

## UNIT II & III

Functions of money- Money is not itself the name of a particular asset. Since the assets which function as money tend to change over time in any given country and among countries, it is best defined independently of the particular assets that may exist in the economy at any one time. At a theoretical level, money is defined in terms of the functions that it performs. The traditional specification of these functions is:

- 1 Medium of exchange/payments. This function was traditionally called the medium of exchange. In a modern context, in which transactions can be conducted with credit cards, it is better to refer to it as the medium of (final) payments.
- 2 Store of value, sometimes specified as a temporary store of value or temporary abode of purchasing power.
- 3 Standard of deferred payments.
- 4 Unit of account.

Of these functions, the medium of payments is the absolutely essential function of money. Any asset that does not directly perform this function – or cannot indirectly perform it through a quick and costless transfer into a medium of payments – cannot be designated as money. A developed economy usually has many assets which can perform such a role, though some do so better than others. The particular assets that perform this role vary over time, with currency being the only or main medium of payments early in the evolution of monetary economies. It is complemented by demand deposits with the arrival of the banking system and then by an increasing array of financial assets as other financial intermediaries become established.

### *Definitions of money*

Historically, the definitions of money have measured the quantity of money in the economy as the sum of those items that serve as media of payments in the economy. However, at any time in a developed monetary economy, there may be other items that do not directly serve as a medium of payments but are readily convertible into the medium of payments at little cost

and trouble and can simultaneously be a store of value. Such items are close substitutes for the medium of payments itself. Consequently, there is a considerable measure of controversy and disagreement about whether to confine the definition of money to the narrow role of the medium of payments or to include in this definition those items that are close substitutes for the medium of payments.<sup>3</sup>

A theoretically oriented answer to this question would aim at a *pure* definition: money is that good which serves directly as a medium of payments. In financially developed economies, this role is performed by currency held by the public and the public's checkable deposits in financial institutions, mainly commercial banks, with their sum being assigned the symbol M1 and called the *narrow definition of money*. The checkable or demand deposits in question are ones against which withdrawals can be made by check or debit cards. Close substitutes to money thus defined as the medium of payments are

referred to as *near-monies*.

An empirical answer to the definition of the money stock is much more eclectic than its theoretical counterpart. It could define money narrowly or broadly, depending upon what substitutes to the medium of payments are included or excluded. The broad definition that has won the widest acceptance among economists is known as (Milton) *Friedman's definition of money* or as *the broad definition of money*. It defines money as the sum of currency in the hands of the public plus all of the public's deposits in commercial banks. The latter include demand deposits as well as savings deposits in commercial banks. Friedman's definition of money is often symbolized as M2, with variants of M2 designated as  $\mathbb{M}2$ ,  $\mathbb{M}2_+$ , or as M2A, M2B, etc. However, there are now in usage many still broader definitions, usually designated as M3, M4, etc.

A still broader definition of money than Friedman's definition is M2 plus deposits in near-banks – i.e. those financial institutions in which the deposits perform almost the same role for depositors as similar deposits in commercial banks. Examples of such institutions are savings and loan associations and mutual savings banks in the United States; credit unions, trust companies and mortgage loan companies in Canada; and building societies in the United Kingdom. The incorporation of such deposits into the measurement of money is designated by the symbols M3, M4, etc., by M2A, M2B, or by  $\mathbb{M}2$ ,  $\mathbb{M}2_+$ , etc. However, the definitions of these symbols have not become standardized and remain country specific. Their specification, and the basis for choosing among them, are given briefly later in this chapter and discussed more fully in Chapter 7.

### Money supply and money stock

Money is a good, which, just like other goods, is demanded and supplied by economic agents in the economy. There are a number of determinants of the demand and supply of money. The most important of the determinants of money demand are national income, the price level and interest rates, while that of money supply is the behavior of the central bank of the country which is given the power to control the money supply and bring about changes in it.

The *equilibrium amount* in the market for money specifies the *money stock*, as opposed to the *money supply*, which is a behavioral function specifying the amount that would be supplied at various interest rates and income levels. The equilibrium amount of money is the amount for which money demand and money supply are equal.

The money supply and the money stock are identical in the case where the money supply is exogenously determined, usually by the policies of the central bank. In such a case, it is independent of the interest rate and other economic variables, though it may influence them. Much of the monetary and macroeconomic reasoning of a theoretical nature assumes this case, so that the terms “money stock” and “money supply” are used synonymously. One has to judge from the context whether the two concepts are being used as distinct or as identical ones.

The control of the money supply rests with the monetary authorities. Their policy with respect to changes in the money supply is known as *monetary policy*.

### Nominal versus the real value of money

The *nominal* value of money is in terms of money itself as the measuring unit. The *real* value of money is in terms of its purchasing power over commodities. Thus, the nominal value of a \$1 note is 1 – and that of a \$20 note is 20. The real value of money is the amount of goods and

services one unit of money can buy and is the reciprocal of the price level of commodities traded in the economy. It equals  $1/P$  where  $P$  is the average price level in the economy. The real value of money is what we usually mean when we use the term “the value of money.”

### **Money and bond markets in monetary macroeconomics**

The “money market” in monetary and macroeconomics is defined as the market in which the demand and supply of money interact, with equilibrium representing its clearance. However, the common English-language usage of this term refers to the market for short-term bonds, especially that of Treasury bills. To illustrate this common usage, this definition is embodied in the term “money market mutual funds,” which are mutual funds with holdings of short-term bonds. It is important to note that our usage of the term “the money market” in this book will follow that of macroeconomics. To reiterate, we will mean by it the market for money, not the market for short-term bonds.

The usual custom in monetary and macroeconomics is to define “bonds” to cover all non-monetary financial assets, including loans and shares, so that the words “bonds,” “credit” and “loans” are treated as synonymous. Given this usage, the “bond/credit/loan market” is defined as the market for all non-monetary financial assets. We will maintain this usage in this book except in Chapter 16, which creates a distinction between marketable bonds and non-marketable loans.

### **A brief history of the definition of money**

The multiplicity of the functions performed by money does not aid in the task of unambiguously identifying particular assets with money and often poses severe problems for such identification, since different assets perform these functions to varying degrees. Problems with an empirical measure of money are not new, nor have they necessarily taken their most acute form only recently.

Early stages in the evolution from a barter economy to a monetary economy usually have one or more commodity monies. One form of these is currency in the form of coins made of a precious metal, with an exchange value which is, at least roughly, equal to the value of the metal in the coin. These coins were usually minted with the monarch’s authority and were declared to be “legal tender,” which obligated the seller or creditor to accept them in payment. Legal tender was in certain circumstances supplemented as a means of payment by the promissory notes of trustworthy persons or institutions and, in the eighteenth and

nineteenth centuries, by bills of exchange<sup>4</sup> in Britain. However, they never became a generally accepted medium of payment. The emergence of private commercial banks<sup>5</sup> after the eighteenth century in Britain led to (private) note issues<sup>6</sup> by them and eventually also to orders of withdrawal – i.e. check – drawn upon these banks by those holding demand deposits with them. However, while the keeping of demand deposits with banks had become common among firms and richer individuals by the beginning of the twentieth century, the popularity of such deposits among ordinary persons came only in the twentieth century. With this popularity, demand deposits became a component of the medium of payments in the economy, with their amount eventually becoming larger than that of currency.

In Britain, in the mid-nineteenth century, economists and bankers faced the problem of whether to treat the demand liabilities of commercial banks, in addition to currency, as money or not. Commercial banking was still in its infancy and was confined to richer individuals and larger firms. While checks functioned as a medium for payments among

these groups, most of the population did not use them. In such a context, there was considerable controversy on the proper definition of money and the appropriate monetary policies and regulations in mid-nineteenth century England. These disputes revolved around the emergence of bank demand deposits as a substitute, though yet quite imperfect, for currency and whether or not the former were a part of the money supply. Further evolution of demand deposits and of banks in the late nineteenth century and the first half of the twentieth century in Britain, Canada and the USA led to the relative security and common usage of demand deposits and established their close substitutability for currency. Consequently, the accepted definition of money by the second quarter of the twentieth century had become currency in the hands of the public plus demand deposits in commercial banks. During this period, saving deposits were not checkable and the banks holding them could insist on due notice being given prior to withdrawal personally by the depositor, so that they were not as liquid as demand deposits and were not taken to be money, defined as the medium of payments. Consequently, until the second half of the twentieth century, the standard definition of money was the narrow definition of money, denoted as M1.

Until the mid-twentieth century, demand deposits in most countries did not pay interest but savings deposits in commercial banks did do so, though subject to legal or customary ceilings on their interest rates. During the 1950s, changes in banking practices caused these savings deposits to increasingly become closer substitutes for demand deposits so that the major dispute of the 1950s on the definition of money was whether savings deposits should or should not be included in the definition of money. However, by the early 1960s, most economists had come to measure the supply of money by M2 – that is, as M1 plus savings

deposits in commercial banks – which does not include any types of deposits in other financial institutions. This mode of defining M2 is known as the Friedman definition (measure) of money, since Milton Friedman had been one of its main proponents in the 1950s and 1960s.

In the USA, during the 1960s, market interest rates on bonds and Treasury bills rose significantly above the ceilings set by the regulatory authorities on the interest rates that could be paid on saving deposits in commercial banks. Competition in the unregulated sphere led to changes in the characteristics of existing near-monies in non-bank financial intermediaries which made them closer to demand deposits and also led to the creation of a range of other assets in the unregulated sphere. Such liabilities of non-financial intermediaries were substitutes – some closer than others but mostly still quite imperfect ones – for currency and demand deposits. Their increasing closeness raised the same sort of controversy that had existed during the nineteenth century about the role of demand deposits and in the 1950s occurred about savings deposits in commercial banks. Similar evolution and controversies occurred in Canada and the UK. The critical question in these controversies was – and still is – how close does an asset have to be to M1, the primary medium of payments, to be included in the measure of money.

#### *Evolution of money and near-monies since 1945*

To summarize the developments on the definition of money in the period since 1945, this period opened with the widely accepted definition of money as being currency in the hands of the public plus demand deposits in commercial banks (M1). This definition emphasized the medium of payments role of money. Demand deposits were regulated in several respects, interest could not be legally – or was not customarily – paid on them, and certain amounts of reserves had to be legally – or were customarily – maintained against them in the banks. Against this background, a variety of developments led to the widespread

creation and acceptance of new substitutes for demand deposits and the increasing closeness of savings deposits to demand deposits. In Canada, this evolution increased the liquidity of savings deposits with the chartered banks, which dominated this end of the financial sector, with also some increase in the liquidity of the liabilities of such non-monetary financial institutions as trust companies, credit associations<sup>7</sup>, and mortgage and loan associations. In the United States, until the 1970s, the changes increased the liquidity primarily of time deposits in the commercial banks, and to some extent of deposits in mutual savings banks, and shares in savings and loan associations. In the United Kingdom, the increase in liquidity occurred for interest-bearing deposits in retail banks and building societies. Given this evolution in the 1960s and 1970s, a variety of studies established these assets to be fairly close – but not perfect – substitutes for demand deposits.

This evolution of close substitutes for M1 led in the 1950s to a renewal of controversy, almost dormant in the first half of this century, on the proper definition of money. In particular, in the third quarter of the twentieth century, there was rapid growth of savings deposits in commercial banks and in non-bank financial intermediaries, with their liabilities becoming increasingly closer substitutes for demand deposits, without their becoming direct media of payments. This led to the acceptance of M2 as the appropriate definition of money, though not without some disputes. In the fourth quarter, as mentioned above, there have been numerous innovations that have made many liabilities of financial intermediaries increasingly indistinguishable from demand deposits. This has led to the adoption or at least espousal of still wider definitions under the symbols M3, M4, etc.

### *Financial innovations*

Financial innovation has been extremely rapid since the 1960s. It has included technical changes in the servicing of various kinds of deposits, such as the introduction of automatic teller machines, telephone banking, on-line banking through the use of computers, etc. It has also included the creation of new assets such as Money Market Mutual Funds, etc., which are often sold by banks and can be easily converted into cash. There has also been the spread first of credit cards, then of debit or bank cards, followed still more recently by the attempts to create and market “electronic money” cards – sometimes also known as electronic purses or smart cards. Further, competition among the different types of financial intermediaries in the provision of liabilities that are close to demand deposits or are readily convertible into the latter, increasingly by telephone and online banking, has increased considerably in recent decades. Many of these innovations have further blurred the distinction between demand and savings deposits to the point of its being only in name rather than in effect, and also blurred the distinction between banks and some of the other types of financial intermediaries as providers of liquid liabilities. This process of innovation, and the evolution of financial institutions into an overlapping pattern in the provision of financial services, are still continuing.

Credit cards allow a payer to pay for a purchase while simultaneously acquiring a debt owed to the credit card company. Because of the latter, most economists choose not to include credit card usage or their authorized limits in the definition of money. Nor are credit cards near-monies. However, their usage reduces the need for the purchaser to hold money and reduces the demand for money.

Debit cards are used to pay for purchases by an electronic transfer from the buyer’s bank account, often a demand deposit account with a bank. They replace the need to make payments in currency or by issuing a check. Therefore, they reduce currency holdings. They also reduce payments by checks. However, they do not obviate the need to hold sufficient balances in the bank account on which the debit is made. They are expected to have a very limited impact

on the holding of deposits, which could increase or decrease.

Electronic transfers are on-line transfers made over the Internet. They reduce the need to use checks for making payments. However, electronic transfers may not affect deposits in banks, or do so marginally due to better money-management practices afforded by on-line banking.

Smart cards embody a certain cash value and can be used to make payments at the point of purchase. Given the increasing prevalence of online banking and debit cards, smart cards are likely to be mainly used for small payments, as in the case of telephone cards, library photo-copying cards, etc. Smart cards reduce the need to hold currency and reduce its demand.

Therefore, financial innovations in the form of debit and smart cards reduce currency holdings rather than demand deposits. Financial innovations in the form of online transfers facilitate the investment of spare balances, which at one time may have been held in savings deposits, in higher-interest money market funds, etc., thereby reducing the demand for savings deposits.

In recent decades, the reduction in brokerage fees for transfers between money and non-monetary financial assets (bonds and stocks) and the Internet revolution in electronic banking have meant a reduction in the demand for money. Part of this is due to a reduction in the

demand for precautionary balances held against unexpected consumption expenditures. This reduction has taken place because individuals can more easily and at lower cost accommodate unexpected expenditure needs by switching out of other assets into money.

### *Theoretical and econometric developments on the definition of money*

Keynes in 1936 had introduced the speculative demand for money as a major motive for holding money and Milton Friedman in 1956 had reinterpreted the quantity theory of money to stress the role of money as a temporary abode of purchasing power, similar to a durable consumer good or a capital good. This analysis is presented in Chapter 2. Numerous theoretical and empirical studies in the 1950s and 1960s pointed out the development of close substitutes for money as a feature of the financial evolution of economies. By the 1960s, these developments led to a realignment of the functional definition of money to stress its store of value aspect, in this case as an asset relative to other assets, rather than medium of payments aspect. The result of this shift in focus was to further stress the closeness of substitution between the liabilities of banks and those of other financial intermediaries.

Such shifts in the definition of money were supported both by shifts in the analysis of the demand for money, suited to the stress on the store-of-value function, and by a large number of empirical studies. However, in the presence of a variety of assets performing the functions of money to varying degrees, purely theoretical analysis did not prove to be a clear guide to the empirical definition or measurement of money. As a result, research on measuring the money stock for empirical and policy purposes took a variety of routes after the 1960s. Several broad routes may be distinguished in this empirical work. Two of these were:

- 1 One of the routes was to measure money as the sum of M1 and those assets that are close substitutes for demand deposits. Closeness of substitution was determined on the basis of the *price and cross-price elasticities* in the money-demand functions or of the *elasticities of substitution* between M1 and various non-money assets. Such studies, discussed in Chapter 7, generally reported relatively high degrees of substitution among M1, savings deposits in commercial banks, and deposits in near-bank financial intermediaries and therefore supported a definition of money that is broader than M1 and in many studies even broader than M2.
- 2 The second major mode of defining money was to examine its appropriateness in a macroeconomic framework. This analysis is presented in Chapter 9. In this approach, the definition of money was specified as that which would “best” explain or predict the course of nominal national income and of other relevant macroeconomic variables over time. But there proved to be little agreement on what these other relevant variables should be. The quantity theory tradition (in the work of Milton Friedman, most of his associates and many other economists) took nominal national income as the only relevant variable. For the 1950s and 1960s, this approach found that the “best” definition of money, as shown by examining the correlation coefficients between various definitions of money and nominal national income, was currency in the hands of the public plus deposits (including time) in the commercial banks. This was the Friedman definition of money and was widely used in the 1960s. However, it should be obvious that the appropriate definition of money under Friedman’s procedure could vary between periods and countries, as it did in the 1970s and 1980s.

Further, in the disputes on this issue in the 1960s, many researchers in the Keynesian tradition took the appropriate macroeconomic variables related to money as being nominal national income and an interest rate, and defined money much more broadly than M2 to include deposits in several types of non-bank financial intermediaries and various types of Treasury bills and government bonds.

Up to the 1970s, empirical work along the above lines brought out an array of results, conflicting in detail though often in agreement that M2 or a still wider definition of money performs better in explaining the relevant macroeconomic variables than money narrowly defined. This consensus vanished in the 1970s and 1980s in the face of increasing empirical evidence that none of the simple-sum aggregates of money – whether M1, M2 or a still broader one – had a stable relationship with nominal national income. Research on the 1970s and 1980s data showed that (a) the demand functions for the various simple-sum monetary aggregates were unstable, and (b) they did not possess a stable relationship with nominal income.

The above findings for the simple sum aggregates prompted the espousal of several new functional forms for the definition of money. Among these are the Divisia aggregates. The construction of and comparison between different monetary aggregates is the subject of Chapter 7. The search for stability of the money-demand function also led to refinement of econometric techniques, resulting in cointegration analysis and error-correction modeling of non-stationary time series data, and the derivation of separate long-run and short-run demand functions for money. These issues are further examined in Chapter 9.

Further, the continuing empirical instability of the demand functions for M2 and still broader definitions of money since the 1980s led to an increased preference for some form of M1 over broader aggregates for policy formulation and estimation, thereby reversing the shift towards M2 and other broad monetary aggregates which had occurred in the 1950s and 1960s. Further, the empirical instability of money-demand functions led to a marked decrease after the 1980s in both analytical and empirical studies on the definition of money.

In addition, after the 1980s, at the monetary policy and macroeconomic level, many central banks and researchers have chosen to focus on the interest rate as the appropriate monetary policy instrument – thereby relegating money supply and demand to the sidelines of macroeconomic reasoning. The discussion of this shift and its implications for macroeconomic modeling and policy analysis is to be found in Chapters 13 to 15.

### **The classical paradigm: the classical group of macroeconomic models**

The classical group of models is consistent with the Walrasian general equilibrium framework and assumes that the market establishes the wages and prices for each of the goods at that



level at which its notional demand and supply are equal (i.e. at which its market “clears”). Since one of the markets is labor, its clearance implies that every worker who wishes to supply labor at the existing wage will have a job and each firm will be able to employ all the workers that it wants to at the existing wage. This state, in the context of the long-run analysis, is known as “full employment,” so that a hallmark of the classical models is that, in long-run equilibrium, they imply full employment.<sup>28</sup> However, in view of their emphasis on labor market clearance, this implication of equilibrium is often turned around and stated as if it was an assumption, which is not strictly correct.<sup>29</sup>

While there is no consensus on the division of the classical group of models into individual models, we adopt the following taxonomy for this book.

### *I. Traditional classical ideas*

“The traditional classical approach (or ideas)” is being proposed in this book as the name for the somewhat disparate ideas on the macrostructure of the economy from the middle of the eighteenth century to the publication of Keynes’s *The General Theory* in 1936. To quite a considerable extent, these ideas were diffuse, varied among authors and changed over time. In any case, there was no single compact version of the overall exposition, though the profession, following Keynes, now treats them as if there was a compact model. We will call this compact statement of the traditional classical ideas the traditional classical model. It was never stated as a compact model even during its heyday during the nineteenth and early twentieth centuries, but its ideas permeate the classical paradigm.

The two components of the traditional classical model directly relevant to monetary economics were the *quantity theory* for the determination of prices (see Chapter 2) and the *loanable funds theory* for the determination of interest rates (see Chapter 19). Its *theory of employment* was the analysis of the labor market and incorporated the assumption of equilibrium, which state represents full employment, so that the traditional classical set of ideas did not possess a theory of unemployment or of variations in aggregate employment other than those of variations in their long-run levels. Hence, it did not possess a theory of the deviations in unemployment and output from their full-employment levels. However, another component of the traditional classical ideas was its *business cycle explanations*, which allowed for fluctuations in economic activity in the economy’s response to real or monetary shocks, so that such explanations implicitly did envisage deviations from full employment.

The traditional classical approach lacked the integration of its microeconomic-based theory of employment and output with its business cycle explanations, as well as of their mix with the quantity theory and the loanable funds theory. To sum up, while this approach had many of the components of macroeconomics, it lacked an integrated macroeconomic framework. It also lacked an explicit treatment of the aggregate demand for commodities, now encompassed in the IS relationship, which is an essential building block of current macroeconomics.

There was also no explicit macroeconomic theory of the commodity market in the traditional classical approach since it did not incorporate a theory for the determination of the aggregate demand for commodities.<sup>30</sup> Instead, this approach studied each commodity market separately in microeconomic terms, that is, in terms of its demand and supply analysis. In place of a theory of aggregate demand for commodities as a whole, the traditional classical approach explicitly, but more often implicitly, settled for Say's law (see Chapter 18), which stated that, in the aggregate, the supply of commodities creates (i.e. always generates) its own demand, so that a separate theory of aggregate demand was not needed or specified.

Say's law was pervasive in the analyses offered by many economists throughout the classical period: among others, it was espoused by Adam Smith in the eighteenth century, David Ricardo in the early nineteenth century, John Stuart Mill in the mid-nineteenth century and Alfred Marshall in the late nineteenth century. However, Say's law is not valid for a monetary economy, which possesses commodities, money and bonds, for several reasons. One of these is that, in a monetary economy, all sellers of commodities are not automatically buyers of commodities to the same extent, since a part of the income of sellers is usually saved, which can be put by them into money or bonds (which include savings deposits in banks) rather than being automatically converted into spending on commodities.

Note that modern theories of aggregate demand do not embody Say's law, so that it is no longer a part of modern macroeconomics.

## II. Neoclassical model

The "neoclassical model" is the name given to the restatement of the traditional classical ideas rebottled and re-flavored in the post-*General Theory* period in a new compact framework. The new bottle was the *IS-LM framework* of analysis; the re-flavoring included the elucidation of some of the nuances of the traditional classical ideas, such as the wealth/Pigou and real balance effects (see Chapter 3) on commodity demand, as well as the addition of new elements such as the speculative demand for money (see Chapter 5) and the explicit analysis of the commodity market at the macroeconomic level. Further, certain elements of the traditional ideas such as the quantity theory, the loanable funds theory, Say's law and the dichotomy between the real and the monetary sectors of the economy were discarded in the rebottling process. The resulting model also differed from the traditional classical ideas by being an integrated macroeconomic framework.

The classical paradigm was, in general, rejected by the majority of the economics profession from the 1940s to the 1970s, though it continued to exist as an outcast. However, refinements and additions to it continued to be made during these decades. The dominant paradigm in these decades was the Keynesian one. The classical paradigm, though with new models, roared back in the 1970s and has since then taken various forms. These are the 1970s monetarism, the modern classical model and the new classical model.

## III. 1970s monetarism

The *1970s monetarist approach*, also known as the *St Louis monetarism*, was the name given to a mainly empirical analysis whose empirical and theoretical expositions were initiated

by economists at the Federal Reserve Bank of St Louis during the 1970s. The short-run version of their model did not assume full employment and did not imply continuous full

employment in the economy. It was relatively close to the then Keynesian models in terms of the impact of monetary policy on output and employment, but it denied on empirical grounds the Keynesian claim of the efficacy of fiscal policy. In its long-run version, it belonged in the classical paradigm.

Therefore, the 1970s monetarism was a hybrid between the classical and the Keynesian paradigms, and made the switch away from Keynesianism palatable for many economists. However, it did not propose any fundamentally new theories, had a short life and was replaced in the early 1980s by ideas truer to the classical paradigm, which eventually took the form of the modern classical paradigm.

#### *IV. Modern classical model*

The modern classical model is a statement of the classical paradigm under the assumptions, among others, of *continuous* labor market clearance even in the short-run, which had strictly not been part of the neoclassical model. In addition, for the short-run, this approach extends the neoclassical model by the introduction of uncertainty and rational expectations. In many respects, the modern classical approach is closer to the Walrasian general equilibrium model than to the traditional classical and neoclassical approaches. It is currently the dominant component of the classical paradigm. Its foundation was laid during the 1970s and 1980s.

For the long-run, the modern classical model extends the definition of the (analytical) long-run to include, in addition to the absence of any adjustment costs and rigidities, the assumption that there are no errors, even random ones, in expectations, which is tantamount to the assumption of certainty. Given labor market clearance, this long-run state is the full-employment one.

For the short-run, the modern classical model allows uncertainty, but with expectations formed according to the rational expectations hypothesis. A discussion of the modern classical model appears in Chapter 14. Among its major implications is that deviations from full employment will occur if the expected price level is different from the actual one, so that there are errors in expectations. However, these errors will be random, and by their very nature are transient and self-correcting, so that the short-run deviations from full employment will be *transient and self-correcting*. In this context, systematic monetary and fiscal policies do not change output and unemployment in the short, as well as the long, run. Further, there is no need for such policies since the economy has the ability to go to full employment on its own and within a short period.

Note that, because of the assumption of continuous labor market clearance both in the short-run and in the long-run, involuntary unemployment<sup>31</sup> cannot exist in the modern classical model, even when there are short-run deviations of employment from the full-employment (long-run equilibrium) level.

The modern classical model has serious limitations. In particular, it does not offer a satisfactory explanation for the short-run stylized facts (listed later in Section 1.12) on the impact of shifts in monetary policy on output (see Chapter 14).

Briefly, for the long-run, the modern classical model is a compact form of the Walrasian general equilibrium model, so that its implications are consistent with those of the latter. It provides the benchmark conclusions, consistent with the stylized facts, on the long-run relationship between money and output. For the short-run, the modern classical model produces transient and self-correcting deviations from full employment, so that there is no sensible role for systematic monetary and fiscal policies in both the short-run and the long-run. For the short-run, the implications of the model for output and unemployment are not valid.

#### *V. New classical model*

The new classical model imposes the assumption of Ricardian equivalence on the modern classical model. This assumption is an aspect of intertemporal rationality and the Jeffersonian (democratic) notion that the government is nothing more than a representative of its electorate and is regarded as such by the public in making the decisions on its own consumption. Such a government is taken to provide just the goods that the population wants and its bonds, held by the public, are regarded by it (the public) as a debt owed by the public to itself. The implications of these assumptions are that the public debt is not part of the net worth of the public and that the public increases its private saving by the amount of a bond-financed government deficit. The latter implies that such deficits do not affect aggregate demand in the economy, and therefore do not change nominal or real GDP (see Chapter 14 for this analysis).

Of all the macroeconomic models in the classical paradigm, the new classical model is the most restrictive one because of its assumption of Ricardian equivalence.

The major alternative to the classical paradigm is the Keynesian one, which has its own set of models.

### **The Keynesian paradigm and the Keynesian set of macroeconomic models**

#### *Using the analogy between the economy and the human body*

The fundamental difference between the classical and Keynesian paradigms is that while the former focuses on the healthy state of the economy,<sup>32</sup> the latter focuses on the pathology – especially the system-wide pathology – of the economy,<sup>33</sup> which may not fully or soon recover<sup>34</sup> from a shock to it (Solow, 1980, 1991). The Keynesian paradigm recognizes that the economy may sometimes have equilibrium in all markets, but does not assert that this occurs always or most of the time. Further, even if there is equilibrium, it may not be the competitive equilibrium of the Walrasian general equilibrium model because the economy may have a different structure or because of group behavior. As a consequence, the Keynesian paradigm implies that when the economy is outside the Walrasian general equilibrium, the government and the central bank may be able to improve on its actual performance through their policies.

We have at various places drawn an analogy between the equilibrium state of the economy and the healthy state of the human body, and that between the deviations from equilibrium and the pathology of the human body. The human body sometimes functions in perfect health and sometimes suffers minor illnesses of a brief expected duration and without any need for the help of a professional (doctor). But it could sometimes suffer from serious illnesses from which the recovery may occur but be slow and be speeded up by the help of a doctor, or suffer ones from which there is no recovery without the intervention of a specialist. There may also be illnesses from which there is no cure and no recovery, but we do not include this limiting state within our analogy. Among the serious illnesses, we note there can be many possibilities: infection with bacterium A rather than B, infection by a bacterium versus a virus, an infection versus a collapse of a lung, a collapse of a lung rather than a heart attack, etc. The list of the possible sources of the deviations from the healthy state can be endless.

Comparing the approach of the two paradigms to the pathology of the economy and applying our analogy, when the classical paradigm does envisage deviations away from the healthy state of the economy, they are supposed to be *minor, transitory* and *self-correcting*. Under it, while the economic body may become ill (that is, deviate from the full-employment state), the illnesses are never serious or long lasting, so that a trip to a doctor either never becomes necessary or will not really be worth the hassle and the cost. By comparison, the Keynesian paradigm envisages the possibility of more serious departures from the general equilibrium (healthy) state of the economy. Its deviations from equilibrium can be due to different pathogens or breakdowns of the different components of the economy. Further, it allows for the possibilities that the recovery may be slow and could be speeded up with expert help (from the government and the central bank), or that it may never occur without such help.

Using the analogy with the human body, we offer the following two fundamental – and highly plausible – axioms on the performance of the macroeconomy.

*$\alpha$ . The economy, like the human body, may sometimes function well and sometimes not.*

Hence, it is essential to study both states, with the former serving as the benchmark for the treatment of the latter.

*$\beta$ . When the economy, just like the human body, is not functioning properly, the causes, symptoms and effective treatments of the malfunction can be quite varied.*

The justification for the  $\beta$  axiom is that one cannot plausibly attribute all possible illnesses to a single underlying cause or attribute all potential causes to an overarching single source. An implication of the  $\beta$  axiom is that since the Keynesian paradigm focuses on the pathology of the economy, it cannot properly be encapsulated within one model with one root pathogen. Hence, more than the classical paradigm and its models, which are almost linear or hierarchical in their relationship, the Keynesian paradigm, if it is to do its job properly, has to be a disparate and, at best, a rather loose collection of models.

To reiterate, by the nature of their attempts to deal with the pathology of the economy, the Keynesian models have to be, and are, quite varied. If they are to do their job properly of dealing with the different types of deviations, such models need not – in fact, must not – all focus on the same types of deviation from the overall equilibrium state or make the same recommendations for policies to address these deviations. Unfortunately, this aspect of the Keynesian paradigm is often not recognized. Frequently, the presentations and discussions

of the Keynesian models miss this requirement for variety within the Keynesian paradigm and seek to force the various Keynesian models into a single format or view it as one unified model. The danger in doing so is that a single prescription could be given as a cure-all for very disparate causes and be inappropriate for many.<sup>35</sup> Chapter 15 provides a small number out of the variety of Keynesian models in the literature.

### *Frequent themes in the Keynesian models*

A common concern of the Keynesian models is with the potential for involuntary unemployment, which produces deviations of actual employment from its full-employment level. Consequently, these models tend to pay special attention to the structure of the labor market, its demand and supply functions and whether or not equilibrium holds between them. Within this focus, many Keynesian models assume nominal wage rigidity, often justified by theories of nominal wage contracts between the workers and the firms. However, there are also Keynesian models that consider the deviations from general equilibrium that could occur even when the nominal wage is fully flexible.

The assumption of the rigidity or stickiness of prices in the economy is often regarded as another common theme of Keynesian models. While this assumption can impose deviations from a general equilibrium, it need not be the only cause of or reason for potential deviations. Therefore, models within the Keynesian paradigm need not, and should not, all be based on price rigidity. There is, consequently, also a place for Keynesian models that consider the deviations from general equilibrium that could occur even when the prices are fully flexible.

Chapter 15 provides a look at some of the Keynesian models. While some of the models presented there assume equilibrium in the macroeconomic models, others do not do so. While some assume a special form of the labor supply function, others assume a different form. While some assume – or imply on the basis of nominal wage contracts – nominal wage rigidity of some form, others do not do so. Similarly, while some models assume or imply price level stickiness or rigidity, others do not do so. This variety in modeling within the Keynesian paradigm becomes even more evident when the Keynesian and the neoKeynesian models are compared.

To reiterate, the variety of modeling, though perplexing and sometimes seemingly contradictory, in the Keynesian paradigm is essential to the proper study of the pathology of the economy. It would be a mistake to force the Keynesian models into a single straightjacket, even though this would provide an attractive means of comparing the classical and Keynesian paradigms as a whole.

### **Which macro paradigm or model must one believe in?**

While most textbooks and economists would consider this to be a legitimate question, our remarks above suggest that it is an improper, and quite likely a dangerous one, for the

formulation of economic policies. The proper study of the economy requires the study of both its healthy state and its diseases. Since we cannot be sanguine that the economy will always operate in general equilibrium, the models of the Keynesian paradigm must not be neglected. Since we cannot be sure that the economy will never be in general equilibrium, the models of the classical paradigm must also not be neglected. Both paradigms have their relevance and usefulness. Neglecting either of them can lead to erroneous policies that impose high costs on the economy and its citizens.

For the practical formulation of monetary policy, the relevant and “interesting” question is not the a priori choice between the classical and the Keynesian models, but rather the perpetually topical one: *what is the current state of the economy like and which model is most applicable to it?* There is rarely a sure answer to this question. Consequently, the judgment on this question and the formulation of the proper monetary policy are an art, not a science – and very often rest on faith in one’s prior beliefs about the nature of the economy.

While one cannot dispense with one’s beliefs and economists rarely give up their conception of the nature of the economy, the fundamental role of economics must be kept in mind. This is that economics is a positivist science, with the objective of explaining the real world. This is done through its theories, which, by their very nature, must be simplifications – more like caricatures – of reality. As such, they may be valid or not, or be better for explaining some aspects of reality rather than others. Intuition and econometrics are both needed and useful in judging their validity and relative value. In brief, one should not hold a dogmatic belief in one theory for all purposes.

A side implication of the positivist objective of economics is the normative one – i.e. the ability to offer policy prescriptions to improve on the performance of the economy, hopefully as a means of increasing the welfare of its citizens. Both the Keynesian and the classical paradigms are essential to these roles.

One way of judging the extent to which the macroeconomic theories are valid or applicable from a monetary perspective is to compare their implications with the stylized facts of the economy.

### *Some stylized facts on money and output*

Stylized facts on the relationship between money and output are general conclusions about this relationship, established on the bases of intuition and empirical studies. Some of these are:

- 1 Over long periods of time, there is a roughly one-to-one relationship between the money supply and the price level.
- 2 Over long periods of time, the relationship between inflation and output growth is not significant.
- 3 Over long periods of time, the correlation between money growth rates and nominal interest rates is very high.
- 4 Changes in money supply and interest rates have a strong impact on aggregate demand.
- 5 Over short periods (a few years), increases in aggregate demand, because of increases in money supply or reductions in interest rates, increase output. This effect builds to a peak and then gradually decreases, so that there is a “hump-shaped pattern” of the effect of monetary policy on output, with the maximum increase in output occurring with a lag longer than one year, sometimes two or more years.

- 6 The impact of an expansionary monetary policy on prices occurs with a longer lag than on output, so that the impact of monetary shocks on output does not mainly occur through price movements.
- 7 Contractionary monetary policies initially reduce output significantly, often for longer than a year and sometimes for several years. The cost in terms of output tends to be larger if inflation is brought down gradually rather than rapidly. It is lower if the policy has greater credibility.

Using analytical terminology, money is not neutral in the short-run but is neutral in the long-run. These conclusions hold for monetary policy, whether it changes the money supply or interest rates. Chapter 14 provides a more detailed list of the stylized facts on the impact of monetary policy on output.

### **Walras's law**

For the closed economy, the standard models of the two paradigms assume four goods: commodities, money, bonds (i.e. all non-monetary financial assets) and labor. Therefore, there should be four equilibrium statements, one for each of the four goods, and the corresponding four curves in the diagrammatic expositions. However, *Walras's law* (see Chapter 18) ensures that equilibrium in any three out of the four markets implies equilibrium in the fourth one, so that one of the markets need not be explicitly studied. This allows the diagrammatic exposition to work with only three equations/curves. Current macroeconomic analysis usually does so for those of the commodity market (the IS equation/curve), the money market (the LM equation/curve if money supply is the instrument of monetary policy but the IR equation/curve if the interest rate is the instrument of monetary policy) and the aggregate supply function (AS equation/curve) or, in its place, a price–output adjustment equation, as in Chapters 14 and 15. In this procedure, the bond market is the one excluded from explicit analysis, so that the bond market curve is not usually drawn. It does, however, remain implicitly in the exposition and can be deduced from the other curves.<sup>36</sup>

### **Monetary policy**

The standard assumption of monetary analysis was that the central bank exercises control over the economy by exogenously controlling the money supply. In this case, the appropriate analysis of aggregate demand is called IS–LM analysis, since the analysis of the money market generates the IS equation/curve. However, for certain types of economies, controlling the economy's interest rate may be a surer way of controlling aggregate demand than its money supply. The central banks of several developed economies, including those of the United States, Canada and Britain, now seem to rely more on the interest rate rather than on the money supply as the primary monetary policy instrument.<sup>37</sup> For their economies, the LM curve is not appropriate. Instead, the analysis generates an IRT (interest rate target) curve, which, in addition to the IS curve, determines the aggregate demand in the model. The IS–LM and IS–IRT analyses are set out in Chapter 13.



If the central bank sets the interest rate as its exogenous monetary policy instrument, it must be willing to supply the amount of money demanded at that interest rate. It can do this by appropriate changes in the monetary base, either of its volition or by allowing commercial banks to borrow from it. In this case, the money supply becomes endogenous to the economy.

### **Neutrality of money and of bonds**

Neutrality of money (and credit/bonds) is the proposition that changes in the money supply and monetary policy do not alter output and employment, as well as the real values of many other real variables. For the short run, most models do not imply neutrality. However, as Chapters 13 to 15 show later, the reasons for such non-neutrality differ between the two paradigms and often also among the models of each paradigm. Note that in the long-run analyses of most models, whether in the classical or the Keynesian paradigm, money and credit are neutral, which is consistent with the stylized facts on the economy set out in Section 1.12 and also in Chapter 14.

Money and credit (non-monetary financial variables) are usually not neutral in the *short term* in real-world economies. Sudden shifts in the availability of money and credit are among the most important reasons for fluctuations in output and unemployment. Notable examples of such non-neutrality are provided by currency, credit and exchange crises, which originate in the financial sector and spread to the real sectors of the economy.

#### *An illustration: the subprime crisis of 2007 in the USA*

The “subprime crisis” originating in the United States in 2007, and its impact on the real sectors of the US and world economies, provide a compelling illustration of the non-neutrality of both money and credit in the economy. Subprime loans in this context were loans made as mortgages to borrowers who were poor credit risks in terms of their incomes and the collateral that they could provide. However, when house prices were rising sharply, such mortgages seemed to be a good bet for both borrowers and lenders. House prices rose sharply from 2002 to 2006, at some point becoming a “bubble.”<sup>38</sup> These mortgages were bundled into “asset-backed corporate securities,” which were sold in financial markets and held by a wide variety of financial firms, especially investment bankers, both in the USA and in other countries. These securities were used, in turn, to back up short-term commercial securities sold by financial firms to corporations as liquid, safe investments. As the bubble in US house prices began to collapse in 2006 and house prices fell, the concern over defaults by mortgagees sharply reduced the demand for mortgage-backed corporate securities, as well as the funds made available for loans in this market.<sup>39</sup> This process also increased the general awareness of risk and the risk premium – labeled as the re-pricing of risk – for other types of bonds, so that the ability of households and firms generally to obtain funds for their expenditures became curtailed and the cost of external

funds increased.<sup>40</sup> These made it difficult for households to buy houses,<sup>41</sup> as well as making it difficult for some corporations to finance their short-term operations,<sup>42</sup> which threatened to reduce production and force the US economy into a recession. The US Federal Reserve System and the European Central Bank, as well as the central banks in many other countries, reacted to the crises in the credit markets by measures to substantially increase the money supply, as well as by reductions in interest rates. In August 2007, while there was considerable uncertainty in the impact of the subprime crisis in financial markets on the real sectors of the economy, there was a general consensus among economists, market analysts, governments and central bankers that, barring appropriate and aggressive monetary policies, the financial crisis would result in a recession in the United States and that this would spread to the world economy.

The impact of the subprime crisis on economic activity, the monetary responses to it and the assessments of the economics profession, as well as those of central bankers and others, clearly show that:

- The consumption and production sectors of the economy depend vitally on the credit sector, so that the supply of credit in the economy is not neutral.
- The supply of credit is not independent of the money supply and interest rates, which are the instruments of monetary policy, so that monetary policy is also not neutral.

To conclude, realistic short-run models of the economy need to embody assumptions about the credit and money markets, and the links between them and consumption and production sectors, that are necessary to imply such non-neutrality. However, few do so. Chapter 16 does so by embodying a link between the supply of short-term loans for working capital and production, as well as a link between such loans and the money supply.

### **1.16 Definitions of monetary and fiscal policies**

The major policy concern of monetary economics is with the impact of monetary policies on the economy. Monetary policy is defined as policy-induced changes in the money supply or/and in interest rates. The control of monetary policy will be taken to be by the central bank or the monetary authority, using these terms as synonymous. The Walrasian general equilibrium and the modern classical models (Chapter 14) imply that, even in the short-run, there is no positive benefit in terms of higher output or lower unemployment from their systematic or anticipated operation (Friedman, 1977; Lucas, 1996), though there are short-run transient effects of random policies. The Keynesian models usually imply that there are such benefits in the short run.

Fiscal policy is the use of government expenditures, taxes and deficits (or surpluses) as a policy to change the economy. While government deficits can be financed through increases in the money supply (and surpluses be accompanied by decreases in it), macroeconomics defines fiscal policy as one in which the money supply is held constant, so that the deficits must be financed by government borrowing through increases in its bonds sold to the public. Similarly, fiscal surpluses are assumed to require purchases of bonds from the central bank and their retirement, without changing the money supply in circulation in the economy. The reason for this definition of fiscal policy is to separate the effects of changes in the fiscal variables from those in the money supply. To reiterate, fiscal policy is, by definition, *bond-financed fiscal policy*.

In the real world, fiscal and monetary policies are intertwined, more so in some countries than others. However, for analytical purposes, they have to be treated as conceptually independent ones. Hence, a money-financed expansionary fiscal policy – that is, deficits financed by increases in the money supply – will be treated as having two components: an expansionary (bond-financed) fiscal policy and an expansionary monetary policy.

## Conclusions

Money performs the two main functions of medium of payments and store of value, with the former being absolutely critical to the transactions role of money in the economy. These functions are performed by a variety of assets, with their liquidity characteristics and substitutability among them changing over time. Innovations in the types of assets and the changing characteristics of existing financial assets mean that the financial assets which meet the role of money keep changing over time.

While currency was considered to be the only form of money at one time, currency and demand deposits were taken to be the only components of money early in the twentieth century, so that the appropriate measure of money was considered to be M1. By 1960, the measure of money had expanded to include time and savings deposits in commercial banks, and therefore had become M2. In subsequent decades, as the liabilities of near-banks became more and more similar to the demand and time deposits of banks, the measures of money were broadened to include the deposits in near-bank financial intermediaries.

The recent incursion of electronics into banking in the form of automatic tellers, banking from home through one's computer or telephone, and the use of smart cards for payments, etc., represents a very fast pace of technical change in the banking industry. It is a safe bet that the empirically appropriate measure of money is changing and will keep changing in the future. During this period of change, the demand functions for money have tended to become unstable, more so for some definitions than others, so that disputes about the proper measure of money have expanded beyond the simple sum aggregates of M1 and M2 to encompass more complex forms.

This chapter has also provided an introduction to the two major paradigms in macroeconomics, classical and Keynesian. Each consists of several models. The classical paradigm usually focuses on the general equilibrium of the economy and its models are closely related to each other. The Keynesian one focuses on the deviations from the general equilibrium of the economy. Since there can be many different causes of such deviations in real-world economies, the Keynesian models are a much more diverse group than the classical ones. Knowledge of both paradigms is essential for the proper understanding of the economy and for the appropriate formulation of monetary policies.

The IS–LM mode of macroeconomic analysis is a mode of exposition of the determination of aggregate demand in models of the classical paradigm, as well as in models of the Keynesian paradigm. However, the IS–LM technique of analysis is inappropriate for economies in which the central bank sets the interest rate, rather than the money supply, in its attempts to control aggregate demand in the economy. This is now the practice of many central banks. In this case, aggregate demand is determined by the IS equation and the interest rate set by the central bank.