simultaneously try to buy more of various services from each other and to sell less. To induce others to sell, they will offer higher prices; to induce others not to buy, they will ask higher prices. Whether the quantity sold goes up or down depends on whether the attempt to buy more is stronger or weaker than the attempt to sell less. But in either case total spending is sure to go up and so are total income and prices paid. When income has doubled, to $20,000,000, the amount of money in existence will again be equal in value to 5.2 weeks' income. The community will have succeeded in reducing its real cash balances to their former level, not by reducing nominal balances but by raising incomes and prices. The process of adjustment may not be smooth; spending may go too far and leave people with real balances that are too small, requiring a subsequent fall in the price level; but the final position will tend toward a doubling of prices, and the previous real flows of services will be resumed with no one any better off than before the new money was distributed.

This simple example embodies most of the basic principles of monetary theory: (1) the central distinction between the nominal and the real quantity of money; (2) the equally crucial contrast between the alternatives open to the individual and to the community as a whole. To each individual separately (in the hypothetical example and in the real world) it looks as if income is outside personal control, but each individual can determine how much cash to hold. To the community as a whole, the total amount of cash is fixed, but it is able to determine the size of its
income in dollars; (3) the importance of attempts. The attempt of people as a whole to spend more than they receive, even though doomed to frustration, has the effect of raising total nominal expenditures and receipts.

Some of the main propositions about the transmission of monetary changes are:

1. The rate of growth of the quantity of money is consistently, though not precisely, related to the rate of growth of nominal income. That is, if the quantity of money grows rapidly, so will nominal income, and conversely. The velocity of circulation, though not constant, is reasonably predictable.

2. This relation is not obvious, mainly because it takes time for changes in monetary growth to affect income.

3. On the average, a change in the rate of monetary growth produces a change in the rate of growth of nominal income six to nine months later. But this is an average.

4. If the rate of monetary growth is reduced, then about six to nine months later the rate of growth of nominal income and also of physical output will decline, but the rate of price rise will be affected very little. There will be downward pressure on prices only as a gap emerges between actual and potential output.

5. The effect on prices comes on the average about a year after the effect on nominal income and output, so that the total delay between a change in monetary growth and a change in the rate of inflation averages roughly two years.

6. The above relationships are variable. There is many a slip between the monetary change and the income change.

7. Monetary changes affect output only in the short run—though "short run" may mean three to five years. Over the longer run, the rate of monetary growth affects only prices. What happens to output in the long run depends on such "real" factors as the enterprise, ingenuity, and industry of the people; the extent of thrift; the structure of industry and government, the rule of law; the relations among nations; and so on.

8. It follows that inflation -- a sustained increase in the rate of price change -- cannot occur without a more rapid increase in the quantity of money than in output. There are, of course, many possible reasons for monetary growth ---gold discoveries, the manner in which government spending is financed, and even the manner in which private spending is financed. The price level may rise or fall for other reasons, for example changes in productivity. These produce one-time changes, not sustained rates of change.

9. Government spending may or may not be inflationary. It will be inflationary if it is financed by creating money—that is, by printing currency or creating bank deposits—and if the resultant rate of monetary growth exceeds the rate of growth of output. If it is financed by taxes or by borrowing from the public, the main effect is that the government spends the funds instead of someone else.

10. One of the most difficult things to explain is the way in which a change in the quantity of money affects income. Generally, the initial effect is not on income at all but on the prices of existing assets (bonds, equities, houses, and other physical capital). An increased rate of monetary growth raises the amount of cash people (or businesses) have relative to other assets. The holders of the excess cash will try to correct this imbalance by buying other assets. But one person's spending is another's receipts. All the people together cannot change the amount of cash all hold—only the monetary authorities can do that. Their attempts will tend, however, to raise the prices of assets and to reduce interest rates. These changes will in turn encourage spending to produce new
assets. Thus the initial effect on balance sheets is translated into an effect on income and spending. In this connection many economists emphasize such assets as durable consumer goods and other real property, and they regard market interest rates as only a small part of the whole complex of relevant rates.

11. One important feature of this mechanism is that a change in monetary growth affects interest rates in one direction at the outset and in the opposite direction later on. More rapid monetary growth at first tends to lower interest rates. But later on, as it raises spending and stimulates price inflation, it also produces a rise in the demand for loans that will tend to raise nominal interest rates. Taking the opposite case, a slower rate of monetary growth at first raises interest rates, but later on, as it reduces spending and price inflation, it lowers interest rates. This inconsistent relation between the quantity of money and interest rates explains why interest rates are often a misleading guide to monetary policy.

12. These propositions clearly imply that monetary policy is important and that what is most important about monetary policy is its effect on the quantity of money, not on bank credit or total credit or interest rates. Wide swings in the rate of change of the quantity of money are evidently destabilizing and should be avoided. Beyond this, different economists draw different conclusions. Some conclude that the monetary authorities should make deliberate changes in the rate of monetary growth in order to offset other forces making for instability; these changes should be gradual and small and make allowance for the lags involved. Others maintain that not enough is known about the relations between changes in the quantity of money and in prices and output to assure that a discretionary monetary policy will do good rather than harm. They believe that a wiser policy would be simply to have the quantity of money grow at a steady rate over time. Most central banks now set a short-term interest rate target and adjust it frequently. Some also set an inflation target to be achieved over several years, and they adjust the interest rate to keep inflation near the target.

13. Countries that choose to control domestic prices must allow their exchange rates to float. The central bank or monetary authority cannot control both interest rates and money stock or both money and the exchange rate. It must choose one of the three.

14. If the central bank fixes the exchange rate and permits capital to flow in and out freely, it leaves control of money to external forces and must accept the rate of inflation consistent with its exchange rate.

Bibliography


Useful readings in monetary theory, of varying levels of difficulty, include: JOHN MAYNARD KEYNES, A Treatise on Money, 2nd vol. (1930, reprinted 1976), DON PATINKIN, Money, Interest, and Prices: An

M. Fr
A.H.M.