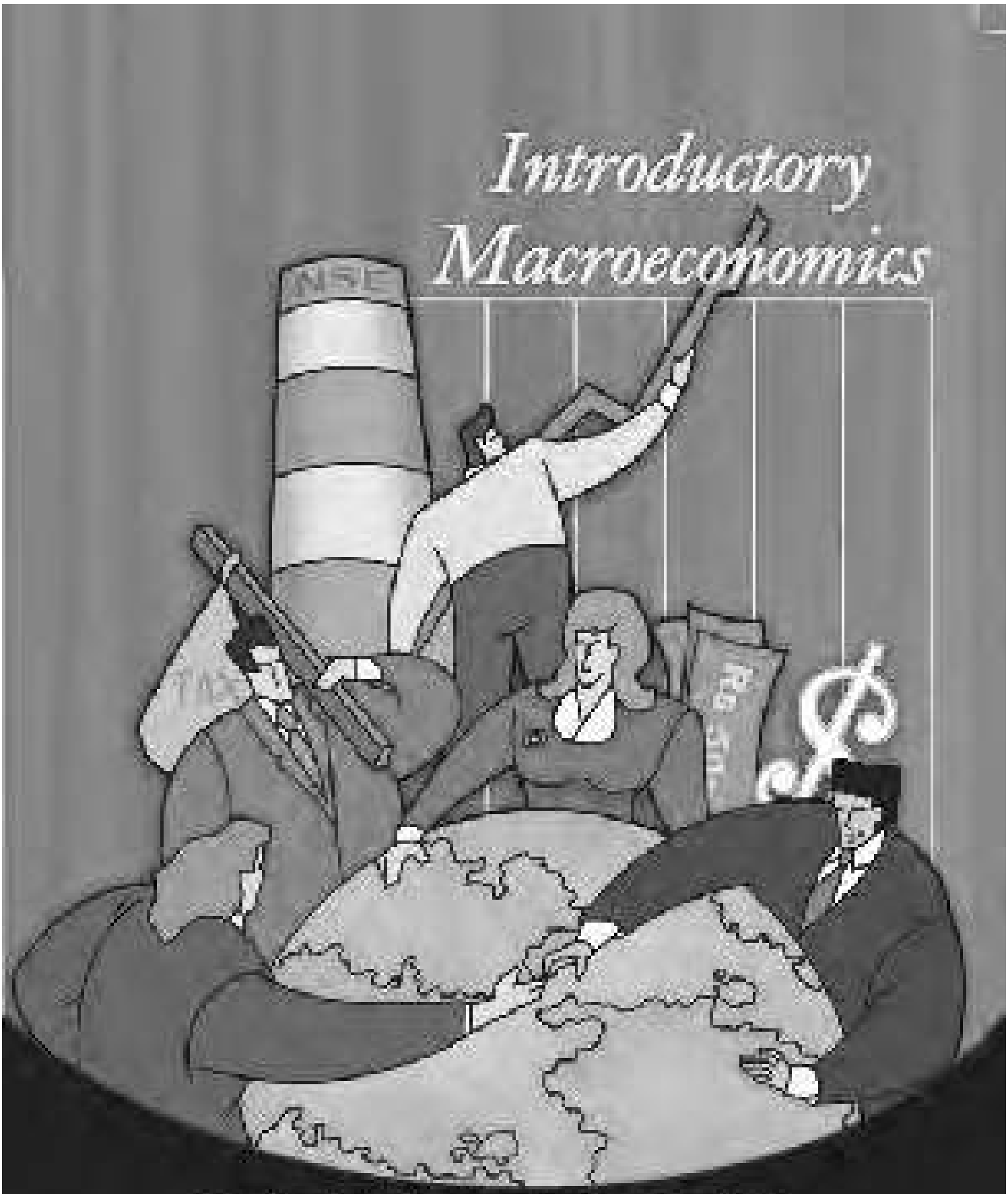
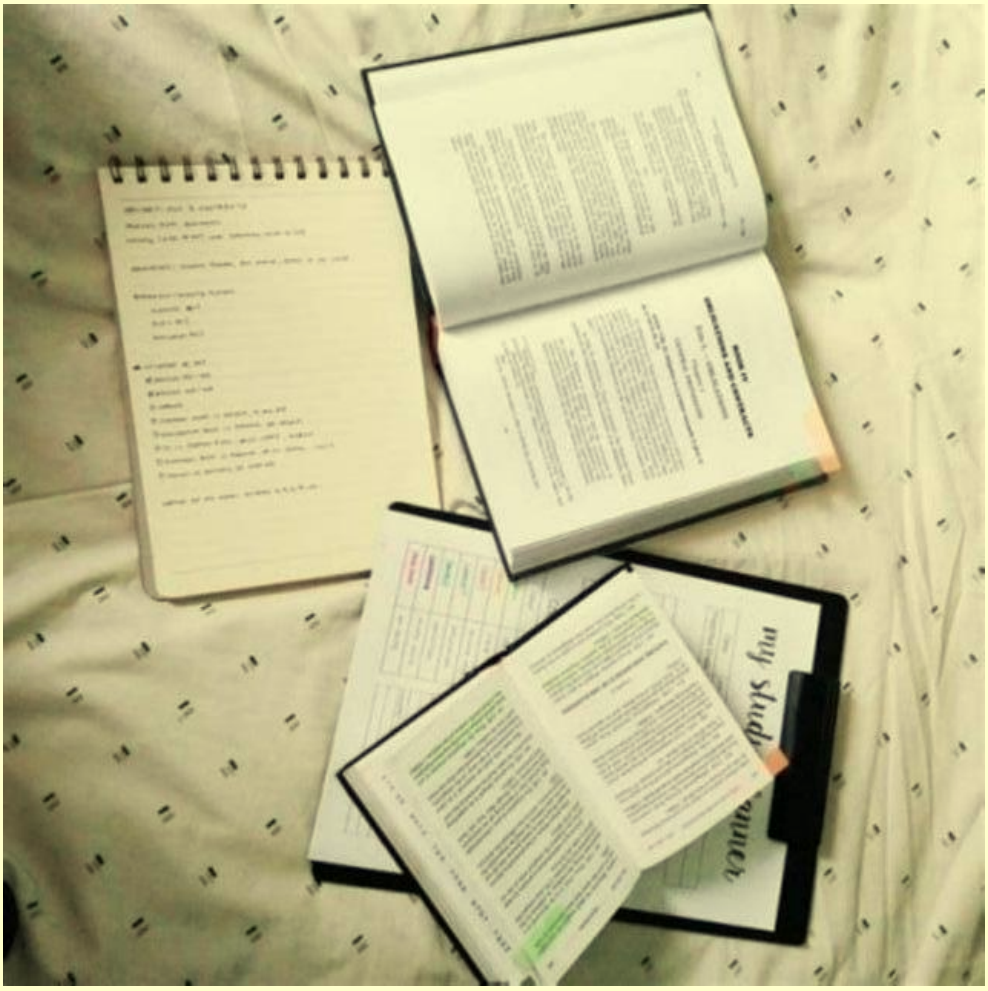
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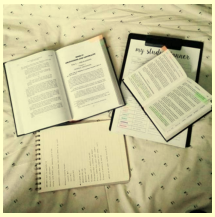
Textbook in Economics for Class XII



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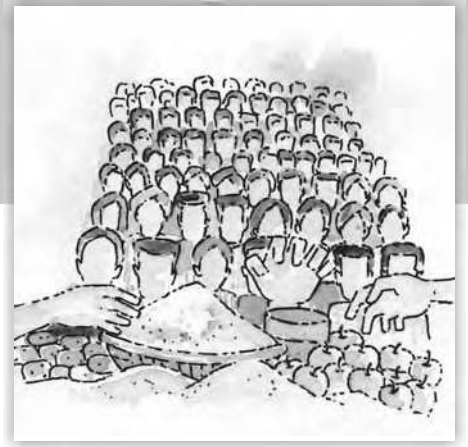
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Chapter 1

Introduction



You must have already been introduced to a study of basic microeconomics. This chapter begins by giving you a simplified account of how macroeconomics differs from the microeconomics that you have known.

Those of you who will choose later to specialise in economics, for your higher studies, will know about the more complex analyses that are used by economists to study macroeconomics today. But the basic questions of the study of macroeconomics would remain the same and you will find that these are actually the broad economic questions that concern all citizens – Will the prices as a whole rise or come down? Is the employment condition of the country as a whole, or of some sectors of the economy, getting better or is it worsening? What would be reasonable indicators to show that the economy is better or worse? What steps, if any, can the State take, or the people ask for, in order to improve the state of the economy? These are the kind of questions that make us think about the health of the country's economy as a whole. These questions are dealt with in macroeconomics at different levels of complexity.

In this book you will be introduced to some of the basic principles of macroeconomic analysis. The principles will be stated, as far as possible, in simple language. Sometimes elementary algebra will be used in the treatment for introducing the reader to some rigour.

If we observe the economy of a country as a whole it will appear that the output levels of all the goods and services in the economy have a tendency to move together. For example, if output of food grain is experiencing a growth, it is generally accompanied by a rise in the output level of industrial goods. Within the category of industrial goods also output of different kinds of goods tend to rise or fall simultaneously. Similarly, prices of different goods and services generally have a tendency to rise or fall simultaneously. We can also observe that the employment level in different production units also goes up or down together.

If aggregate output level, price level, or employment level, in the different production units of an economy, bear close relationship to each other then the task of analysing the entire economy becomes relatively easy. Instead of dealing with the above mentioned variables at individual (disaggregated) levels, we can think of a single good as the representative of all the

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goods and services produced within the economy. This representative good will have a level of production which will correspond to the average production level of all the goods and services. Similarly, the price or employment level of this representative good will reflect the general price and employment level of the economy.

In macroeconomics we usually simplify the analysis of how the country's total production and the level of employment are related to attributes (called 'variables') like prices, rate of interest, wage rates, profits and so on, by focusing on a single imaginary commodity and what happens to it. We are able to afford this simplification and thus usefully abstain from studying what happens to the many real commodities that actually are bought and sold in the market because we generally see that what happens to the prices, interests, wages and profits etc. for one commodity more or less also happens for the others. Particularly, when these attributes start changing fast, like when prices are going up (in what is called an inflation), or employment and production levels are going down (heading for a depression), the general directions of the movements of these variables for all the individual commodities are usually of the same kind as are seen for the aggregates for the economy as a whole.

We will see below why, sometimes, we also depart from this useful simplification when we realise that the country's economy as a whole may best be seen as composed of distinct sectors. For certain purposes the interdependence of (or even rivalry between) two sectors of the economy (agriculture and industry, for example) or the relationships between sectors (like the household sector, the business sector and government in a democratic set-up) help us understand some things happening to the country's economy much better, than by only looking at the economy as a whole.

While moving away from different goods and focusing on a representative good may be convenient, in the process, we may be overlooking some vital distinctive characteristics of individual goods. For example, production conditions of agricultural and industrial commodities are of a different nature. Or, if we treat a single category of labour as a representative of all kinds of labours, we may be unable to distinguish the labour of the manager of a firm from the labour of the accountant of the firm. So, in many cases, instead of a single representative category of good (or labour, or production technology), we may take a handful of different kinds of goods. For example, three general kinds of commodities may be taken as a representative of all commodities being produced within the economy: agricultural goods, industrial goods and services. These goods may have different production technology and different prices. Macroeconomics also tries to analyse how the individual output levels, prices, and employment levels of these different goods gets determined.

From this discussion here, and your earlier reading of microeconomics, you may have already begun to understand in what way macroeconomics differs from microeconomics. To recapitulate briefly, in microeconomics, you came across individual 'economic agents' (see box) and the nature of the motivations that drive them. They were 'micro' (meaning 'small') agents – consumers choosing their respective optimum combinations of goods to buy, given their tastes and incomes; and producers trying to make maximum profit out of producing their goods keeping their costs as low as possible and selling at a price as high as they could get in the markets. In other words, microeconomics was a study of individual markets of demand and supply and the 'players', or the decision-makers, were also individuals (buyers or sellers, even companies) who were seen

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as trying to maximise their profits (as producers or sellers) and their personal satisfaction or welfare levels (as consumers). Even a large company was 'micro' in the sense that it had to act in the interest of its own shareholders which was not necessarily the interest of the country as a whole. For microeconomics the 'macro' (meaning 'large') phenomena affecting the economy as a whole, like inflation or unemployment, were either not mentioned or were taken as given. These were not variables that individual buyers or sellers could change. The nearest that microeconomics got to macroeconomics was when it looked at General Equilibrium, meaning the equilibrium of supply and demand in each market in the economy.

Economic Agents

By economic units or economic agents, we mean those individuals or institutions which take economic decisions. They can be consumers who decide what and how much to consume. They may be producers of goods and services who decide what and how much to produce. They may be entities like the government, corporation, banks which also take different economic decisions like how much to spend, what interest rate to charge on the credits, how much to tax, etc.

Macroeconomics tries to address situations facing the economy as a whole. **Adam Smith**, the founding father of modern economics, had suggested that if the buyers and sellers in each market take their decisions following only their own self-interest, economists will not need to think of the wealth and welfare of the country as a whole separately. But economists gradually discovered that they had to look further.

Economists found that first, in some cases, the markets did not or could not exist. Secondly, in some other cases, the markets existed but failed to produce equilibrium of demand and supply. Thirdly, and most importantly, in a large number of situations society (or the State, or the people as a whole) had decided to pursue certain important social goals unselfishly (in areas like employment, administration, defence, education and health) for which some of the aggregate effects of the microeconomic decisions made by the individual economic agents needed to be modified. For these purposes macroeconomists had to study the effects in the markets of taxation and other budgetary policies, and policies for bringing about changes in money supply, the rate of interest, wages, employment, and output. Macroeconomics has, therefore, deep roots in microeconomics because it has to study the aggregate effects of the forces of demand and supply in the markets. However, in addition, it has to deal with policies aimed at also modifying these forces, if necessary, to follow choices made by society outside the markets. In a developing country like India such choices have to be made to remove or reduce unemployment, to improve access to education and primary health care for all, to provide for good administration, to provide sufficiently for the defence of the country and so on. Macroeconomics shows two simple characteristics that are evident in dealing with the situations we have just listed. These are briefly mentioned below.

First, who are the macroeconomic decision makers (or 'players')? Macroeconomic policies are pursued by the State itself or statutory bodies like the Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI) and similar institutions. Typically, each such body will have one or more public goals to pursue as defined by law or the Constitution of India itself. These goals



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are not those of individual economic agents maximising their private profit or welfare. Thus the macroeconomic agents are basically different from the individual decision-makers.

Secondly, what do the macroeconomic decision-makers try to do? Obviously they often have to go beyond economic objectives and try to direct the deployment of economic resources for such public needs as we have listed above. Such activities are not aimed at serving individual self-interests. They are pursued for the welfare of the country and its people as a whole.

1.1 Emergence of Macroeconomics

Macroeconomics, as a separate branch of economics, emerged after the British economist **John Maynard Keynes** published his celebrated book *The General Theory of Employment, Interest and Money* in 1936. The dominant thinking in economics before Keynes was that all the labourers who are ready to work will find employment and all the factories will be working at their full capacity. This school of thought is known as the classical tradition. However, **the Great Depression** of 1929 and the subsequent years saw the output and employment levels in the countries of Europe and North America fall by huge amounts. It affected other countries of the world as well. Demand for goods in the market was low, many factories were lying idle, workers were thrown out of jobs. In USA, from 1929 to 1933, **unemployment rate** rose from 3 per cent to 25 per cent (unemployment rate may be defined as the number of people who are not working and are looking for jobs divided by the total number of people who are working or looking for jobs). Over the same period aggregate output in USA fell by about 33 per cent. These events made economists think about the functioning of the economy in a new way. The fact that the economy may have long lasting unemployment had to be theorised about and explained. Keynes' book was an attempt in this direction. Unlike his predecessors, his approach was to examine the working of the economy in its entirety and examine the interdependence of the different sectors. The subject of macroeconomics was born.



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1.2 Context of the Present Book of Macroeconomics

We must remember that the subject under study has a particular historical context. We shall examine the working of the economy of a capitalist country in this book. In a **capitalist country** production activities are mainly carried out by capitalist enterprises. A typical capitalist enterprise has one or several **entrepreneurs** (people who exercise control over major decisions and bear a large part of the risk associated with the firm/enterprise). They may themselves supply the **capital** needed to run the enterprise, or they may borrow the capital. To carry out production they also need **natural resources** – a part consumed in the process of production (e.g. raw materials) and a part fixed (e.g. plots of land). And they need the most important element of human labour to carry out production. This we shall refer to as **labour**. After producing output with the help of these three factors of production, namely capital, land and labour, the entrepreneur sells the product in the market. The money that is earned is called **revenue**. Part of the revenue is paid out as rent for the service rendered by land, part of it is paid to capital as interest and part of it goes to labour as wages. The rest of the revenue is the earning of the entrepreneurs and it is called **profit**. Profits are often used by the producers in the next period to buy new machinery or to build new factories, so that production can be expanded. These expenses which raise productive capacity are examples of **investment expenditure**.

In short, a capitalist economy can be defined as an economy in which most of the economic activities have the following characteristics (a) there is private ownership of means of production (b) production takes place for selling the output in the market (c) there is sale and purchase of labour services at a price which is called the **wage rate** (the labour which is sold and purchased against wages is referred to as **wage labour**).

If we apply the above mentioned three criteria to the countries of the world we would find that capitalist countries have come into being only during the last three to four hundred years. Moreover, strictly speaking, even at present, a handful of countries in North America, Europe and Asia will qualify as capitalist countries. In many underdeveloped countries production (in agriculture especially) is carried out by peasant families. Wage labour is seldom used and most of the labour is performed by the family members themselves. Production is not solely for the market; a great part of it is consumed by the family. Neither do many peasant farms experience significant rise in capital stock over time. In many tribal societies the ownership of land does not exist; the land may belong to the whole tribe. In such societies the analysis that we shall present in this book will not be applicable. It is, however, true that many developing countries have a significant presence of production units which are organised according to capitalist principles. The production units will be called firms in this book. In a firm the entrepreneur (or entrepreneurs) is at the helm of affairs. She hires wage labour from the market, she employs the services of capital and land as well. After hiring these inputs she undertakes the task of production. Her motive for producing goods and services (referred to as output) is to sell them in the market and earn profits. In the process she undertakes risks and uncertainties. For example, she may not get a high enough price for the goods she is producing; this may lead to fall in the profits that she earns. It is to be noted that in a capitalist country the factors of production earn their incomes through the process of production and sale of the resultant output in the market.

In both the developed and developing countries, apart from the private capitalist sector, there is the institution of State. The role of the state includes



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framing laws, enforcing them and delivering justice. The state, in many instances, undertakes production – apart from imposing taxes and spending money on building public infrastructure, running schools, colleges, providing health services etc. These economic functions of the state have to be taken into account when we want to describe the economy of the country. For convenience we shall use the term government to denote state.

Apart from the firms and the government, there is another major sector in an economy which is called the household sector. By a household we mean a single individual who takes decisions relating to her own consumption, or a group of individuals for whom decisions relating to consumption are jointly determined. Households also save and pay taxes. How do they get the money for these activities? We must remember that the households consist of people. These people work in firms as workers and earn wages. They are the ones who work in the government departments and earn salaries, or they are the owners of firms and earn profits. Indeed the market in which the firms sell their products could not have been functioning without the demand coming from the households.

So far we have described the major players in the domestic economy. But all the countries of the world are also engaged in external trade. The external sector is the fourth important sector in our study. Trade with the external sector can be of two kinds

1. The domestic country may sell goods to the rest of the world. These are called **exports**.
2. The economy may also buy goods from the rest of the world. These are called **imports**. Besides exports and imports, the rest of the world affects the domestic economy in other ways as well.
3. Capital from foreign countries may flow into the domestic country, or the domestic country may be exporting capital to foreign countries.

Summary

Macroeconomics deals with the aggregate economic variables of an economy. It also takes into account various interlinkages which may exist between the different sectors of an economy. This is what distinguishes it from microeconomics; which mostly examines the functioning of the particular sectors of the economy, assuming that the rest of the economy remains the same. Macroeconomics emerged as a separate subject in the 1930s due to Keynes. The Great Depression, which dealt a blow to the economies of developed countries, had provided Keynes with the inspiration for his writings. In this book we shall mostly deal with the working of a capitalist economy. Hence it may not be entirely able to capture the functioning of a developing country. Macroeconomics sees an economy as a combination of four sectors, namely households, firms, government and external sector.

Key Concepts

Rate of interest
Profits
Great Depression
Four factors of production
Inputs
Labour
Entrepreneurship
Wage rate
Economic agents or units
Unemployment rate
Means of production
Land
Capital
Investment expenditure

Wage labour	Capitalist country or capitalist economy
Firms	Capitalist firms
Output	Households
Government	External sector
Exports	Imports

Exercises

1. What is the difference between microeconomics and macroeconomics?
2. What are the important features of a capitalist economy?
3. Describe the four major sectors in an economy according to the macroeconomic point of view.
4. Describe the Great Depression of 1929.

Suggested Readings

1. Bhaduri, A., 1990. *Macroeconomics: The Dynamics of Commodity Production*, pages 1 – 27, Macmillan India Limited, New Delhi.
2. Mankiw, N. G., 2000. *Macroeconomics*, pages 2 – 14, Macmillan Worth Publishers, New York.

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Chapter 2



National Income Accounting

In this chapter we will introduce the fundamental functioning of a simple economy. In section 2.1 we describe some primary ideas we shall work with. In section 2.2 we describe how we can view the aggregate income of the entire economy going through the sectors of the economy in a circular way. The same section also deals with the three ways to calculate the national income; namely product method, expenditure method and income method. The last section 2.3 describes the various sub-categories of national income. It also defines different price indices like GDP deflator, Consumer Price Index, Wholesale Price Indices and discusses the problems associated with taking GDP of a country as an indicator of the aggregate welfare of the people of the country.

2.1 Some Basic Concepts of Macroeconomics

One of the pioneers of the subject we call economics today, Adam Smith, named his most influential work – *An Enquiry into the Nature and Cause of the Wealth of Nations*. What generates the economic wealth of a nation? What makes countries rich or poor? These are some of the central questions of economics. It is not that countries which are endowed with a bounty of natural wealth – minerals or forests or the most fertile lands – are naturally the richest countries. In fact the resource rich Africa and Latin America have some of the poorest countries in the world, whereas many prosperous countries have scarcely any natural wealth. There was a time when possession of natural resources was the most important consideration but even then the resource had to be transformed through a production process.

The economic wealth, or well-being, of a country thus does not necessarily depend on the mere possession of resources; the point is how these resources are used in generating a flow of production and how, as a consequence, income and wealth are generated from that process.

Let us now dwell upon this flow of production. How does this flow of production arise? People combine their energies with natural and manmade environment within a certain social and technological structure to generate a flow of production.

In our modern economic setting this flow of production arises out of production of commodities – goods and services by millions of enterprises large and small. These enterprises range from giant

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corporations employing a large number of people to single entrepreneur enterprises. But what happens to these commodities after being produced? Each producer of commodities intends to sell her output. So from the smallest items like pins or buttons to the largest ones like aeroplanes, automobiles, giant machinery or any saleable service like that of the doctor, the lawyer or the financial consultant–the goods and services produced are to be sold to the consumers. The consumer may, in turn, be an individual or an enterprise and the good or service purchased by that entity might be for final use or for use in further production. When it is used in further production it often loses its characteristic as that specific good and is transformed through a productive process into another good. Thus a farmer producing cotton sells it to a spinning mill where the raw cotton undergoes transformation to yarn; the yarn is, in turn, sold to a textile mill where, through the productive process, it is transformed into cloth; the cloth is, in turn, transformed through another productive process into an article of clothing which is then ready to be sold finally to the consumers for final use. Such an item that is meant for final use and will not pass through any more stages of production or transformations is called a **final good**.

Why do we call this a final good? Because once it has been sold it passes out of the active economic flow. It will not undergo any further transformation at the hands of any producer. It may, however, undergo transformation by the action of the ultimate purchaser. In fact many such final goods are transformed during their consumption. Thus the tea leaves purchased by the consumer are not consumed in that form – they are used to make drinkable tea, which is consumed. Similarly most of the items that enter our kitchen are transformed through the process of cooking. But cooking at home is not an economic activity, even though the product involved undergoes transformation. Home cooked food is not sold to the market. However, if the same cooking or tea brewing was done in a restaurant where the cooked product would be sold to customers, then the same items, such as tea leaves, would cease to be final goods and would be counted as inputs to which economic value addition can take place. Thus it is not in the nature of the good but in the economic nature of its use that a good becomes a final good.

Of the final goods, we can distinguish between **consumption goods** and **capital goods**. Goods like food and clothing, and services like recreation that are consumed when purchased by their ultimate consumers are called consumption goods or consumer goods. (This also includes services which are consumed but for convenience we may refer to them as consumer goods.)

Then there are other goods that are of durable character which are used in the production process. These are tools, implements and machines. While they make production of other commodities feasible, they themselves don't get transformed in the production process. They are also final goods yet they are not final goods to be ultimately consumed. Unlike the final goods that we have considered above, they are the crucial backbone of any production process, in aiding and enabling the production to take place. These goods form a part of capital, one of the crucial factors of production in which a productive enterprise has invested, and they continue to enable the production process to go on for continuous cycles of production. These are capital goods and they gradually undergo wear and tear, and thus are repaired or gradually replaced over time. The stock of capital that an economy possesses is thus preserved, maintained and renewed partially or wholly over time and this is of some importance in the discussion that will follow.

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We may note here that some commodities like television sets, automobiles or home computers, although they are for ultimate consumption, have one characteristic in common with capital goods – they are also durable. That is, they are not extinguished by immediate or even short period consumption; they have a relatively long life as compared to articles such as food or even clothing. They also undergo wear and tear with gradual use and often need repairs and replacements of parts, i.e., like machines they also need to be preserved, maintained and renewed. That is why we call these goods **consumer durables**.

Thus if we consider all the final goods and services produced in an economy in a given period of time they are either in the form of consumption goods (both durable and non-durable) or capital goods. As final goods they do not undergo any further transformation in the economic process.

Of the total production taking place in the economy a large number of products don't end up in final consumption and are not capital goods either. Such goods may be used by other producers as material inputs. Examples are steel sheets used for making automobiles and copper used for making utensils. These are **intermediate goods**, mostly used as raw material or inputs for production of other commodities. *These are not final goods.*

Now, to have a comprehensive idea of the total flow of production in the economy, we need to have a quantitative measure of the aggregate level of final goods produced in the economy. However, in order to get a quantitative assessment – a measure of the total final goods and services produced in the economy – it is obvious that we need a *common measuring rod.* We cannot add metres of cloth produced to tonnes of rice or number of automobiles or machines. Our common measuring rod is money. Since each of these commodities is produced for sale, *the sum total of the monetary value of these diverse commodities gives us a measure of final output.* But why are we to measure final goods only? Surely intermediate goods are crucial inputs to any production process and a significant part of our manpower and capital stock are engaged in production of these goods. However, since we are dealing with value of output, we should realise that the value of the final goods already includes the value of the intermediate goods that have entered into their production as inputs. Counting them separately will lead to the error of *double counting.* Whereas considering intermediate goods may give a fuller description of total economic activity, counting them will highly exaggerate the final value of our economic activity.

At this stage it is important to introduce the concepts of **stocks** and **flows**. Often we hear statements like the average salary of someone is Rs 10,000 or the output of the steel industry is so many tonnes or so many rupees in value. But these are incomplete statements because it is not clear whether the income which is being referred to is yearly or monthly or daily income and surely that makes a huge difference. Sometimes, when the context is familiar, we assume that the time period is known and therefore do not mention it. But inherent in all such statements is a definite period of time. Otherwise such statements are meaningless. Thus income, or output, or profits are concepts that make sense only when a time period is specified. These are called flows because they occur in a period of time. Therefore we need to delineate a time period to get a quantitative measure of these. Since a lot of accounting is done annually in an economy, many of these are expressed annually like annual profits or production. Flows are defined over a period of time.

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In contrast, capital goods or consumer durables once produced do not wear out or get consumed in a delineated time period. In fact capital goods continue to serve us through different cycles of production. The buildings or machines in a factory are there irrespective of the specific time period. There can be addition to, or deduction from, these if a new machine is added or a machine falls in disuse and is not replaced. These are called stocks. Stocks are defined at a particular point of time. However we can measure a *change in stock* over a specific period of time like how many machines were added this year. Such changes in stocks are thus flows, which can be measured over specific time periods. A particular machine can be part of the capital stock for many years (unless it wears out); but that machine can be part of the flow of new machines added to the capital stock only for a single year.

To further understand the difference between stock variables and flow variables, let us take the following example. Suppose a tank is being filled with water coming from a tap. The amount of water which is flowing into the tank from the tap per minute is a flow. But how much water there is in the tank at a particular point of time is a stock concept.

To come back to our discussion on the measure of final output, that part of our final output that comprises of capital goods constitutes **gross investment** of an economy[1]. These may be machines, tools and implements; buildings, office spaces, storehouses or infrastructure like roads, bridges, airports or jetties. But all the capital goods produced in a year do not constitute an addition to the capital stock already existing. A significant part of current output of capital goods goes in maintaining or replacing part of the existing stock of capital goods. This is because the already existing capital stock suffers wear and tear and needs maintenance and replacement. A part of the capital goods produced this year goes for replacement of existing capital goods and is not an addition to the stock of capital goods already existing and its value needs to be subtracted from gross investment for arriving at the measure for net investment. This deletion, which is made from the value of gross investment in order to accommodate regular wear and tear of capital, is called **depreciation**.

So new addition to capital stock in an economy is measured by net investment or new capital formation, which is expressed as

Net Investment = Gross investment – Depreciation

Let us examine this concept called depreciation a little more in detail. Let us consider a new machine that a firm invests in. This machine may be in service for the next twenty years after which it falls into disrepair and needs to be replaced. We can now imagine as if the machine is being gradually used up in each year's production process and each year one twentieth of its original value is getting depreciated. So, instead of considering a bulk investment for replacement after twenty years, we consider an annual depreciation cost every year. This is the usual sense in which the term depreciation is used and inherent in its conception is the expected life of a particular capital good, like twenty years in our example of the machine. Depreciation is thus an annual allowance for wear and tear of a

[1]This is how economists define investment. This must not be confused with the commonplace notion of investment which implies using money to buy physical or financial assets. Thus use of the term investment to denote purchase of shares or property or even having an insurance policy has nothing to do with how economists define investment. Investment for us is always capital formation, a gross or net addition to capital stock.

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capital good.[2] In other words it is the cost of the good divided by number of years of its useful life.[3]

Notice here that depreciation is an accounting concept. No real expenditure may have actually been incurred each year yet depreciation is annually accounted for. In an economy with thousands of enterprises with widely varying periods of life of their equipment, in any particular year, some enterprises are actually making the bulk replacement spending. Thus, we can realistically assume that there will be a steady flow of actual replacement spending which will more or less match the amount of annual depreciation being accounted for in that economy.

Now if we go back to our discussion of total final output produced in an economy, we see that there is output of consumer goods and services and output of capital goods. The consumer goods sustain the consumption of the entire population of the economy. Purchase of consumer goods depends on the capacity of the people to spend on these goods which, in turn, depends on their income. The other part of the final goods, the capital goods, are purchased by business enterprises either for maintenance or addition to their capital stock so that they can continue to maintain or expand the flow of their production. In a specific time period, say in a year, the total production of final goods can thus be either in the form of consumption or investment and there is thus a trade-off. If an economy, out of its current production of final goods, produces more of consumer goods, it is producing less of investment goods and vice-versa.

We will soon see, however, that this simple additive relation is more complex in more than one way.

The relation, in fact, is that of a basic circularity expressing the self-feeding nature of the production process. Consumption goods sustain the basic objective of any economy – the need to consume. Consumption may range from basic life sustenance to luxurious lifestyles. Human beings must consume to survive and work and it is consumption of the basic necessities of life – food, clothing, shelter that make us function. But as human societies advance and progress, their consumption needs become much more wide ranging and complex. Not only are newer consumption needs perceived and correspondingly new consumer goods and services produced, but also the meaning of basic necessities may now include not only food and clothing but such essentials like basic education and health care. If consumption is the ultimate objective, these consumables – goods and services – are to be both produced and purchased. Whereas it is possible, in different social or economic arrangements, for goods to be produced and distributed to members of the society without being purchased or sold, we are not considering an economy like that. In the economy under consideration all goods and services are produced by the entrepreneur for sale and the enterprise intends to make a profit through the act of selling.

So the act of production makes this consumption feasible in two ways – by producing these consumption goods and simultaneously generating the income for those who are involved in the production process. The entrepreneur buys machines and employs people to make this production feasible. The objective of the entrepreneur is to sell the commodities produced and earn profits. The act

[2]Depreciation does not take into account unexpected or sudden destruction or disuse of capital as can happen with accidents, natural calamities or other such extraneous circumstances.

[3]We are making a rather simple assumption here that there is a constant rate of depreciation based on the original value of the asset. There can be other methods to calculate depreciation in actual practice.

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of employment, in turn, generates income for those who are employed. The income that the employed earn and the profit that the entrepreneur earns become the basis for purchase of consumption goods that are being produced for sale.

But the production of consumption goods would not be feasible without capital goods. Human labour is combined or applied on the stock of capital goods to produce the consumables and the capital goods. More sophisticated the capital goods are, more will be the productivity of labour. The traditional weaver would take months to weave a sari but with modern machinery thousands of pieces of clothing are produced in a day. Decades were taken to construct the great historical monuments like the Pyramids or the Taj Mahal but with modern construction machinery one can build a skyscraper in a few years. One of the signs of progress in our modern society is both the qualitative and quantitative enhancement that has happened to capital stock. The larger and more sophisticated the capital stock, the more numerous and more varied will be the output of commodities and, consequently, more numerous and varied will be the production of consumption goods.

But aren't we contradicting ourselves? Earlier we have seen how, of the total output of final goods in an economy, if a larger share goes for production of capital goods, a smaller share is available for production of consumer goods. Here we have to bring in the relevance of the time period in our discussion. Given a stock of capital goods with which production commences in a year, of the total output produced at the end of the year, if more of capital goods are produced then less of consumption goods are produced. But the more the capital goods produced now, more will be the productive capacity of the system in the future. Hence a larger volume of consumption goods can be produced in the future. If, at present, the economy sets aside a greater fraction of its output for investment purpose, its capacity to produce more output in the future rises. This phenomenon becomes possible because capital goods, unlike non-durable consumer goods, do not get immediately exhausted with their use – they add to the stock of capital in quantitative terms. The new stock may also be qualitatively superior to the existing stock (just as a modern textile mill is more productive than the old handlooms). In both cases the capacity of the economy to produce more output in the future rises.

Now if we concentrate on production in a given time period, say a year, we can observe the basic circularity.

Total output of final goods and services produced in an economy in a year has two different parts – the consumer goods and services, and the capital goods. The consumer goods and services sustain the consumption of the total population of the economy. From the population of the economy is derived its workforce, people who contribute to production either by providing their labour and skill or by supplying their capital or entrepreneurship. Such human effort is combined with existing stock of capital goods – tools, machines, infrastructure etc. to form the basis for production of output. Of this a part of the final output comprises of this year's capital goods production, which replaces or adds to the existing capital stock, and the resultant capital stock, in interaction with human labour and entrepreneurship, will be the basis for production of output in the next cycle of production i.e. next year. Thus the economic cycle rolls on, making a continuous process of consumption and production possible.

We can also observe here that unless the current production of capital goods is entirely used up for replacement of old capital stock, which in most instances is rather unlikely, i.e. if there is a net addition to capital stock at the end of this



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year's production cycle, next year's production commences with a larger stock of capital. This can thus become the basis for larger production of output. Thus the economic cycle not only rolls on, it also has a strong tendency to expand.

We can also locate another view of the circular flow inherent in the discussion we have made had so far.

Since we are dealing with all goods and services that are produced for the market, i.e. to be sold, the crucial factor enabling such sale is demand for such products backed by purchasing power. One must have the necessary ability to purchase commodities. Otherwise one's need for commodities does not get recognised by the market.

We have already discussed above that one's ability to buy commodities comes from the income one earns as labourer (earning wages), or as entrepreneur (earning profits), or as landlord (earning rents), or as owner of capital (earning interests). In short, the incomes that people earn as owners of factors of production are used by them to meet their demand for goods and services.

So we can see a circular flow here which is facilitated through the market. Simply put, the firms' demand for factors of production to run the production process creates payments to the public. In turn, the public's demand for goods and services creates payments to the firms and enables the sale of the products they produce.

So the social act of consumption and production are intricately linked and, in fact, there is a circular causation here. The process of production in an economy generates factor payments for those involved in production and generates goods and services as the outcome of the production process. The incomes so generated create the capacity to purchase the final consumption goods and thus enable their sale by the business enterprises, the basic object of their production. The capital goods which are also generated in the production process also enable their producers to earn income – wages, profits etc. in a similar manner. The capital goods add to, or maintain, the capital stock of an economy and thus make production of other commodities possible.

2.2 Circular Flow of Income and Methods of Calculating National Income

The description of the economy in the previous section enables us to have a rough idea of how a simple economy – without a government, external trade or any savings – may function. The households receive their payments from the firms for productive activities they perform for the latter. As we have mentioned before, there may fundamentally be four kinds of contributions that can be made during the production of goods and services (a) contribution made by human labour, remuneration for which is called wage (b) contribution made by capital, remuneration for which is called interest (c) contribution made by entrepreneurship, remuneration of which is profit (d) contribution made by fixed natural resources (called 'land'), remuneration for which is called rent.

In this simplified economy, there is only one way in which the households may dispose off their earnings – by spending their entire income on the goods and services produced by the domestic firms. The other channels of disposing their income are closed: we have assumed that the households do not save, they do not pay taxes to the government – since there is no government, and neither do they buy imported goods since there is no external trade in this simple economy. In other words, factors of production use their remunerations to buy

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the goods and services which they assisted in producing. The aggregate consumption by the households of the economy is equal to the aggregate expenditure on goods and services produced by the firms in the economy. The entire income of the economy, therefore, comes back to the producers in the form of sales revenue. There is no leakage from the system – there is no difference between the amount that the firms had distributed in the form of factor payments (which is the sum total of remunerations earned by the four factors of production) and the aggregate consumption expenditure that they receive as sales revenue.

In the next period the firms will once again produce goods and services and pay remunerations to the factors of production. These remunerations will once again be used to buy the goods and services. Hence year after year we can imagine the aggregate income of the economy going through the two sectors, firms and households, in a circular way. This is represented in Fig. 2.1. When the income is being spent on the goods and services produced by the firms, it takes the form of aggregate expenditure received by the firms. Since the value of expenditure must be equal to the value of goods and services, we can equivalently measure the aggregate income by calculating the aggregate value of goods and services produced by the firms. When the aggregate revenue received by the firms is paid out to the factors of production it takes the form of aggregate income.

In Fig. 2.1, the uppermost arrow, going from the households to the firms, represents the spending the households undertake to buy goods and services produced by the firms. The second arrow going from the firms to the households is the counterpart of the arrow above. It stands for the goods and services which are flowing from the firms to the households. In other words, this flow is what the households are getting from the firms, for which they are making the expenditures. In short, the two arrows on the top represent the goods and services market – the arrow above represents the flow of payments for the goods and services, the arrow below represents the flow of goods and services. The two arrows at the bottom of the diagram similarly represent the factors of production market. The lower most arrow going from the households to the firms symbolises the services that the households are rendering to the firms. Using these services the firms are manufacturing the output. The arrow above this, going from the firms to the households, represents the payments made by the firms to the households for the services provided by the latter.

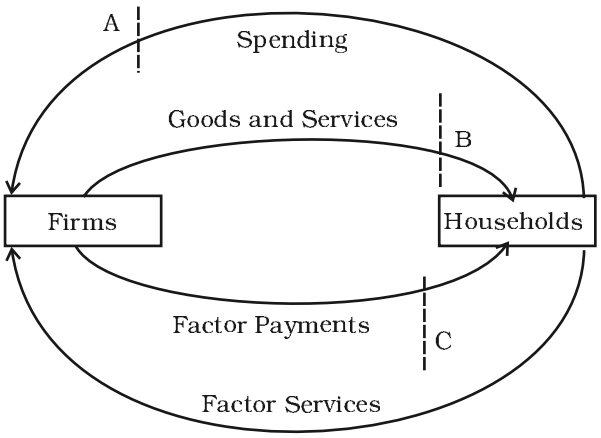


Fig. 2.1: *Circular Flow of Income in a Simple Economy*

Since the same amount of money, representing the aggregate value of goods and services, is moving in a circular way, if we want to estimate the aggregate value of goods and services produced during a year we can measure the annual value of the flows at any of the dotted lines indicated in the diagram. We can measure the uppermost flow (at point A) by measuring the aggregate value of spending that the firms receive for the final goods and services which they produce.

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This method will be called the **expenditure method**. If we measure the flow at B by measuring the aggregate value of final goods and services produced by all the firms, it will be called **product method**. At C, measuring the sum total of all factor payments will be called **income method**.

Observe that the aggregate spending of the economy must be equal to the aggregate income earned by the factors of production (the flows are equal at A and C). Now let us suppose that at a particular period of time the households decide to spend more on the goods and services produced by the firms. For the time being let us ignore the question where they would find the money to finance that extra spending since they are already spending all of their income (they may have borrowed the money to finance the additional spending). Now if they spend more on the goods and services, the firms will produce more goods and services to meet this extra demand. Since they will produce more, the firms must also pay the factors of production extra remunerations. How much extra amount of money will the firms pay? The additional factor payments must be equal to the value of the additional goods and services that are being produced. Thus the households will eventually get the extra earnings required to support the initial additional spending that they had undertaken. In other words, the households can decide to spend more – spend beyond their means. And in the end their income will rise exactly by the amount which is necessary to carry out the extra spending. Putting it differently, an economy may decide to spend more than the present level of income. But by doing so, its income will eventually rise to a level consistent with the higher spending level. This may seem a little paradoxical at first. But since income is moving in a circular fashion, it is not difficult to figure out that a rise in the flow at one point must eventually lead to a rise in the flow at all levels. This is one more example of how the functioning of a single economic agent (say, a household) may differ from the functioning of the economy as a whole. In the former the spending gets restricted by the individual income of a household. It can never happen that a single worker decides to spend more and this leads to an equivalent rise in her income. We shall spend more time on how higher aggregate spending leads to change in aggregate income in a later chapter.

The above mentioned sketchy illustration of an economy is admittedly a simplified one. Such a story which describes the functioning of an imaginary economy is called a **macroeconomic model**. It is clear that a model does not describe an actual economy in detail. For example, our model assumes that households do not save, there is no government, no trade with other countries. However models do not want to capture an economy in its every minute detail – their purpose is to highlight some essential features of the functioning of an economic system. But one has to be cautious not to simplify the matters in such a way that misrepresents the essential nature of the economy. The subject of economics is full of models, many of which will be presented in this book. One task of an economist is to figure out which model is applicable to which real life situation.

If we change our simple model described above and introduce savings, will it change the principal conclusion that the aggregate estimate of the income of the economy will remain the same whether we decide to calculate it at A, B or C? It turns out that this conclusion does not change in a fundamental way. No matter how complicated an economic system may be, the annual production of goods and services estimated through each of the three methods is the same.

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We have seen that the aggregate value of goods and services produced in an economy can be calculated by three methods. We now discuss the detailed steps of these calculations.

2.2.1 The Product or Value Added Method

In product method we calculate the aggregate annual value of goods and services produced (if a year is the unit of time). How to go about doing this? Do we add up the value of all goods and services produced by all the firms in an economy? The following example will help us to understand.

Let us suppose that there are only two kinds of producers in the economy. They are the wheat producers (or the farmers) and the bread makers (the bakers). The wheat producers grow wheat and they do not need any input other than human labour. They sell a part of the wheat to the bakers. The bakers do not need any other raw materials besides wheat to produce bread. Let us suppose that in a year the total value of wheat that the farmers have produced is Rs 100. Out of this they have sold Rs 50 worth of wheat to the bakers. The bakers have used this amount of wheat completely during the year and have produced Rs 200 worth of bread. What is the value of total production in the economy? If we follow the simple way of aggregating the values of production of the sectors, we would add Rs 200 (value of production of the bakers) to Rs 100 (value of production of farmers). The result will be Rs 300.

A little reflection will tell us that the value of aggregate production is not Rs 300. The farmers had produced Rs 100 worth of wheat for which it did not need assistance of any inputs. Therefore the entire Rs 100 is rightfully the contribution of the farmers. But the same is not true for the bakers. The bakers had to buy Rs 50 worth of wheat to produce their bread. The Rs 200 worth of bread that they have produced is not entirely their own contribution. To calculate the net contribution of the bakers, we need to subtract the value of the wheat that they have bought from the farmers. If we do not do this we shall commit the mistake of 'double counting'. This is because Rs 50 worth of wheat will be counted twice. First it will be counted as part of the output produced by the farmers. Second time, it will be counted as the imputed value of wheat in the bread produced by the bakers.

Therefore, the net contribution made by the bakers is, Rs 200 – Rs 50 = Rs 150. Hence, aggregate value of goods produced by this simple economy is Rs 100 (net contribution by the farmers) + Rs 150 (net contribution by the bakers) = Rs 250.

The term that is used to denote the net contribution made by a firm is called its **value added**. We have seen that the raw materials that a firm buys from another firm which are completely used up in the process of production are called 'intermediate goods'. Therefore the value added of a firm is, *value of production of the firm – value of intermediate goods used by the firm*. The value added of a firm is distributed among its four factors of production, namely, labour, capital, entrepreneurship and land. Therefore wages, interest, profits and rents paid out by the firm must add up to the value added of the firm. Value added is a flow variable.

We can represent the example given above in terms of Table 2.1.

Table 2.1: Production, Intermediate Goods and Value Added

	Farmer	*Baker*
Total production	100	200
Intermediate goods used	0	50
Value added	100	200 – 50 =150

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Here all the variables are expressed in terms of money. We can think of the market prices of the goods being used to evaluate the different variables listed here. And we can introduce more players in the chain of production in the example and make it more realistic and complicated. For example, the farmer may be using fertilisers or pesticides to produce wheat. The value of these inputs will have to be deducted from the value of output of wheat. Or the bakers may be selling the bread to a restaurant whose value added will have to be calculated by subtracting the value of intermediate goods (bread in this case).

We have already introduced the concept of depreciation, which is also known as consumption of fixed capital. Since the capital which is used to carry out production undergoes wear and tear, the producer has to undertake replacement investments to keep the value of capital constant. The replacement investment is same as depreciation of capital. If we include depreciation in value added then the measure of value added that we obtain is called **Gross Value Added**. If we deduct the value of depreciation from gross value added we obtain **Net Value Added**. Unlike gross value added, net value added does not include wear and tear that capital has undergone. For example, let us say a firm produces Rs 100 worth of goods per year, Rs 20 is the value of intermediate goods used by it during the year and Rs 10 is the value of capital consumption. The gross value added of the firm will be, Rs 100 – Rs 20 = Rs 80 per year. The net value added will be, Rs 100 – Rs 20 – Rs 10 = Rs 70 per year.

It is to be noted that while calculating the value added we are taking the *value of production* of firm. But a firm may be unable to sell all of its produce. In such a case it will have some unsold stock at the end of the year. Conversely, it may so happen that a firm had some initial unsold stock to begin with. During the year that follows it has produced very little. But it has met the demand in the market by selling from the stock it had at the beginning of the year. How shall we treat these stocks which a firm may intentionally or unintentionally carry with itself? Also, let us remember that a firm buys raw materials from other firms. The part of raw material which gets used up is categorised as an intermediate good. What happens to the part which does not get used up?

In economics, the stock of unsold finished goods, or semi-finished goods, or raw materials which a firm carries from one year to the next is called **inventory**. Inventory is a stock variable. It may have a value at the beginning of the year; it may have a higher value at the end of the year. In such a case inventories have increased (or accumulated). If the value of inventories is less at the end of the year compared to the beginning of the year, inventories have decreased (decumulated). We can therefore infer that the *change of inventories of a firm during a year ≡ production of the firm during the year – sale of the firm during the year.*

The sign '≡' stands for identity. Unlike equality ('='), an identity always holds irrespective of what variables we have on the left hand and right hand sides of it. For example, we can write $2 + 2 \equiv 4$, because this is always true. But we must write $2 \times x = 4$. This is because two times x equals to 4 for a particular value of x, (namely when $x = 2$) and not always. We cannot write $2 \times x \equiv 4$.

Observe that since production of the firm ≡ value added + intermediate goods used by the firm, we get, change of inventories of a firm during a year ≡ value added + intermediate goods used by the firm – sale of the firm during a year.

For example, let us suppose that a firm had an unsold stock worth of Rs 100 at the beginning of a year. During the year it had produced Rs 1,000

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worth of goods and managed to sell Rs 800 worth of goods. Therefore the Rs 200 is the difference between production and sales. This Rs 200 worth of goods is the change in inventories. This will add to the Rs 100 worth of inventories the firm started with. Hence the inventories at the end of the year is, Rs 100 + Rs 200 = Rs 300. Notice that change in inventories takes place over a period of time. Therefore it is a **flow variable**.

Inventories are treated as capital. Addition to the stock of capital of a firm is known as **investment**. Therefore change in the inventory of a firm is treated as investment. There can be three major categories of investment. First is the rise in the value of inventories of a firm over a year which is treated as investment expenditure undertaken by the firm. The second category of investment is the fixed business investment, which is defined as the addition to the machinery, factory buildings, and equipments employed by the firms. The last category of investment is the residential investment, which refers to the addition of housing facilities.

Change in inventories may be planned or unplanned. In case of an unexpected fall in sales, the firm will have unsold stock of goods which it had not anticipated. Hence there will be **unplanned accumulation of inventories**. In the opposite case where there is unexpected rise in the sales there will be **unplanned decumulation of inventories**.

This can be illustrated with the help of the following example. Suppose a firm manufactures shirts. It starts the year with an inventory of 100 shirts. During the coming year it expects to sell 1,000 shirts. Hence it produces 1,000 shirts, expecting to keep an inventory of 100 at the end of the year. However, during the year, the sales of shirts turn out to be unexpectedly low. The firm is able to sell only 600 shirts. This means that the firm is left with 400 unsold shirts. The firm ends the year with 400 + 100 = 500 shirts. The unexpected rise of inventories by 400 will be an example of unplanned accumulation of inventories. If, on the other hand, the sales had been more than 1,000 we would have unplanned decumulation of inventories. For example, if the sales had been 1,050, then not only the production of 1,000 shirts will be sold, the firm will have to sell 50 shirts out of the inventory. This 50 unexpected reduction in inventories is an example of unexpected decumulation of inventories.

What can be the examples of **planned accumulation** or **decumulation of inventories**? Suppose the firm wants to raise the inventories from 100 shirts to 200 shirts during the year. Expecting sales of 1,000 shirts during the year (as before), the firm produces 1000 + 100 = 1,100 shirts. If the sales are actually 1,000 shirts, then the firm indeed ends up with a rise of inventories. The new stock of inventories is 200 shirts, which was indeed planned by the firm. This rise is an example of planned accumulation of inventories. On the other hand if the firm had wanted to reduce the inventories from 100 to 25 (say), then it would produce 1000 – 75 = 925 shirts. This is because it plans to sell 75 shirts out of the inventory of 100 shirts it started with (so that the inventory at the end of the year becomes 100 – 75 = 25 shirts, which the firm wants). If the sales indeed turn out to be 1000 as expected by the firm, the firm will be left with the planned, reduced inventory of 25 shirts.

We shall have more to say on the distinction between unplanned and planned change in inventories in the chapters which follow.



Taking cognizance of change of inventories we may write

Gross value added of firm, i ($GVAi$) ≡ Gross value of the output produced by the firm i (Qi) – Value of intermediate goods used by the firm (Zi)

$GVAi$ ≡ Value of sales by the firm (Vi) + Value of change in inventories (Ai) – Value of intermediate goods used by the firm (Zi) (2.1)

Equation (2.1) has been derived by using: Change in inventories of a firm during a year ≡ Production of the firm during the year – Sale of the firm during the year.

It is worth noting that the sales by the firm includes sales not only to domestic buyers but also to buyers abroad (the latter is termed as exports). It is also to be noted that all the above mentioned variables are flow variables. Generally these are measured on an annual basis. Hence they measure value of the flows per year.

Net value added of the firm i ≡ $GVAi$ – Depreciation of the firm i (Di)

If we sum the gross value added of all the firms of the economy in a year, we get a measure of the value of aggregate amount of goods and services produced by the economy in a year (just as we had done in the wheat-bread example). Such an estimate is called **Gross Domestic Product** (**GDP**). Thus GDP ≡ Sum total of gross value added of all the firms in the economy.

If there are N firms in the economy, each assigned with a serial number from 1 to N, then GDP ≡ Sum total of the gross value added of all the firms in the economy

$$\equiv GVA_1 + GVA_2 + \cdots + GVA_N$$

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Therefore

$$\text{GDP} \equiv \sum_{i=1}^{N} GVA_i \quad (2.2)$$

The symbol $\sum$ is a shorthand – it is used to denote summation. For example, $\sum_{i=1}^{N} X_i$ will be equal to $X_1 + X_2 + \ldots + X_N$. In this case, $\sum_{i=1}^{N} GVA_i$ stands for the sum total of gross value added of all the N firms. We know that the net value added of the i-th firm (NVA_i) is the gross value added minus the wear and tear of the capital employed by the firm.

Thus, $NVA_i \equiv GVA_i - D_i$

Therefore, $GVA_i \equiv NVA_i + D_i$

This is for the i-th firm. There are N such firms. Therefore the GDP of the entire economy, which is the sum total of the value added of all the N firms (by (2.2)), will be the sum total of the net value added and depreciation of the N firms.

In other words, $GDP \equiv \sum_{i=1}^{N} NVA_i + \sum_{i=1}^{N} D_i$

This implies that the gross domestic product of the economy is the sum total of the net value added and depreciation of all the firms of the economy. Summation of net value added of all firms is called **Net Domestic Product** (**NDP**).

Symbolically, $NDP \equiv \sum_{i=1}^{N} NVA_i$

2.2.2 Expenditure Method

An alternative way to calculate the GDP is by looking at the demand side of the products. This method is referred to as the expenditure method. In the farmer-baker example that we have described before, the aggregate value of the output

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in the economy by expenditure method will be calculated in the following way. In this method we add the final expenditures that each firm makes. Final expenditure is that part of expenditure which is undertaken not for intermediate purposes. The Rs 50 worth of wheat which the bakers buy from the farmers counts as intermediate goods, hence it does not fall under the category of final expenditure. Therefore the aggregate value of output of the economy is Rs 200 (final expenditure received by the baker) + Rs 50 (final expenditure received by the farmer) = Rs 250 per year.

Firm i can make the final expenditure on the following accounts (a) the final consumption expenditure on the goods and services produced by the firm. We shall denote this by C_i. We may note that mostly it is the households which undertake consumption expenditure. There may be exceptions when the firms buy consumables to treat their guests or for their employees (b) the final investment expenditure, I_i, incurred by other firms on the capital goods produced by firm i. Observe that unlike the expenditure on intermediate goods which is not included in the calculation of GDP, expenditure on investments is included. The reason is that investment goods remain with the firm, whereas intermediate goods are consumed in the process of production (c) the expenditure that the government makes on the final goods and services produced by firm i. We shall denote this by G_i. We may point out that the final expenditure incurred by the government includes both the consumption and investment expenditure (d) the export revenues that firm i earns by selling its goods and services abroad. This will be denoted by X_i.

Thus the sum total of the revenues that the firm i earns is given by

$RV_i \equiv$ Sum total of final consumption, investment, government and exports expenditures received by the firm i

$$\equiv C_i + I_i + G_i + X_i$$

If there are N firms then summing over N firms we get

$\sum_{i=1}^{N} RV_i \equiv$ Sum total of final consumption, investment, government and exports expenditures received by all the firms in the economy

$$\equiv \sum_{i=1}^{N} C_i + \sum_{i=1}^{N} I_i + \sum_{i=1}^{N} G_i + \sum_{i=1}^{N} X_i \qquad (2.3)$$

Let C be the aggregate final consumption expenditure of the entire economy. Notice that a part of C is spent on imports of consumption goods. Let C_m denote expenditure on the imports of consumption goods. Therefore $C - C_m$ denotes that part of aggregate final consumption expenditure that is spent on the domestic firms. Similarly, let $I - I_m$ stand for that part of aggregate final investment expenditure that is spent on domestic firms, where I is the value of the aggregate final investment expenditure of the economy and out of this I_m is spent on foreign investment goods. Similarly $G - G_m$ stands for that part of aggregate final government expenditure that is spent on the domestic firms, where G is the aggregate expenditure of the government of the economy and G_m is the part of G which is spent on imports.

Therefore, $\sum_{i=1}^{N} C_i \equiv$ Sum total of final consumption expenditures received by all the firms in the economy $\equiv C - C_m$; $\sum_{i=1}^{N} I_i \equiv$ Sum total of final investment expenditures received by all the firms in the economy $\equiv I - I_m$;

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$\sum_{i=1}^{N} G_i \equiv$ Sum total of final government expenditures received by all the firms in the economy $\equiv G - G_m$. Substituting these in equation (2.3) we get

$$\begin{aligned}\sum_{i=1}^{N} RV_i &\equiv C - C_m + I - I_m + G - G_m + \sum_{i=1}^{N} X_i \\ &\equiv C + I + G + \sum_{i=1}^{N} X_i - (C_m + I_m + G_m) \\ &\equiv C + I + G + X - M\end{aligned}$$

Here $X \equiv \sum_{i=1}^{N} X_i$ denotes aggregate expenditure by the foreigners on the exports of the economy. $M \equiv C_m + I_m + G_m$ is the aggregate imports expenditure incurred by the economy.

We know, GDP $\equiv$ Sum total of all the final expenditure received by the firms in the economy.

In other words

$$\text{GDP} \equiv \sum_{i=1}^{N} RV_i \equiv X + I + G + X - M \qquad (2.4)$$

Equation (2.4) expresses GDP according to the expenditure method.

2.2.3 Income Method

As we mentioned in the beginning, the sum of final expenditures in the economy must be equal to the incomes received by all the factors of production taken together (final expenditure is the spending on final goods, it does not include spending on intermediate goods). This follows from the simple idea that the revenues earned by all the firms put together must be distributed among the factors of production as salaries, wages, profits, interest earnings and rents. Let there be M number of households in the economy. Let W_i be the wages and salaries received by the i-th household in a particular year. Similarly, P_i, In_i, R_i be the gross profits, interest payments and rents received by the i-th household in a particular year. Therefore GDP is given by

$$\text{GDP} \equiv \sum_{i=1}^{M} W_i + \sum_{i=1}^{M} P_i + \sum_{i=1}^{M} In_i + \sum_{i=1}^{M} R_i \equiv W + P + In + R \qquad (2.5)$$

Here, $\sum_{i=1}^{M} W_i \equiv \text{W}$, $\sum_{i=1}^{M} P_i \equiv \text{P}$, $\sum_{i=1}^{M} In_i \equiv \text{In}$, $\sum_{i=1}^{M} R_i \equiv \text{R}$. Taking equations (2.2), (2.4) and (2.5) together we get

$$\text{GDP} \equiv \sum_{i=1}^{N} GVA_i \equiv C + I + G + X - M \equiv W + P + In + R \qquad (2.6)$$

It is to be noted that in identity (2.6), I stands for sum total of both planned and unplanned investments undertaken by the firms.

Since the identities (2.2), (2.4) and (2.6) are different expressions of the same variable, namely GDP, we may represent the equivalence by Fig. 2.2.

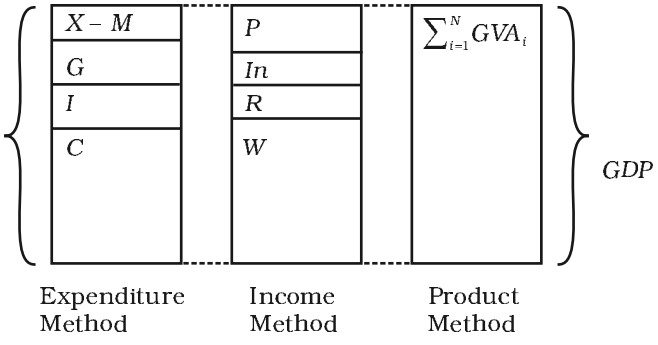


Fig. 2.2: Diagramtic Representation of GDP by the Three Methods

It may be worth examining how the households dispose off their earnings. There are three major ways

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in which they may do so. Either they consume it, or they save it, or pay taxes with it (assuming that no aid or donation, 'transfer payment' in general, is being sent abroad, which is another way to spend their incomes). Let S stand for the aggregate savings made by them and T be the sum total of taxes paid by them. Therefore

$$\text{GDP} \equiv C + S + T \tag{2.7}$$

Comparing (2.4) with (2.7) we find

$$C + I + G + X - M \equiv C + S + T$$

Cancelling final consumption expenditure C from both sides we get

$$I + G + X - M \equiv S + T$$

In other words

$$(I - S) + (G - T) \equiv M - X \tag{2.8}$$

In (2.8), $G - T$ measures by what amount the government expenditure exceeds the tax revenue earned by it. This is referred to as **budget deficit**. $M - X$ is known as the **trade deficit**–it measures the excess of import expenditure over the export revenue earned by the economy (M is the outflow from the country, X is the inflow into the country).

If there is no government, no foreign trade then $G = T = M = X = 0$. Hence (2.8) yields

$$I \equiv S \tag{2.9}$$

(2.9) is simply an accounting identity. Out of the GDP, a part is consumed and a part is saved (from the recipient side of the incomes). On the other hand, from the side of the firms, the aggregate final expenditure received by them (≡ GDP) must be equal to consumption expenditure and investment expenditure. The aggregate of incomes received by the households is equal to the expenditure received by the firms because the income method and expenditure method would give us the same figure of GDP. Since consumption expenditure cancels out from both sides, we are left with aggregate savings equal to the aggregate gross investment expenditure.

2.3 Some Macroeconomic Identities

Gross Domestic Product measures the aggregate production of final goods and services taking place within the domestic economy during a year. But the whole of it may not accrue to the citizens of the country. For example, a citizen of India working in Saudi Arabia may be earning her wage and it will be included in the Saudi Arabian GDP. But legally speaking, she is an Indian. Is there a way to take into account the earnings made by Indians abroad or by the factors of production owned by Indians? When we try to do this, in order to maintain symmetry, we must deduct the earnings of the foreigners who are working within our domestic economy, or the payments to the



The foreigner is to have a share in your domestic economy. Discuss this in the classroom.

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factors of production owned by the foreigners. For example, the profits earned by the Korean-owned Hyundai car factory will have to be subtracted from the GDP of India. The macroeconomic variable which takes into account such additions and subtractions is known as **Gross National Product (GNP)**. It is, therefore, defined as follows

GNP ≡ GDP + Factor income earned by the domestic factors of production employed in the rest of the world – Factor income earned by the factors of production of the rest of the world employed in the domestic economy

Hence, GNP ≡ GDP + Net factor income from abroad

(Net factor income from abroad = Factor income earned by the domestic factors of production employed in the rest of the world – Factor income earned by the factors of production of the rest of the world employed in the domestic economy).

We have already noted that a part of the capital gets consumed during the year due to wear and tear. This wear and tear is called depreciation. Naturally, depreciation does not become part of anybody's income. If we deduct depreciation from GNP the measure of aggregate income that we obtain is called **Net National Product (NNP)**. Thus

NNP ≡ GNP – Depreciation

It is to be noted that all these variables are evaluated at market prices. Through the expression given above, we get the value of NNP evaluated at market prices. But market price includes **indirect taxes**. When indirect taxes are imposed on goods and services, their prices go up. Indirect taxes accrue to the government. We have to deduct them from NNP evaluated at market prices in order to calculate that part of NNP which actually accrues to the factors of production. Similarly, there may be **subsidies** granted by the government on the prices of some commodities (in India petrol is heavily taxed by the government, whereas cooking gas is subsidised). So we need to add subsidies to the NNP evaluated at market prices. The measure that we obtain by doing so is called **Net National Product at factor cost** or **National Income**.

Thus, NNP at factor cost ≡ National Income (NI) ≡ NNP at market prices – (Indirect taxes – Subsidies) ≡ NNP at market prices – Net indirect taxes (Net indirect taxes ≡ Indirect taxes – Subsidies)

We can further subdivide the National Income into smaller categories. Let us try to find the expression for the part of NI which is received by households. We shall call this **Personal Income (PI)**. First, let us note that out of NI, which is earned by the firms and government enterprises, a part of profit is not distributed among the factors of production. This is called **Undistributed Profits (UP)**. We have to deduct UP from NI to arrive at PI, since UP does not accrue to the households. Similarly, Corporate Tax, which is imposed on the earnings made by the firms, will also have to be deducted from the NI, since it does not accrue to the households. On the other hand, the households do receive interest payments from private firms or the government on past loans advanced by them. And households may have to pay interests to the firms and the government as well, in case they had borrowed money from either. So we have to deduct the net interests paid by the households to the firms and government. The households receive transfer payments from government and firms (pensions, scholarship, prizes, for example) which have to be added to calculate the Personal Income of the households.

Thus, Personal income (PI) ≡ NI – Undistributed profits – **Net interest payments made by households – Corporate tax + Transfer payments to the households from the government and firms**.

However, even PI is not the income over which the households have complete say. They have to pay taxes from PI. If we deduct the **Personal Tax Payments** (income tax, for example) and **Non-tax Payments** (such as fines) from PI, we obtain what is known as the Personal Disposable Income. Thus

Personal Disposable Income (PDI) ≡ PI – Personal tax payments – Non-tax payments.

Personal Disposable Income is the part of the aggregate income which belongs to the households. They may decide to consume a part of it, and save the rest. In Fig. 2.3 we present a diagrammatic representation of the relations between these major macroeconomic variables.

A table of some of the principal macroeconomic variables of India (at current prices, for the years 1990-91 to 2004-05) has been provided at the end of the chapter, to give the reader a rough idea of their actual values.

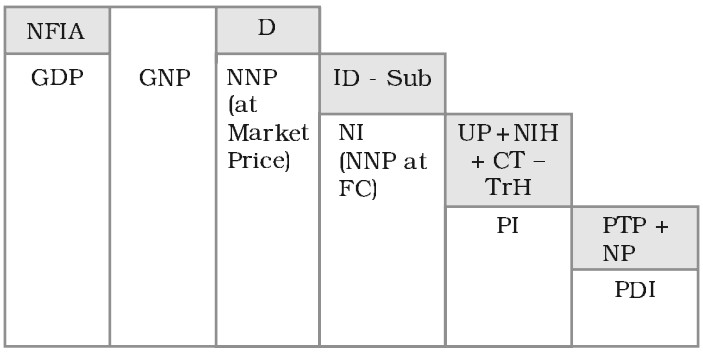


Fig. 2.3: Diagrammatic representation of the subcategories of aggregate income. NFIA: Net Factor Income from Abroad, D: Depreciation, ID: Indirect Taxes, Sub: Subsidies, UP: Undistributed Profits, NIH: Net Interest Payments by Households, CT: Corporate Taxes, TrH: Transfers recived by Households, PTP: Personal Tax Payments, NP: Non-Tax Payments.

National Disposable Income and Private Income

Apart from these categories of aggregate macroeconomic variables, in India, a few other aggregate income categories are also used in National Income accounting

- **National Disposable Income** = Net National Product at market prices + Other current transfers from the rest of the world

The idea behind National Disposable Income is that it gives an idea of what is the maximum amount of goods and services the domestic economy has at its disposal. Current transfers from the rest of the world include items such as gifts, aids, etc.

- **Private Income** = Factor income from net domestic product accruing to the private sector + National debt interest + Net factor income from abroad + Current transfers from government + Other net transfers from the rest of the world

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2.4 Goods and Prices

One implicit assumption in all this discussion is that the prices of goods and services do not change during the period of our study. If prices change, then there may be difficulties in comparing GDPs. If we measure the GDP of a country

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in two consecutive years and see that the figure for GDP of the latter year is twice that of the previous year, we may conclude that the volume of production of the country has doubled. But it is possible that only prices of all goods and services have doubled between the two years whereas the production has remained constant.

Therefore, in order to compare the GDP figures (and other macroeconomic variables) of different countries or to compare the GDP figures of the same country at different points of time, we cannot rely on GDPs evaluated at current market prices. For comparison we take the help of **real GDP**. Real GDP is calculated in a way such that the goods and services are evaluated at some **constant set of prices** (or **constant prices**). Since these prices remain fixed, if the Real GDP changes we can be sure that it is the volume of production which is undergoing changes. **Nominal GDP**, on the other hand, is simply the value of GDP at the current prevailing prices. For example, suppose a country only produces bread. In the year 2000 it had produced 100 units of bread, price was Rs 10 per bread. GDP at current price was Rs 1,000. In 2001 the same country produced 110 units of bread at price Rs 15 per bread. Therefore nominal GDP in 2001 was Rs 1,650 (=110 × Rs 15). Real GDP in 2001 calculated at the price of the year 2000 (2000 will be called the base year) will be 110 × Rs 10 = Rs 1,100.

Notice that the ratio of nominal GDP to real GDP gives us an idea of how the prices have moved from the **base year** (the year whose prices are being used to calculate the real GDP) to the current year. In the calculation of real and nominal GDP of the current year, the volume of production is fixed. Therefore, if these measures differ it is only due to change in the price level between the base year and the current year. The ratio of nominal to real GDP is a well known index of prices. This is called **GDP Deflator**. Thus if GDP stands for nominal GDP and gdp stands for real GDP then, GDP deflator = $\frac{GDP}{gdp}$.

Sometimes the deflator is also denoted in percentage terms. In such a case deflator = $\frac{GDP}{gdp}$ × 100 per cent. In the previous example, the GDP deflator is $\frac{1,650}{1,100}$ = 1.50 (in percentage terms this is 150 per cent). This implies that the price of bread produced in 2001 was 1.5 times the price in 2000. Which is true because price of bread has indeed gone up from Rs 10 to Rs 15. Like GDP deflator, we can have GNP deflator as well.

There is another way to measure change of prices in an economy which is known as the **Consumer Price Index** (**CPI**). This is the index of prices of a given basket of commodities which are bought by the representative consumer. CPI is generally expressed in percentage terms. We have two years under consideration – one is the base year, the other is the current year. We calculate the cost of purchase of a given basket of commodities in the base year. We also calculate the cost of purchase of the same basket in the current year. Then we express the latter as a percentage of the former. This gives us the Consumer Price Index of the current year vis-´a-vis the base year. For example let us take an economy which produces two goods, rice and cloth. A representative consumer buys 90 kg of rice and 5 pieces of cloth in a year. Suppose in the year 2000 the price of a kg of rice was Rs 10 and a piece of cloth was Rs 100. So the consumer had to spend a total sum of Rs 10 × 90 = Rs 900 on rice in 2000. Similarly, she spent Rs 100 × 5 = Rs 500 per year on cloth. Summation of the two items is, Rs 900 + Rs 500 = Rs 1,400.

Now suppose the prices of a kg of rice and a piece of cloth has gone up to Rs 15 and Rs 120 in the year 2005. To buy the same quantity of rice and clothes the representative will have to spend Rs 1,350 and Rs 600 respectively (calculated in a similar way as before). Their sum will be, Rs 1,350 + Rs 600 = Rs 1,950. The CPI therefore will be $\frac{1,950}{1,400} \times 100 = 139.29$ (approximately).

It is worth noting that many commodities have two sets of prices. One is the retail price which the consumer actually pays. The other is the wholesale price, the price at which goods are traded in bulk. These two may differ in value because of the margin kept by traders. Goods which are traded in bulk (such as raw materials or semi-finished goods) are not purchased by ordinary consumers. Like CPI, the index for wholesale prices is called **Wholesale Price Index (WPI)**. In countries like USA it is referred to as Producer Price Index (PPI). Notice CPI (and analogously WPI) may differ from GDP deflator because

1. The goods purchased by consumers do not represent all the goods which are produced in a country. GDP deflator takes into account all such goods and services.
2. CPI includes prices of goods consumed by the representative consumer, hence it includes prices of imported goods. GDP deflator does not include prices of imported goods.
3. The weights are constant in CPI – but they differ according to production level of each good in GDP deflator.

2.5 GDP and Welfare

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Can the GDP of a country be taken as an index of the welfare of the people of that country? If a person has more income he or she can buy more goods and services and his or her material well-being improves. So it may seem reasonable to treat his or her income level as his or her level of well-being. GDP is the sum total of value of goods and services created within the geographical boundary of a country in a particular year. It gets distributed among the people as incomes (except for retained earnings). So we may be tempted to treat higher level of GDP of a country as an index of greater well-being of the people of that country (to account for price changes, we may take the value of real GDP instead of nominal GDP). But there are at least three reasons why this may not be correct



How uniform is the distribution of GDP? It still seems that a majority of the people are poor and only some have benefited.

1. **Distribution of GDP – how uniform is it:** If the GDP of the country is rising, the welfare may not rise as a consequence. This is because the rise in GDP may

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be concentrated in the hands of very few individuals or firms. For the rest, the income may in fact have fallen. In such a case the welfare of the entire country cannot be said to have increased. For example, suppose in year 2000, an imaginary country had 100 individuals each earning Rs 10. Therefore the GDP of the country was Rs 1,000 (by income method). In 2001, let us suppose the same country had 90 individuals earning Rs 9 each, and the rest 10 individual earning Rs 20 each. Suppose there had been no change in the prices of goods and services between these two periods. The GDP of the country in the year 2001 was 90 × (Rs 9) + 10 × (Rs 20) = Rs 810 + Rs 200 = Rs 1,010. Observe that compared to 2000, the GDP of the country in 2001 was higher by Rs 10. But this has happened when 90 per cent of people of the country have seen a drop in their real income by 10 per cent (from Rs 10 to Rs 9), whereas only 10 per cent have benefited by a rise in their income by 100 per cent (from Rs 10 to Rs 20). 90 per cent of the people are worse off though the GDP of the country has gone up. If we relate welfare improvement in the country to the percentage of people who are better off, then surely GDP is not a good index.

2. **Non-monetary exchanges:** Many activities in an economy are not evaluated in monetary terms. For example, the domestic services women perform at home are not paid for. The exchanges which take place in the informal sector without the help of money are called barter exchanges. In barter exchanges goods (or services) are directly exchanged against each other. But since money is not being used here, these exchanges are not registered as part of economic activity. In developing countries, where many remote regions are underdeveloped, these kinds of exchanges do take place, but they are generally not counted in the GDPs of these countries. This is a case of underestimation of GDP. Hence GDP calculated in the standard manner may not give us a clear indication of the productive activity and well-being of a country.
3. **Externalities:** Externalities refer to the benefits (or harms) a firm or an individual causes to another for which they are not paid (or penalised). Externalities do not have any market in which they can be bought and sold. For example, let us suppose there is an oil refinery which refines crude petroleum and sells it in the market. The output of the refinery is the amount of oil it refines. We can estimate the value added of the refinery by deducting the value of intermediate goods used by the refinery (crude oil in this case) from the value of its output. The value added of the refinery will be counted as part of the GDP of the economy. But in carrying out the production the refinery may also be polluting the nearby river. This may cause harm to the people who use the water of the river. Hence their utility will fall. Pollution may also kill fish or other organisms of the river on which fish survive. As a result the fishermen of the river may be losing their income and utility. Such harmful effects that the refinery is inflicting on others, for which it does not have to bear any cost, are called externalities. In this case, the GDP is not taking into account such negative externalities. Therefore, if we take GDP as a measure of welfare of the economy we shall be overestimating the actual welfare. This was an example of negative externality. There can be cases of positive externalities as well. In such cases GDP will underestimate the actual welfare of the economy.

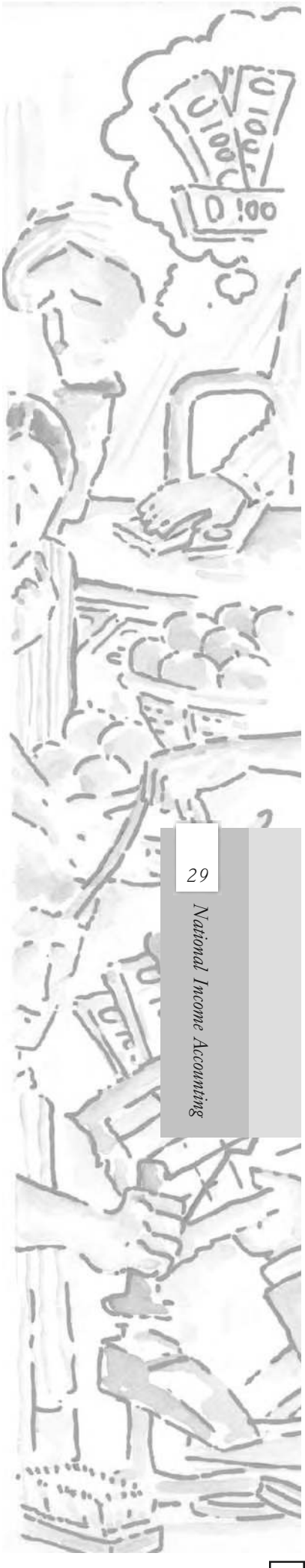
Summary

At a very fundamental level, the macroeconomy (it refers to the economy that we study in macroeconomics) can be seen as working in a circular way. The firms employ inputs supplied by households and produce goods and services to be sold to households. Households get the remuneration from the firms for the services rendered by them and buy goods and services produced by the firms. So we can calculate the aggregate value of goods and services produced in the economy by any of the three methods (a) measuring the aggregate value of factor payments (income method) (b) measuring the aggregate value of goods and services produced by the firms (product method) (c) measuring the aggregate value of spending received by the firms (expenditure method). In the product method, to avoid double counting, we need to deduct the value of intermediate goods and take into account only the aggregate value of final goods and services. We derive the formulae for calculating the aggregate income of an economy by each of these methods. We also take note that goods can also be bought for making investments and these add to the productive capacity of the investing firms. There may be different categories of aggregate income depending on whom these are accruing to. We have pointed out the difference between GDP, GNP, NNP at market price, NNP at factor cost, PI and PDI. Since prices of goods and services may vary, we have discussed how to calculate the three important price indices (GDP deflator, CPI, WPI). Finally we have noted that it may be incorrect to treat GDP as an index of the welfare of the country.

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Key Concepts

Final goods	Consumption goods
Consumer durables	Capital goods
Intermediate goods	Stocks
Flows	Gross investment
Net investment	Depreciation
Wage	Interest
Profit	Rent
Circular flow of income	Product method of calculating National Income
Expenditure method of calculating National Income	Income method of calculating National Income
Macroeconomic model	Input
Value added	Inventories
Planned change in inventories	Unplanned change in inventories
Gross Domestic Product (GDP)	Net Domestic Product (NDP)
Gross National Product (GNP)	Net National Product (NNP) (at market price)
NNP (at factor cost) or National Income (NI)	Undistributed profits
Net interest payments made by households	Corporate tax
Transfer payments to the households from the government and firms	Personal Income (PI)
Personal tax payments	Non-tax payments
Personal Disposable Income (PDI)	National Disposable Income



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Private Income	Nominal GDP
Real GDP	Base year
GDP Deflator	Consumer Price Index (CPI)
Wholesale Price Index (WPI)	Externalities

Exercises

1. What are the four factors of production and what are the remunerations to each of these called?
2. Why should the aggregate final expenditure of an economy be equal to the aggregate factor payments? Explain.
3. Distinguish between stock and flow. Between net investment and capital which is a stock and which is a flow? Compare net investment and capital with flow of water into a tank.
4. What is the difference between planned and unplanned inventory accumulation? Write down the relation between change in inventories and value added of a firm.
5. Write down the three identities of calculating the GDP of a country by the three methods. Also briefly explain why each of these should give us the same value of GDP.
6. Define budget deficit and trade deficit. The excess of private investment over saving of a country in a particular year was Rs 2,000 crores. The amount of budget deficit was (–) Rs 1,500 crores. What was the volume of trade deficit of that country?
7. Suppose the GDP at market price of a country in a particular year was Rs 1,100 crores. Net Factor Income from Abroad was Rs 100 crores. The value of Indirect taxes – Subsidies was Rs 150 crores and National Income was Rs 850 crores. Calculate the aggregate value of depreciation.
8. Net National Product at Factor Cost of a particular country in a year is Rs 1,900 crores. There are no interest payments made by the households to the firms/government, or by the firms/government to the households. The Personal Disposable Income of the households is Rs 1,200 crores. The personal income taxes paid by them is Rs 600 crores and the value of retained earnings of the firms and government is valued at Rs 200 crores. What is the value of transfer payments made by the government and firms to the households?
9. From the following data, calculate Personal Income and Personal Disposable Income.

	Rs (crore)
(a) Net Domestic Product at factor cost	8,000
(b) Net Factor Income from abroad	200
(c) Undisbursed Profit	1,000
(d) Corporate Tax	500
(e) Interest Received by Households	1,500
(f) Interest Paid by Households	1,200
(g) Transfer Income	300
(h) Personal Tax	500

10. In a single day Raju, the barber, collects Rs 500 from haircuts; over this day, his equipment depreciates in value by Rs 50. Of the remaining Rs 450, Raju pays sales tax worth Rs 30, takes home Rs 200 and retains Rs 220 for improvement and buying of new equipment. He further pays Rs 20 as income tax from his income. Based on this information, complete Raju's contribution

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to the following measures of income (a) Gross Domestic Product (b) NNP at market price (c) NNP at factor cost (d) Personal income (e) Personal disposable income.

11. The value of the nominal GNP of an economy was Rs 2,500 crores in a particular year. The value of GNP of that country during the same year, evaluated at the prices of same base year, was Rs 3,000 crores. Calculate the value of the GNP deflator of the year in percentage terms. Has the price level risen between the base year and the year under consideration?

12. Write down some of the limitations of using GDP as an index of welfare of a country.

Suggested Readings

1. Bhaduri, A., 1990. *Macroeconomics: The Dynamics of Commodity Production*, pages 1 – 27, Macmillan India Limited, New Delhi.
2. Branson, W. H., 1992. *Macroeconomic Theory and Policy*, (third edition), pages 15 – 34, Harper Collins Publishers India Pvt Ltd., New Delhi.
3. Dornbusch, R and S. Fischer. 1988. *Macroeconomics*, (fourth edition) pages 29 – 62, McGraw Hill, Paris.
4. Mankiw, N. G., 2000. *Macroeconomics*, (fourth edition) pages 15 – 76, Macmillan Worth Publishers, New York.

Appendix 2.1

Table 2.2: Various Macroeconomic Aggregates of India at Current Prices (old series; unit: Rs crores); Source: Reserve Bank of India: *Handbook of Indian Economy*.

	GDP at Market Price	Net Factor Income from Abroad	GNP at Market Price	Consumption of Fixed capital (depreciation)	NNP at Market Price
1990-91	5,68,674	–7,545	5,61,129	53,264	5,07,865
1991-92	6,53,117	–10,077	6,43,040	64,402	5,78,638
1992-93	7,48,367	–11,645	7,36,722	74,512	6,62,210
1993-94	8,59,220	–12,080	8,47,140	83,353	7,63,787
1994-95	10,12,770	–13,083	9,99,687	97,994	9,01,693
1995-96	11,88,012	–13,484	11,74,528	1,17,926	10,56,602
1996-97	13,68,209	–13,082	13,55,127	1,36,503	12,18,624
1997-98	15,22,547	–13,205	15,09,342	1,51,997	13,57,345
1998-99	17,40,985	–14,968	17,26,017	1,68,066	15,57,951
1999-00	19,36,831	–15,431	19,21,400	1,82,359	17,39,041
2000-01	20,89,500	–18,109	20,71,391	1,97,895	18,73,696
2001-02	22,71,984	–15,566	22,56,418	2,17,679	20,38,739
2002-03	24,63,324	–13,166	24,50,158	2,32,952	22,17,206
2003-04	27,60,025	–14,078	27,45,947	2,53,637	24,92,310
2004-05	31,05,512	–17,707	30,87,805	2,77,131	28,17,968



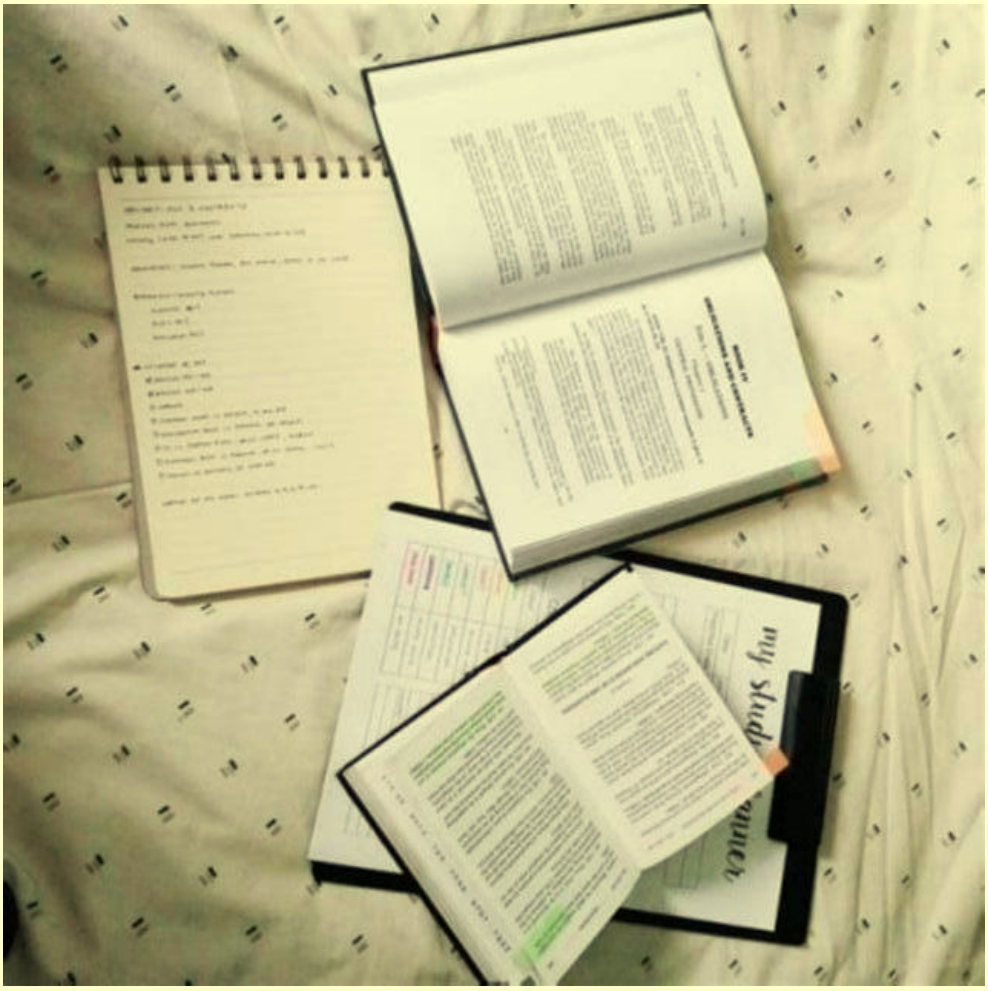
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Table 2.3: Various Macroeconomic Aggregates of India at Current Prices (old series; unit: Rs crores); Source: Reserve Bank of India: *Handbook of Indian Economy*.

	Indirect Taxes – Subsidy	NNP at Factor Factor Cost (National Income)	Personal Disposable Income
1990-91	57,720	4,50,145	4,61,192
1991-92	64,031	5,14,607	5,27,018
1992-93	75,146	5,87,064	6,11,390
1993-94	77,875	6,85,912	7,07,692
1994-95	95,712	8,05,981	8,34,764
1995-96	1,14,741	9,41,861	9,49,191
1996-97	1,24,662	10,93,962	11,27,542
1997-98	1,32,399	12,24,946	12,53,142
1998-99	1,42,858	14,15,093	14,61,827
1999-00	1,74,993	15,64,048	16,11,834
2000-01	1,86,501	16,86,995	17,76,381
2001-02	1,90,510	18,48,229	19,67,770
2002-03	2,08,436	20,08,770	21,06,551
2003-04	2,40,240	22,52,070	23,58,503
2004-05	2,75,047	25,35,627	N. A.

Table 2.4: Various Macroeconomic Aggregates of India at Current Prices (old series; unit: Rs crores); Source: Reserve Bank of India: *Handbook of Indian Economy*.

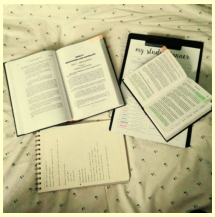
	Private Final Consumption Expenditure	Gross Domestic Capital Formation (Investments made by both private and public sectors)	Government Final Consumption Expenditure
1990-91	3,81,157	1,49,536	66,030
1991-92	4,40,594	1,47,285	74,285
1992-93	4,96,310	1,76,722	83,957
1993-94	5,69,225	1,98,412	97,725
1994-95	6,59,239	1,63,356	1,08,639
1995-96	7,60,138	3,19,527	1,28,816
1996-97	8,96,470	3,34,999	1,45,725
1997-98	9,76,131	3,74,480	1,72,189
1998-99	11,34,134	3,93,021	2,14,033
1999-00	12,67,658	4,90,669	2,51,108
2000-01	13,53,709	4,98,179	2,64,237
2001-02	14,85,675	5,13,543	2,83,351
2002-03	15,83,879	6,10,228	2,91,547
2003-04	17,61,788	7,26,868	3,12,109
2004-05	N. A.	N. A.	N. A.



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Chapter 3

Money and Banking



Money is the commonly accepted medium of exchange. In an economy which consists of only one individual there cannot be any exchange of commodities and hence there is no role for money. Even if there are more than one individual but they do not take part in market transactions, such as a family living on an isolated island, money has no function for them. However, as soon as there are more than one economic agent who engage themselves in transactions through the market, money becomes an important instrument for facilitating these exchanges. Economic exchanges without the mediation of money are referred to as *barter exchanges*. However, they presume the rather improbable *double coincidence of wants*. Consider, for example, an individual who has a surplus of rice which she wishes to exchange for clothing. If she is not lucky enough she may not be able to find another person who has the diametrically opposite demand for rice with a surplus of clothing to offer in exchange. The search costs may become prohibitive as the number of individuals increases. Thus, to smoothen the transaction, an intermediate good is necessary which is acceptable to both parties. Such a good is called money. The individuals can then sell their produces for money and use this money to purchase the commodities they need. Though facilitation of exchanges is considered to be the principal role of money, it serves other purposes as well. Following are the main functions of money in a modern economy.

3.1 Functions of Money

As explained above, the first and foremost role of money is that it acts as a *medium of exchange*. Barter exchanges become extremely difficult in a large economy because of the high costs people would have to incur looking for suitable persons to exchange their surpluses.

Money also acts as a convenient *unit of account*. The value of all goods and services can be expressed in monetary units. When we say that the value of a certain wristwatch is Rs 500 we mean that the wristwatch can be exchanged for 500 units of money, where a unit of money is rupee in this case. If the price of a pencil is Rs 2 and that of a pen is Rs 10 we can calculate the relative price of a pen with respect to a pencil, viz. a pen is worth

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10 ÷ 2 = 5 pencils. The same notion can be used to calculate the value of money itself with respect to other commodities. In the above example, a rupee is worth 1 ÷ 2 = 0.5 pencil or 1 ÷ 10 = 0.1 pen. Thus if prices of all commodities increase in terms of money which, in other words, can be regarded as a general increase in the price level, the value of money in terms of any commodity must have decreased – in the sense that a unit of money can now purchase less of any commodity. We call it a deterioration in the purchasing power of money.

A barter system has other deficiencies. It is difficult to carry forward one's wealth under the barter system. Suppose you have an endowment of rice which you do not wish to consume today entirely. You may regard this stock of surplus rice as an asset which you may wish to consume, or even sell off, for acquiring other commodities at some future date. But rice is a perishable item and cannot be stored beyond a certain period. Also, holding the stock of rice requires a lot of space. You may have to spend considerable time and resources looking for people with a demand for rice when you wish to exchange your stock for buying other commodities. This problem can be solved if you sell your rice for money. Money is not perishable and its storage costs are also considerably lower. It is also acceptable to anyone at any point of time. Thus money can act as a store of value for individuals. Wealth can be stored in the form of money for future use. However, to perform this function well, the value of money must be sufficiently stable. A rising price level may erode the purchasing power of money. It may be noted that any asset other than money can also act as a store of value, e.g. gold, landed property, houses or even bonds (to be introduced shortly). However, they may not be easily convertible to other commodities and do not have universal acceptability.

3.2 Demand for Money

Money is the most liquid of all assets in the sense that it is universally acceptable and hence can be exchanged for other commodities very easily. On the other hand, it has an opportunity cost. If, instead of holding on to a certain cash balance, you put the money in a savings account in some bank you can earn interest on that money. While deciding on how much money to hold at a certain point of time one has to consider the trade off between the advantage of liquidity and the disadvantage of the foregone interest. Demand for money balance is thus often referred to as liquidity preference. People desire to hold money balance broadly from two motives.

3.2.1 The Transaction Motive

The principal motive for holding money is to carry out transactions. If you receive your income weekly and pay your bills on the first day of every week, you need not hold any cash balance throughout the rest of the week; you may as well ask your employer to deduct your expenses directly from your weekly salary and deposit the balance in your bank account. But our expenditure patterns do not normally match our receipts. People earn incomes at discrete points in time and spend it continuously throughout the interval. Suppose you earn Rs 100 on the first day of every month and run down this balance evenly over the rest of the month. Thus your cash balance at the beginning and end of the month are Rs 100 and 0, respectively. Your average cash holding can then be calculated as (Rs 100 + Rs 0) ÷ 2 = Rs 50, with which you are making transactions worth Rs 100 per month. Hence your average transaction demand for money is equal to half your monthly income, or, in other words, half the value of your monthly transactions.

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Consider, next, a two-person economy consisting of two entities – a firm (owned by one person) and a worker. The firm pays the worker a salary of Rs 100 at the beginning of every month. The worker, in turn, spends this income over the month on the output produced by the firm – the only good available in this economy! Thus, at the beginning of each month the worker has a money balance of Rs 100 and the firm a balance of Rs 0. On the last day of the month the picture is reversed – the firm has gathered a balance of Rs 100 through its sales to the worker. The average money holding of the firm as well as the worker is equal to Rs 50 each. Thus the total transaction demand for money in this economy is equal to Rs 100. The total volume of monthly transactions in this economy is Rs 200 – the firm has sold its output worth Rs 100 to the worker and the latter has sold her services worth Rs 100 to the firm. The transaction demand for money of the economy is again a fraction of the total volume of transactions in the economy over the unit period of time.

In general, therefore, the transaction demand for money in an economy, M_T^d, can be written in the following form

$$M_T^d = k.T \tag{3.1}$$

where T is the total value of (nominal) transactions in the economy over unit period and k is a positive fraction.

The two-person economy described above can be looked at from another angle. You may perhaps find it surprising that the economy uses money balance worth only Rs 100 for making transactions worth Rs 200 per month. The answer to this riddle is simple – each rupee is changing hands twice a month. On the first day, it is being transferred from the employer's pocket to that of the worker and sometime during the month, it is passing from the worker's hand to the employer's. The number of times a unit of money changes hands during the unit period is called the **velocity of circulation of money**. In the above example it is 2, inverse of half – the ratio of money balance and the value of transactions. Thus, in general, we may rewrite equation (3.1) in the following form

$$\frac{1}{k}.M_T^d = T, \text{ or, } v.M_T^d = T \tag{3.2}$$

where, $v = 1/k$ is the velocity of circulation. Note that the term on the right hand side of the above equation, T, is a flow variable whereas money demand, M_T^d, is a stock concept – it refers to the stock of money people are willing to hold at a particular point of time. The velocity of money, v, however, has a time dimension. It refers to the number of times every unit of stock changes hand during a unit period of time, say, a month or a year. Thus, the left hand side, $v.M_T^d$, measures the total value of monetary transactions that has been made with this stock in the unit period of time. This is a flow variable and is, therefore, equal to the right hand side.

We are ultimately interested in learning the relationship between the aggregate transaction demand for money of an economy and the (nominal) GDP in a given year. The total value of annual transactions in an economy includes transactions in all intermediate goods and services and is clearly much greater than the nominal GDP. However, normally, there exists a stable, positive relationship between value of transactions and the nominal GDP. An increase in nominal GDP implies an increase in the total value of transactions and hence a greater transaction demand for money from equation (3.1). Thus, in general, equation (3.1) can be modified in the following way

$$M_T^d = kPY \tag{3.3}$$

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where Y is the real GDP and P is the general price level or the GDP deflator. The above equation tells us that transaction demand for money is positively related to the real income of an economy and also to its average price level.

3.2.2 The Speculative Motive

An individual may hold her wealth in the form of landed property, bullion, bonds, money etc. For simplicity, let us club all forms of assets other than money together into a single category called 'bonds'. Typically, bonds are papers bearing the promise of a future stream of monetary returns over a certain period of time. These papers are issued by governments or firms for borrowing money from the public and they are tradable in the market. Consider the following two-period bond. A firm wishes to raise a loan of Rs 100 from the public. It issues a bond that assures Rs 10 at the end of the first year and Rs 10 plus the principal of Rs 100 at the end of the second year. Such a bond is said to have a face value of Rs 100, a maturity period of two years and a coupon rate of 10 per cent. Assume that the rate of interest prevailing in your savings bank account is equal to 5 per cent. Naturally you would like to compare the earning from this bond with the interest earning of your savings bank account. The exact question that you would ask is as follows: How much money, if kept in my savings bank account, will generate Rs 10 at the end of one year? Let this amount be X. Therefore

$$X\left(1 + \frac{5}{100}\right) = 10$$

In other words

$$X = \frac{10}{\left(1+\frac{5}{100}\right)}$$

This amount, Rs X, is called the present value of Rs 10 discounted at the market rate of interest. Similarly, let Y be the amount of money which if kept in the savings bank account will generate Rs 110 at the end of two years. Thus, the present value of the stream of returns from the bond should be equal to

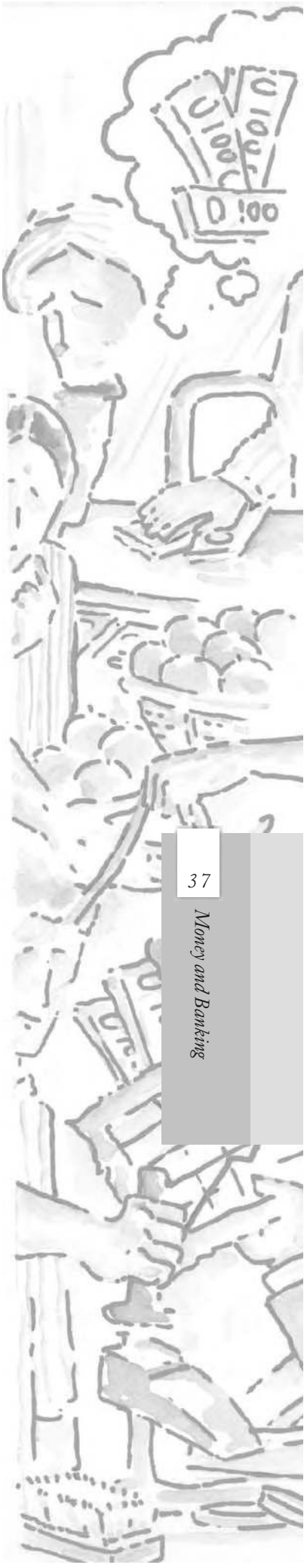
$$PV = X + Y = \frac{10}{\left(1+\frac{5}{100}\right)} + \frac{(10+100)}{\left(1+\frac{5}{100}\right)^2}$$

Calculation reveals that it is Rs 109.29 (approx.). It means that if you put Rs 109.29 in your savings bank account it will fetch the same return as the bond. But the seller of the bond is offering the same at a face value of only Rs 100. Clearly the bond is more attractive than the savings bank account and people will rush to get hold of the bond. Competitive bidding will raise the price of the bond above its face value, till price of the bond is equal to its PV. If price rises above the PV the bond becomes less attractive compared to the savings bank account and people would like to get rid of it. The bond will be in excess supply and there will be downward pressure on the bond-price which will bring it back to the PV. It is clear that under competitive assets market condition the price of a bond must always be equal to its present value in equilibrium.

Now consider an increase in the market rate of interest from 5 per cent to 6 per cent. The present value, and hence the price of the same bond, will become

$$\frac{10}{\left(1+\frac{6}{100}\right)} + \frac{(10+100)}{\left(1+\frac{6}{100}\right)^2} = 107.33 \text{ (approx.)}$$

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It follows that the price of a bond is inversely related to the market rate of interest.

Different people have different expectations regarding the future movements in the market rate of interest based on their private information regarding the economy. If you think that the market rate of interest should eventually settle down to 8 per cent per annum, then you may consider the current rate of 5 per cent too low to be sustainable over time. You expect interest rate to rise and consequently bond prices to fall. If you are a bond holder a decrease in bond price means a loss to you – similar to a loss you would suffer if the value of a property held by you suddenly depreciates in the market. Such a loss occurring from a falling bond price is called a capital loss to the bond holder. Under such circumstances, you will try to sell your bond and hold money instead. Thus speculations regarding future movements in interest rate and bond prices give rise to the speculative demand for money.

When the interest rate is very high everyone expects it to fall in future and hence anticipates capital gains from bond-holding. Hence people convert their money into bonds. Thus, speculative demand for money is low. When interest rate comes down, more and more people expect it to rise in the future and anticipate capital loss. Thus they convert their bonds into money giving rise to a high speculative demand for money. Hence speculative demand for money is inversely related to the rate of interest. Assuming a simple form, the speculative demand for money can be written as

$$M_S^d = \frac{r_{max} - r}{r - r_{min}} \qquad (3.4)$$

where r is the market rate of interest and r_{max} and r_{min} are the upper and lower limits of r, both positive constants. It is evident from equation (3.4) that as r decreases from r_{max} to r_{min}, the value of M_S^d increases from 0 to ∞.

As mentioned earlier, interest rate can be thought of as an opportunity cost or 'price' of holding money balance. If supply of money in the economy increases and people purchase bonds with this extra money, demand for bonds will go up, bond prices will rise and rate of interest will decline. In other words, with an increased supply of money in the economy the price you have to pay for holding money balance, viz. the rate of interest, should come down. However, if the market rate of interest is already low enough so that everybody expects it to rise in future, causing capital losses, nobody will wish to hold bonds. Everyone in the economy will hold their wealth in money balance and if additional money is injected within the economy it will be used up to satiate people's craving for money balances without increasing the demand for bonds and without further lowering the rate of interest below the floor r_{min}. Such a situation is called a **liquidity trap**. The speculative money demand function is infinitely elastic here.

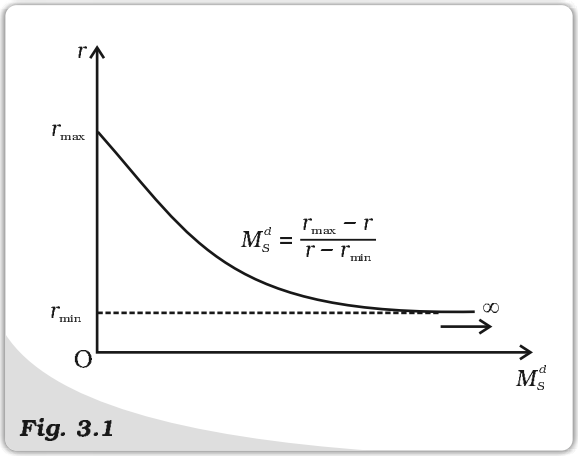


Fig. 3.1 *The Speculative Demand for Money*

In Fig. 3.1 the speculative demand for money is plotted on the horizontal axis and the rate

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of interest on the vertical axis. When $r = r_{max}$, speculative demand for money is zero. The rate of interest is so high that everyone expects it to fall in future and hence is sure about a future capital gain. Thus everyone has converted the speculative money balance into bonds. When $r = r_{min}$, the economy is in the liquidity trap. Everyone is sure of a future rise in interest rate and a fall in bond prices. Everyone puts whatever wealth they acquire in the form of money and the speculative demand for money is infinite.

Total demand for money in an economy is, therefore, composed of transaction demand and speculative demand. The former is directly proportional to real GDP and price level, whereas the latter is inversely related to the market rate of interest. The aggregate money demand in an economy can be summarised by the following equation

$$M^d = M_T^d + M_S^d$$

$$\text{or, } M^d = kPY + \frac{r_{max} - r}{r - r_{min}} \qquad (3.5)$$

3.3 The Supply of Money

In a modern economy money consists mainly of currency notes and coins issued by the monetary authority of the country. In India currency notes are issued by the Reserve Bank of India (RBI), which is the monetary authority in India. However, coins are issued by the Government of India. Apart from currency notes and coins, the balance in savings, or current account deposits, held by the public in commercial banks is also considered money since cheques drawn on these accounts are used to settle transactions. Such deposits are called demand deposits as they are payable by the bank on demand from the account-holder. Other deposits, e.g. fixed deposits, have a fixed period to maturity and are referred to as **time deposits**.

Though a hundred-rupee note can be used to obtain commodities worth Rs 100 from a shop, the value of the paper itself is negligible – certainly less than Rs 100. Similarly, the value of the metal in a five-rupee coin is probably not worth Rs 5. Why then do people accept such notes and coins in exchange of goods which are apparently more valuable than these? The value of the currency notes and coins is derived from the guarantee provided by the issuing authority of these items. Every currency note bears on its face a promise from the Governor of RBI that if someone produces the note to RBI, or any other commercial bank, RBI will be responsible for giving the person purchasing power equal to the value printed on the note. The same is also true of coins. Currency notes and coins are therefore called **fiat money**. They do not have **intrinsic value** like a gold or silver coin. They are also called **legal tenders** as they cannot be refused by any citizen of the country for settlement of any kind of transaction. Cheques drawn on savings or current accounts, however, can be refused by anyone as a mode of payment. Hence, demand deposits are not legal tenders.

3.3.1 Legal Definitions: Narrow and Broad Money

Money supply, like money demand, is a stock variable. The total stock of money in circulation among the public at a particular point of time is called money supply. RBI publishes figures for four alternative measures of money supply, viz. M1, M2, M3 and M4. They are defined as follows

M1 = CU + DD

M2 = M1 + Savings deposits with Post Office savings banks

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M3 = M1 + Net time deposits of commercial banks

M4 = M3 + Total deposits with Post Office savings organisations (excluding National Savings Certificates)

where, CU is currency (notes plus coins) held by the public and DD is net demand deposits held by commercial banks. The word 'net' implies that only deposits of the public held by the banks are to be included in money supply. The interbank deposits, which a commercial bank holds in other commercial banks, are not to be regarded as part of money supply.

M1 and M2 are known as **narrow money**. M3 and M4 are known as **broad money**. These gradations are in decreasing order of liquidity. M1 is most liquid and easiest for transactions whereas M4 is least liquid of all. M3 is the most commonly used measure of money supply. It is also known as **aggregate monetary resources**[1].

3.3.2 Money Creation by the Banking System

In this section we shall explore the determinants of money supply. Money supply will change if the value of any of its components such as CU, DD or Time Deposits changes. In what follows we shall, for simplicity, use the most liquid definition of money, viz. M1 = CU + DD, as the measure of money supply in the economy. Various actions of the monetary authority, RBI, and commercial banks are responsible for changes in the values of these items. The preference of the public for holding cash balances vis-´a-vis deposits in banks also affect the money supply. These influences on money supply can be summarised by the following key ratios.

The Currency Deposit Ratio: The currency deposit ratio (**cdr**) is the ratio of money held by the public in currency to that they hold in bank deposits. cdr = CU/DD. If a person gets Re 1 she will put Rs 1/(1 + cdr) in her bank account and keep Rs cdr/(1 + cdr) in cash. It reflects people's preference for liquidity. It is a purely behavioural parameter which depends, among other things, on the seasonal pattern of expenditure. For example, cdr increases during the festive season as people convert deposits to cash balance for meeting extra expenditure during such periods.

The Reserve Deposit Ratio: Banks hold a part of the money people keep in their bank deposits as reserve money and loan out the rest to various investment projects. Reserve money consists of two things – vault cash in banks and deposits of commercial banks with RBI. Banks use this reserve to meet the demand for cash by account holders. Reserve deposit ratio (**rdr**) is the proportion of the total deposits commercial banks keep as reserves.

Keeping reserves is costly for banks, as, otherwise, they could lend this balance to interest earning investment projects. However, RBI requires commercial banks to keep reserves in order to ensure that banks have a safe cushion of assets to draw on when account holders want to be paid. RBI uses various policy instruments to bring forth a healthy rdr in commercial banks. The first instrument is the **Cash Reserve Ratio** which specifies the fraction of their deposits that banks must keep with RBI. There is another tool called **Statutory Liquidity Ratio** which requires the banks to maintain

[1]See Appendix 3.2 for an estimate of the variations in M1 and M3 over time.



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a given fraction of their total demand and time deposits in the form of specified liquid assets. Apart from these ratios RBI uses a certain interest rate called the **Bank Rate** to control the value of rdr. Commercial banks can borrow money from RBI at the bank rate when they run short of reserves. A high bank rate makes such borrowing from RBI costly and, in effect, encourages the commercial banks to maintain a healthy rdr.

Table 3.1: Sample Balance Sheet of a Commercial Bank

Assets – Rs		*Liability – Rs*	
• Reserves		Deposits	100
– Vault Cash	15		
– Deposits with RBI	5		
• Bank Credit			
– Loans	30		
– Investments	50		
rdr = 0.2			

Commercial Banks

Commercial Banks accept deposits from the public and lend out this money to interest earning investment projects. The rate of interest offered by the bank to deposit holders is called the 'borrowing rate' and the rate at which banks lend out their reserves to investors is called the 'lending rate'. The difference between the two rates, called 'spread', is the profit that is appropriated by the banks. Deposits are broadly of two types – demand deposits, payable by the banks on demand from the account holder, e.g. current and savings account deposits, and time deposits, which have a fixed period to maturity, e.g. fixed deposits. Lending by commercial banks consists mainly of cash credit, demand and short-term loans to private investors and banks' investments in government securities and other approved bonds. The creditworthiness of a person is judged by her current assets or the **collateral** (a security pledged for the repayment of a loan) she can offer.

Table 3.2: Sample Balance Sheet of RBI

Assets (sources) – Rs		*Liability (uses) – Rs*	
Gold	10	Currency	
Foreign Exchange	20	*Currency held by Public*	200
Govt. Securities (Loan to GOI)	230	*Vault Cash held by Commercial Banks*	10
Loan to Commercial Banks	5	Deposits of Commercial Banks with RBI	40
		Treasury Deposits of GOI	15
Monetary Base (sources)	265	Monetary Base (uses)	265

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***High Powered Money*:** The total liability of the monetary authority of the country, RBI, is called the **monetary base** or **high powered money**. It consists of currency (notes and coins in circulation with the public and vault cash of commercial banks) and deposits held by the Government of India and commercial banks with RBI. If a member of the public produces a currency note to RBI the latter must pay her value equal to the figure printed on the note. Similarly, the deposits are also refundable by RBI on demand from deposit-holders. These items are claims which the general public, government or banks have on RBI and hence are considered to be the liability of RBI.

RBI acquires assets against these liabilities. The process can be understood easily if we consider a simple stylised example. Suppose RBI purchases gold or dollars worth Rs 5. It pays for the gold or foreign exchange by issuing currency to the seller. The currency in circulation in the economy thus goes up by Rs 5, an item that shows up on the **liability** side of the balance sheet. The value of the acquired assets, also equal to Rs 5, is entered under the appropriate head on the Assets side. Similarly, RBI acquires debt bonds or securities issued by the government and pays the government by issuing currency in return. It issues loans to commercial banks in a similar fashion[2].

We are now ready to explain the mechanism of money creation by the monetary authority, RBI. Suppose RBI wishes to increase the money supply. It will then inject additional high powered money into the economy in the following way. Let us assume that RBI purchases some asset, say, government bonds or gold worth Rs H from the market. It will issue a cheque of Rs H on itself to the seller of the bond. Assume also that the values of cdr and rdr for this economy are 1 and 0.2, respectively. The seller encashes the cheque at her account in Bank A, keeping Rs $\frac{H}{2}$ in her account and taking Rs $\frac{H}{2}$ away as cash. Currency held by the public thus goes up by $\frac{H}{2}$. Bank A's liability goes up by Rs $\frac{H}{2}$ because of this increment in deposits. But its assets also go up by the same amount through the possession of this cheque, which is nothing but a claim of the same amount on RBI. The liability of RBI goes up by Rs H, which is the sum total of the claims of Bank A and its client, the seller, worth Rs $\frac{H}{2}$ and Rs $\frac{H}{2}$, respectively. Thus, by definition, high powered money increases by Rs H.

The process does not end here. Bank A will keep Rs $\frac{0.2H}{2}$ of the extra deposit as reserve and loan out the rest, i.e. Rs $\frac{(1-0.2)H}{2}$ = Rs $\frac{0.8H}{2}$ to another borrower[3]. The borrower will presumably use this loan on some investment project and spend the money as factor payment. Suppose a worker of that project gets the payment. The worker will then keep Rs $\frac{0.8H}{4}$ as cash and put Rs $\frac{0.8H}{4}$ in her account in Bank B. Bank B, in turn, will lend Rs $\frac{0.64H}{4}$. Someone who receives that money will keep $\frac{0.64H}{8}$ in cash and put $\frac{0.64H}{8}$ in some other Bank C. The process continues *ad infinitum*.

[2]See Appendix 3.2 for an estimate of changes in the sources of monetary base over time.

[3]We are implicitly assuming that the demand for bank loans at the existing lending rate is infinite, i.e. banks can loan out any amount they wish.

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Let us now look at Table 3.3 to get an idea of how the money supply in the economy is changing round after round.

Table 3.3: The Multiplier Process

	Currency	*Deposits*	*Money Supply*
Round 1	$\frac{H}{2}$	$\frac{H}{2}$ (Bank A)	H
Round 2	$\frac{0.8H}{4}$	$\frac{0.8H}{4}$ (Bank B)	$\frac{0.8H}{2}$
Round 3	$\frac{0.64H}{8}$	$\frac{0.64H}{8}$ (Bank C)	$\frac{0.64H}{4}$
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	etc.

The second column shows the increment in the value of currency holding among the public in each round. The third column measures the value of the increment in bank deposits in the economy in a similar way. The last column is the sum total of these two, which, by definition, is the increase in money supply in the economy in each round (presumably the simplest and the most liquid measure of money, viz. M1). Note that the amount of increments in money supply in successive rounds are gradually diminishing. After a large number of rounds, therefore, the size of the increments will be virtually indistinguishable from zero and subsequent round effects will not practically contribute anything to the total volume of money supply. We say that the round effects on money supply represent a **convergent** process. In order to find out the total increase in money supply we must add up the infinite geometric series[4] in the last column, i.e.

$$H + \frac{0.8H}{2} + \frac{0.64H}{4} + \cdots\cdots\infty$$

$$H\left\{1+\left(\frac{0.8}{2}\right)+\left(\frac{0.8}{2}\right)^2+\cdots\cdots\infty\right\} = \frac{H}{1-0.4} = \frac{5H}{3}$$

The increment in total money supply exceeds the amount of high powered money initially injected by RBI into the economy. We define **money multiplier** as the ratio of the stock of money to the stock of high powered money in an economy, viz. M/*H*. Clearly, its value is greater than 1.

We need not always go through the round effects in order to compute the value of the money multiplier. We did it here just to demonstrate the process of money creation in which the commercial banks have an important role to play. However, there exists a simpler way of deriving the multiplier. By definition, money supply is equal to currency plus deposits

$$M = CU + DD = (1 + cdr)DD$$

where, cdr = CU/DD. Assume, for simplicity, that treasury deposit of the Government with RBI is zero. High powered money then consists of currency held by the public and reserves of the commercial banks, which include vault cash and banks' deposits with RBI. Thus

$$H = CU + R = cdr.DD + rdr.DD = (cdr + rdr)DD$$

[4]See Appendix 3.1 for a brief discussion on such series.

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Thus the ratio of money supply to high powered money

$$\frac{M}{H} = \frac{1 + cdr}{cdr + rdr} > 1, \quad \text{as } rdr < 1$$

This is precisely the measure of the money multiplier.

3.3.3 Instruments of Monetary Policy and the Reserve Bank of India

It is clear from the above discussion that the total amount of money stock in the economy is much greater than the volume of high powered money. Commercial banks create this extra amount of money by giving out a part of their deposits as loans or investment credits. It is also evident from Table 3.1 that the total amount of deposits held by all commercial banks in the country is much larger than the total size of their reserves. If all the account-holders of all commercial banks in the country want their deposits back at the same time, the banks will not have enough means to satisfy the need of every account-holder and there will be bank failures.

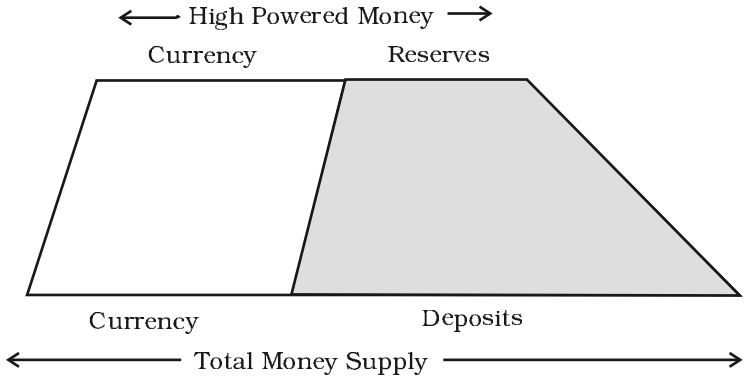


Fig. 3.2: *High Powered Money in Relation to Total Money Supply*

All this is common knowledge to every informed individual in the economy. Why do they still keep their money in bank deposits when they are aware of the possibility of default by their banks in case of a bank run (a situation where everybody wants to take money out of one's bank account before the bank runs out of reserves)?

The Reserve Bank of India plays a crucial role here. In case of a crisis like the above it stands by the commercial banks as a guarantor and extends loans to ensure the solvency of the latter. This system of guarantee assures individual account-holders that their banks will be able to pay their money back in case of a crisis and there is no need to panic thus avoiding bank runs. This role of the monetary authority is known as the **lender of last resort**.

Apart from acting as a banker to the commercial banks, RBI also acts as a banker to the Government of India, and also, to the state governments. It is commonly held that the government, sometimes, 'prints money' in case of a budget deficit, i.e., when it cannot meet its expenses (e.g. salaries to the government employees, purchase of defense equipment from a manufacturer of such goods etc.) from the tax revenue it has earned. The government, however, has no legal authority to issue currency in this fashion. So it borrows money by selling treasury bills or government securities to RBI, which issues currency to the government in return. The government then pays for its expenses with this



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money. The money thus ultimately comes into the hands of the general public (in the form of salary or sales proceeds of defense items etc.) and becomes a part of the money supply. Financing of budget deficits by the governments in this fashion is called **Deficit Financing through Central Bank Borrowing**.

However, the most important role of RBI is as the controller of money supply and credit creation in the economy. RBI is the independent authority for conducting monetary policy in the best interests of the economy – it increases or decreases the supply of high powered money in the economy and creates incentives or disincentives for the commercial banks to give loans or credits to investors. The instruments which RBI uses for conducting monetary policy are as follows.

Open Market Operations: RBI purchases (or sells) government securities to the general public in a bid to increase (or decrease) the stock of high powered money in the economy. Suppose RBI purchases Rs 100 worth government securities from the bond market. It will issue a cheque of Rs 100 on itself to the seller of the bond. The seller will deposit the cheque in her bank, which, in turn, will credit the seller's account with a balance of Rs 100. The bank's deposits go up by Rs 100 which is a liability to the bank. However, its assets also go up by Rs 100 by the possession of this cheque, which is a claim on RBI. The bank will deposit this cheque to RBI which, in turn, will credit the bank's account with RBI with Rs 100. The changes in RBI's balance sheet are shown in Table 3.4.

Total liability of RBI, or, by definition, the supply of high powered money in the economy has gone up by Rs 100. If RBI wishes to reduce the supply of high powered money it undertakes an open market sale of government securities of its own holding in just the reverse fashion, thereby reducing the monetary base.

Table 3.4: Effects of Open Market Purchase on the Balance Sheet of RBI

Assets (sources) – Rs		*Liability (uses) – Rs*	
All Other Assets	0	Currency	0
Government Securities	+ 100	Deposits of Commercial Banks with RBI	+ 100
Monetary Base (sources)	+ 100	Monetary Base (uses)	+ 100

Bank Rate Policy: As mentioned earlier, RBI can affect the reserve deposit ratio of commercial banks by adjusting the value of the bank rate – which is the rate of interest commercial banks have to pay RBI – if they borrow money from it in case of shortage of reserves. A low (or high) bank rate encourages banks to keep smaller (or greater) proportion of their deposits as reserves, since borrowing from RBI is now less (or more) costly than before. As a result banks use a greater (or smaller) proportion of their resources for giving out loans to borrowers or investors, thereby enhancing (or depressing) the multiplier process via assisting (or resisting) secondary money creation. In short, a low (or high) bank rate reduces (or increases) rdr and hence increases (or decreases) the value of the money multiplier, which is (1 + cdr)/(cdr + rdr). Thus, for any given amount of high powered money, *H*, total money supply goes up.

Varying Reserve Requirements: Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) also work through the rdr-route. A high (or low) value of CRR or SLR helps increase (or decrease) the value of reserve deposit ratio, thus diminishing (or increasing) the value of the money multiplier and money supply in the economy in a similar fashion.

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Sterilisation by RBI: RBI often uses its instruments of money creation for stabilising the stock of money in the economy from external shocks. Suppose due to future growth prospects in India investors from across the world increase their investments in Indian bonds which under such circumstances, are likely to yield a high rate of return. They will buy these bonds with foreign currency. Since one cannot purchase goods in the domestic market with foreign currency, a person who sells these bonds to foreign investors will exchange her foreign currency holding into rupee at a commercial bank. The bank, in turn, will submit this foreign currency to RBI and its deposits with RBI will be credited with equivalent sum of money. What kind of adjustments take place from this entire transaction? The commercial bank's total reserves and deposits remain unchanged (it has purchased the foreign currency from the seller using its vault cash, which, therefore, goes down; but the bank's deposit with RBI goes up by an equivalent amount – leaving its total reserves unchanged). There will, however, be increments in the assets and liabilities on the RBI balance sheet. RBI's foreign exchange holding goes up. On the other hand, the deposits of commercial banks with RBI also increase by an equal amount. But that means an increase in the stock of high powered money – which, by definition, is equal to the total liability of RBI. With money multiplier in operation, this, in turn, will result in increased money supply in the economy.

This increased money supply may not altogether be good for the economy's health. If the volume of goods and services produced in the economy remains unchanged, the extra money will lead to increase in prices of all commodities. People have more money in their hands with which they compete each other in the commodities market for buying the same old stock of goods. As too much money is now chasing the same old quantities of output, the process ends up in bidding up prices of every commodity – an increase in the general price level, which is also known as inflation.

RBI often intervenes with its instruments to prevent such an outcome. In the above example, RBI will undertake an open market sale of government securities of an amount equal to the amount of foreign exchange inflow in the economy, thereby keeping the stock of high powered money and total money supply unchanged. Thus it sterilises the economy against adverse external shocks. This operation of RBI is known as **sterilisation**.

Money supply is, therefore, an important macroeconomic variable. Its overall influence on the values of the equilibrium rate of interest, price level and output of an economy is of great significance. We take up these issues in the next chapter.

Summary

Exchange of commodities without the mediation of money is called Barter Exchange. It suffers from lack of double coincidence of wants. Money facilitates exchanges by acting as a commonly acceptable medium of exchange. In a modern economy, people hold money broadly from two motives – transaction motive and speculative motive. Supply of money, on the other hand, consists of currency notes and coins, demand and time deposits held by commercial banks, etc. It is classified as narrow and broad money according to the decreasing order of liquidity. In India, the supply of money is regulated by the Reserve Bank of India (RBI) which acts as the monetary authority of the country. Various actions of the public, the commercial banks of the country and RBI are responsible for changes in the supply of money in the economy. RBI regulates money supply by controlling the stock of high powered money, the bank rate and reserve requirements of the commercial banks. It also sterilises the money supply in the economy against external shocks.

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Key Concepts

Barter exchange	Double coincidence of wants
Money	Medium of exchange
Unit of account	Store of value
Transaction demand	Speculative demand
Bonds	Present value
Rate of interest	Capital gain or loss
Liquidity trap	Fiat money
Legal tender	Narrow money
Broad money	Aggregate monetary resources
Currency deposit ratio	Reserve deposit ratio
High powered money	Money multiplier
Lender of last resort	Deficit financing through central bank borrowing
Open market operation	Bank Rate
Cash Reserve Ratio (CRR)	Statutory Liquidity Ratio (SLR)
Sterilisation	

Exercises

1. What is a barter system? What are its drawbacks?
2. What are the main functions of money? How does money overcome the shortcomings of a barter system?
3. What is transaction demand for money? How is it related to the value of transactions over a specified period of time?
4. Suppose a bond promises Rs 500 at the end of two years with no intermediate return. If the rate of interest is 5 per cent per annum what is the price of the bond?
5. Why is speculative demand for money inversely related to the rate of interest?
6. What is 'liquidity trap'?
7. What are the alternative definitions of money supply in India?
8. What is a 'legal tender'? What is 'fiat money'?
9. What is High Powered Money?
10. Explain the functions of a commercial bank.
11. What is money multiplier? How will you determine its value? What ratios play an important role in the determination of the value of the money multiplier?
12. What are the instruments of monetary policy of RBI? How does RBI stabilize money supply against exogenous shocks?
13. Do you consider a commercial bank 'creator of money' in the economy?
14. What role of RBI is known as 'lender of last resort'?

Suggested Readings

1. Dornbusch, R. and S. Fischer. 1990. *Macroeconomics*, (fifth edition) pages 345 – 427, McGraw Hill, Paris.
2. Branson, W. H., 1992. *Macroeconomic Theory and Policy*, (second edition), pages 243 – 280, Harper Collins Publishers India Pvt. Ltd., New Delhi.
3. Sikdar, S., 2006. *Principles of Macroeconomics*, pages 77 – 89, Oxford University Press, New Delhi.

Appendix 3.1

The Sum of an Infinite Geometric Series

We want to find out the sum of an infinite geometric series of the following form

$$S = a + a.r + a.r^2 + a.r^3 + \cdots + a.r^n \cdots \infty$$

where a and r are real numbers and $0 < r < 1$. To compute the sum, multiply the above equation by r to obtain

$$r.S = a.r + a.r^2 + a.r^3 + \cdots + a.r^{n+1} \cdots \infty$$

Subtract the second equation from the first to get

$$S - r.S = a$$
$$\text{or, } (1 - r)S = a$$

which yields

$$S = \frac{a}{1-r}$$

In the example used for the derivation of the money multiplier, $a = 1$ and $r = 0.4$. Hence the value of the infinite series is

$$\frac{1}{1-0.4} = \frac{5}{3}$$

Appendix 3.2

Money Supply in India

Table 3.5: Change in M1 and M3 Over Time

Year	*M1*	*M3*
1989-90	81,060	2,30,950
1990-91	92,892	2,65,828
1991-92	1,14,406	3,17,049
1992-93	1,24,066	3,64,016
1993-94	1,50,778	4,31,084
1994-95	1,92,257	5,27,496
1995-96	2,14,844	5,99,191
1996-97	2,40,615	6,96,012
1997-98	2,67,844	8,21,332
1998-99	3,09,128	9,81,020
1999-00	3,41,796	11,24,174
2000-01	3,79,450	13,13,220
2001-02	4,22,843	14,98,355
2002-03	4,72,827	17,25,222

Source: S. Sikdar, *Principles of Macroeconomics*, OUP, 2006. Unit: Rs crore.

The difference in values between the two columns is attributable to the time deposits held by commercial banks.

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Appendix 3.3

Changes in the Composition of the Sources of Monetary Base Over Time

Table 3.6: Sources of Changes in the Monetary Base

Year	Percentage Changes in		
	Loan to GOI	*Loan to Banks*	*Foreign Assets*
1984-90	105.50	13.60	7.60
1991-92	44.00	– 34.00	92.50
1992-93	38.80	32.72	33.30
1993-94	3.10	14.90	103.90
1994-95	7.10	26.30	76.10
1995-96	79.30	34.90	– 2.50
1996-97	50.10	– 275.40	366.90
1997-98	41.80	7.70	80.30
1998-99	52.40	30.80	66.60
1999-00	– 20.20	31.00	131.80
2000-01	24.70	– 25.50	137.50
2001-02	1.70	– 27.70	193.50

Source: S. Sikdar, *Principles of Macroeconomics*, OUP, 2006.

Note that RBI has been tightening domestic credit to Government of India and commercial banks as part of sterilisation exercise whenever the inflow of foreign assets to the Indian economy has been on the rise.

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Chapter 4

Income Determination



We have so far talked about the national income, price level, rate of interest etc. in an ad hoc manner – without investigating the forces that govern their values. The basic objective of macroeconomics is to develop theoretical tools, called models, capable of describing the processes which determine the values of these variables. Specifically, the models attempt to provide theoretical explanation to questions such as what causes periods of slow growth or recessions in the economy, or increment in the price level, or a rise in unemployment. It is difficult to account for all the variables at the same time. Thus, when we concentrate on the determination of a particular variable, we must hold the values of all other variables constant. This is a stylisation typical of almost any theoretical exercise and is called the assumption of *ceteris paribus*, which literally means 'other things remaining equal'. You can think of the procedure as follows – in order to solve for the values of two variables x and y from two equations, we solve for one variable, say x, in terms of y from one equation first, and then substitute this value into the other equation to obtain the complete solution. We apply the same method in the analysis of the macroeconomic system.

4.1 Ex Ante and Ex Post

In the chapter on National Income Accounting, we have come across terms like consumption, investment, or the total output of final goods and services in an economy (GDP). These terms have dual connotations. In Chapter 2 they were used in the accounting sense – denoting actual values of these items as measured by the activities within the economy in a certain year. We call these actual or accounting values **ex post** measures of these items.

These terms, however, can be used with a different connotation. Consumption may denote not what people have actually consumed in a given year, but what they had planned to consume during the same period. Similarly, investment can mean the amount a producer plans to add to her inventory. It may be different from what she ends up doing. Suppose the producer plans to add Rs 100 worth goods to her stock by the end of the year. Her planned investment is, therefore, Rs 100 in that year. However, due to an unforeseen upsurge of demand for her goods in the market the volume of her sales exceeds what

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she had planned to sell and, to meet this extra demand, she has to sell goods worth Rs 30 from her stock. Therefore, at the end of the year, her inventory goes up by Rs (100 – 30) = Rs 70 only. Her planned investment is Rs 100 whereas her actual, or ex post, investment is Rs 70 only. We call the planned values of the variables – consumption, investment or output of final goods – their **ex ante** measures.

In a theoretical model of the economy the **ex ante** values of these variables should be our primary concern. If anybody wants to predict what the equilibrium value of the final goods, output or GDP will be it is important for her to know what quantities of the final goods people plan to demand or supply. We must, therefore, learn about the determinants of the ex ante values of consumption, investment or aggregate output of the economy.

***Ex Ante Consumption*:** What does planned consumption depend on? People spend a part of their income on consumption and save the rest. Suppose your income increases by Rs 100. You will not use up this entire extra income but save a certain fraction, say 20 per cent, of it to build up a cushion of savings for the period when you cease to earn income, or for meeting large expenses in future. Different people plan to save different fractions of their additional incomes (with the rich typically saving a greater proportion of their income than the poor), and if we average these we may arrive at a fraction which will give us an idea of what proportion of the total additional income of the economy people wish to save as a whole. We call this fraction the **marginal propensity to save** (**mps**). It gives us the ratio of total additional planned savings in an economy to the total additional income of the economy. Since consumption is the complement of savings (additional income of the economy is either put into additional savings or used for extra consumption by the people), if we subtract the mps from 1, we get the **marginal propensity to consume** (**mpc**), which, in a similar way, is the fraction of total additional income that people use for consumption. Suppose, mpc of an economy is c, where $0 < c < 1$. If the total income of the economy increases from 0 to Y, then total consumption of the economy should be

$$C = c(Y - 0) = c.Y$$

However, it is not precisely so. We have forgotten something here. If the income of the economy in a certain year is zero, the above equation tells us that the economy has to starve for an entire year, which is, obviously, an outrageous idea. If your income is zero in a certain period you use your past savings to buy certain minimum consumption items in order to survive. Hence we must add the minimum or subsistence level of consumption of the economy in the above equation, which, therefore, becomes

$$C = \bar{C} + c.Y \qquad (4.1)$$

where $\bar{C} > 0$ is the minimum consumption level and is a given or exogenous item to our model, which, therefore, is treated as a constant. The equation tells us that as the income of the economy increases above zero, the economy uses c proportion of this extra income to increase its consumption above the minimum level.

***Ex Ante Investment*:** Investment is defined as addition to the stock of physical capital (such as machines, buildings, roads etc., i.e. anything that adds to the future productive capacity of the economy) and changes in the inventory (or the stock of finished goods) of a producer. Note that 'investment goods' (such as machines) are also part of the final goods – they are not intermediate goods like

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raw materials. Machines produced in an economy in a given year are not 'used up' to produce other goods but yield their services over a number of years.

Investment decisions by producers, such as whether to buy a new machine, depend, to a large extent, on the market rate of interest. However, for simplicity, we assume here that firms plan to invest the same amount every year. We can write the ex ante investment demand as

$$I = \bar{I} \tag{4.2}$$

where $\bar{I}$ is a positive constant which represents the autonomous (given or exogenous) investment in the economy in a given year.

***Ex Ante Aggregate Demand for Final Goods*:** In an economy without a government, the ex ante aggregate demand for final goods is the sum total of the ex ante consumption expenditure and ex ante investment expenditure on such goods, viz. $AD = C + I$. Substituting the values of C and I from equations (4.1) and (4.2), aggregate demand for final goods can be written as

$$AD = \bar{C} + \bar{I} + c.Y$$

If the final goods market is in equilibrium this can be written as

$$Y = \bar{C} + \bar{I} + c.Y$$

where Y is the ex ante, or planned, supply of final goods. This equation can be further simplified by adding up the two autonomous terms, $\bar{C}$ and $\bar{I}$, making it

$$Y = \bar{A} + c.Y \tag{4.3}$$

where $\bar{A} = \bar{C} + \bar{I}$ is the total autonomous expenditure in the economy. In reality, these two components of autonomous expenditure behave in different ways. $\bar{C}$, representing subsistence consumption level of an economy, remains more or less stable over time. However, $\bar{I}$ has been observed to undergo periodic fluctuations.

A word of caution is in order. The term Y on the left hand side of equation (4.3) represents the ex ante output or the planned supply of final goods. On the other hand, the expression on the right hand side denotes ex ante or planned aggregate demand for final goods in the economy. Ex ante supply is equal to ex ante demand only when the final goods market, and hence the economy, is in equilibrium. Equation (4.3) should not, therefore, be confused with the accounting identity of Chapter 2, which states that the ex post value of total output must always be equal to the sum total of ex post consumption and ex post investment in the economy. If ex ante demand for final goods falls short of the output of final goods that the producers have planned to produce in a given year, equation (4.3) will not hold. Stocks will be piling up in the warehouses which we may consider as *unintended accumulation of inventories*. It is not a part of planned or ex ante investment. However, it is definitely a part of the actual addition to inventories at the end of the year or, in other words, an ex post investment. Thus even though planned Y is greater than planned $C + I$, actual Y will be equal to actual $C + I$, with the extra output showing up as unintended accumulation of inventories in the ex post I on the right hand side of the accounting identity.

At this point, we can introduce a government in this economy. The major economic activities of the government that affect the aggregate demand for final goods and services can be summarized by the fiscal variables Tax (T) and Government Expenditure (G), both autonomous to our analysis. Government, through its expenditure G on final goods and services, adds to the aggregate



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demand like other firms and households. On the other hand, taxes imposed by the government take a part of the income away from the household, whose disposable income, therefore, becomes $Y_d = Y - T$. Households spend only a fraction of this disposable income for consumption purpose. Hence, equation (4.3) has to be modified in the following way to incorporate the government

$$Y = \bar{C} + \bar{I} + G + c(Y - T)$$

Note that $G - c.T$, like $\bar{C}$ or $\bar{I}$, just adds to the autonomous term $\bar{A}$. It does not significantly change the analysis in any qualitative way. We shall, for the sake of simplicity, ignore the government sector for the rest of this chapter. Observe also, that without the government imposing indirect taxes and subsidies, the total value of final goods and services produced in the economy, GDP, becomes identically equal to the National Income. Henceforth, throughout the rest of the chapter, we shall refer to Y as GDP or National Income interchangeably.

4.2 Movement Along a Curve versus Shift of a Curve

We shall be using graphical techniques to analyse the model of the economy. It is, therefore, important for us to learn how to read a graph. Let us now plot two variables a and b on the horizontal and vertical axes on a graph depicting the equation of a straight line of the form $b = ma + \varepsilon$, where $m > 0$ is called the slope of the straight line and $\varepsilon > 0$ is the intercept on the vertical (i.e. b) axis (Fig. 4.1). When a increases by 1 unit the value of b increases by m units. These are called movements of the variables *along the graph*.

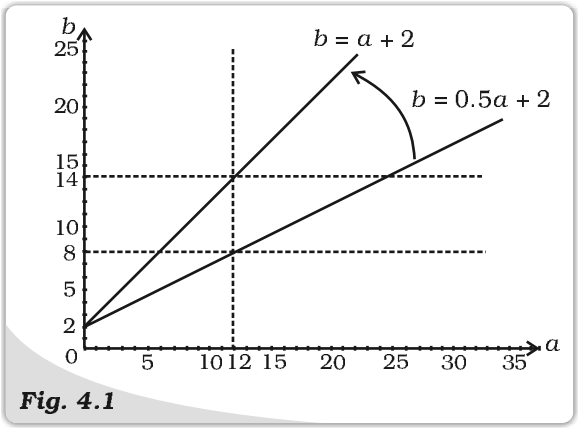


Fig. 4.1

A Positively Sloping Straight Line Swings Upwards as its Slope is Doubled

Consider a fixed value for ε equal to 2. Let m take two values $m = 0.5$ and $m = 1$, respectively. Corresponding to these values of m we have two straight lines, one steeper than the other. The entities ε and m are called the parameters of the graph. They do not appear as variables on the axes, but act in the background to regulate the position of the graph. As m increases in the above example the straight line swings upwards. This is called a **parametric shift** of a graph.

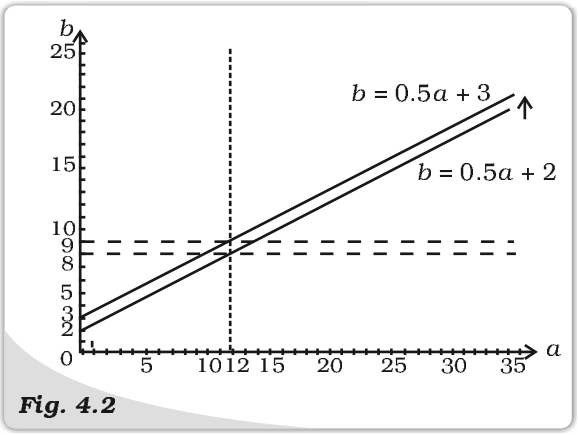


Fig. 4.2

A Positively Sloping Straight Line Shifts Upwards in Parallel as its Intercept is Increased

Since a straight line of the above form has another parameter ε, we can observe another type of parametric shift of this line. To see this hold m constant at 0.5 and increase the intercept term ε from 2 to 3. The straight line now shifts in parallel upwards as shown in Fig. 4.2.

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Consider, next, the following two equations representing a downward and an upward sloping straight line, respectively

$y = z - x$, and, $y = 1 + x$, $z \geq 0$

In the first equation z appears as an intercept parameter. Hence for increasing values of z starting from zero, the first straight line will undergo parallel upward shifts as depicted in Fig. 4.3. Consequently, its points of intersection with the second straight line will move up along the second line as shown in Fig. 4.3.

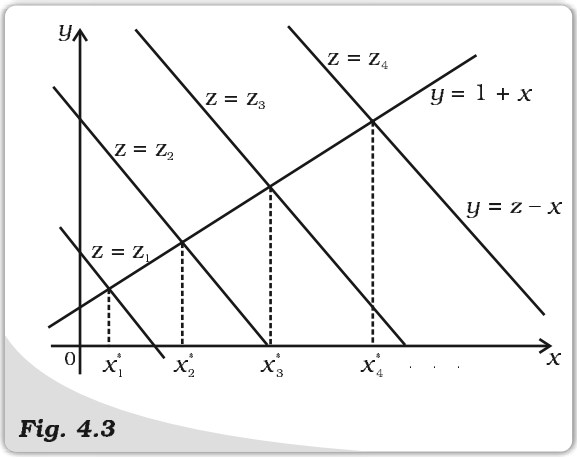


Fig. 4.3

Parametric Shift of z and Changing Equilibrium Values of x

Suppose we want to find out the relationship between z and equilibrium values of x. This can be obtained by plotting the points (x^*_1, z_1), (x^*_2, z_2), (x^*_3, z_3) etc. on a figure depicting the variables x and z on the horizontal and vertical axes, respectively, as shown in Fig. 4.4.

Note that in the (x, y) plane z was being treated as a parameter. But in the (x, z) plane z is a variable in its own right. What we have essentially done is the following – we have kept z constant while dealing with x and y in the second equation and solved for y in terms of x. Then we have plugged this solution in the first equation to derive the relationship between x and z. We shall be making use of this technique throughout this chapter.

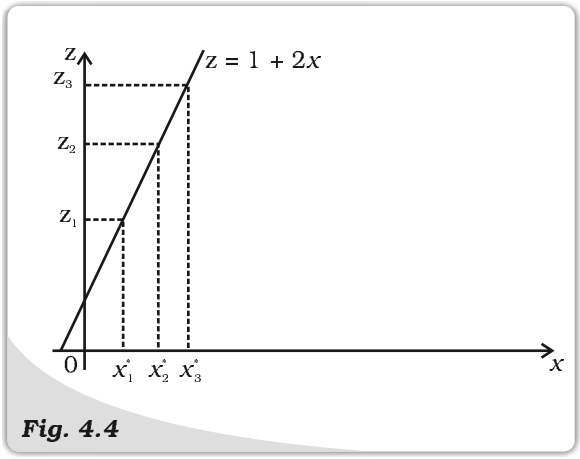


Fig. 4.4

Relationship between x and z

4.3 The Short Run Fixed Price Analysis of the Product Market

We now turn to the derivation of aggregate demand under fixed price of final goods and constant rate of interest in the economy. In order to hold price constant at any particular level, however, one must assume that the suppliers are willing to supply whatever amount consumers will demand at that price. If quantity supplied is either in excess of or falls short of quantity demanded at this price, price will change because of excess supply or demand. To avoid this problem, we assume that the elasticity of supply is infinite – i.e., supply schedule is



How will the producer try to update his production plans in order to avoid excess supply or demand? Discuss this in the classroom.

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horizontal – at the fixed price. Under such circumstances, equilibrium output will be solely determined by the aggregate amount of demand at this price in the economy. We call it **effective demand principle**.

Note also the word short run. We assume that prices in the economy take some time to respond to the forces of excess supply or demand. In the mean time, producers try to update their production plans in order to avoid excess supply or demand. For instance, if they face an excess supply in the current production cycle they will plan to produce less in the next cycle so as to avoid accumulation of stocks in their warehouses. Note also that an individual producer is very small compared to the size of the national market and, therefore, she cannot affect market price on her own. An individual producer has to accept the price that prevails in the market. The aggregate price level in the economy changes only when adjustments in all markets of the economy fail to eliminate the excess demand or supply. Prices are, therefore, assumed to vary only in the long run.

4.3.1 A Point on the Aggregate Demand Curve

At a fixed price, the value of ex ante aggregate demand for final goods, AD, is equal to the sum total of ex ante consumption expenditure and ex ante investment expenditure. Under the effective demand principle, the equilibrium output of the final goods is equal to ex ante aggregate demand, as represented by equation 4.3

$$Y = \bar{A} + c.Y$$

where $\bar{A}$ is the total value of autonomous expenditure in the economy. Let us consider a numerical example to derive the value of the aggregate demand and hence equilibrium output in the economy at a fixed price. Suppose the values of the autonomous expenditures are $\bar{C} = 40$, $\bar{I} = 10$ and the value of mpc, $c = 0.8$. What will be the equilibrium value of Y ?

Consider $Y = 200$, as a trial solution. At this output, the value of the ex ante consumption expenditure is $C = \bar{C} + 0.8.Y = 40 + (0.8)200 = 200$, ex ante investment expenditure is $I = \bar{I} = 10$ and ex ante aggregate demand is AD = $C + I = 200 + 10 = 210$. At the level of output $Y = 200$ the value of ex ante aggregate demand is 210, which denotes a situation of excess demand. Clearly, $Y = 200$ is not the equilibrium level of output in the economy.

Consider, next, the output level $Y = 300$. Calculations similar to the above case shows that the value of ex ante aggregate demand will be

$$\bar{A} + cY = \bar{C} + \bar{I} + cY = 50 + (0.8)300 = 290.$$

The ex ante aggregate demand falls short of the output and there is excess supply. Hence, $Y = 300$ is also not the equilibrium level of output in the economy.

Finally, consider $Y = 250$. At this output, $AD = 50 + (0.8)250 = 250$. We have ultimately hit the correct value of Y, at which aggregate demand equals aggregate supply. $Y = 250$ is, therefore, the equilibrium output of the economy at the fixed price-interest rate combination.

4.3.2 Effects of an Autonomous Change on Equilibrium Demand in the Product Market

What are the determinants of the equilibrium value of aggregate demand at fixed price? In other words, what governs whether the equilibrium aggregate demand would be 250 or 210 or 290 in the above example? The equilibrium output and aggregate demand at the fixed price-interest rate is derived by solving

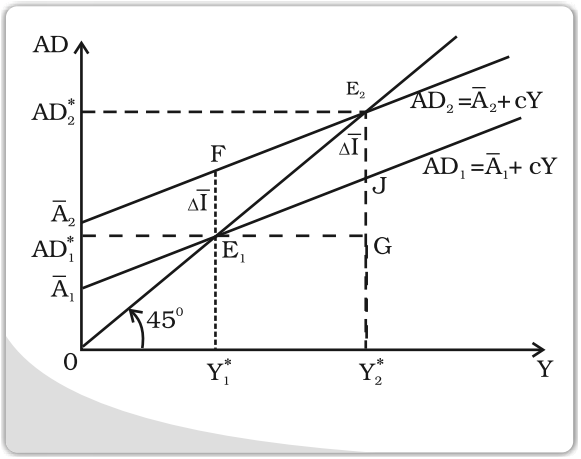
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the equation $Y = AD = \bar{A} + cY$. It is an equation involving only one variable, Y. The solution of the equation is

$$Y = \frac{\bar{A}}{1-c} \tag{4.4}$$

The value of Y will, therefore, depend on the values of the parameters on the right hand side, which are $\bar{A}$ and c in this case. In the above example, the equilibrium value of aggregate demand, 250, and hence the position of the single point on the aggregate demand schedule that we have derived so far, will depend on the values of these parameters. Compare the equation $AD = \bar{A} + cY$ with the equation of a straight line of the standard form: $b = \varepsilon + ma$, as discussed in section 4.2. $\bar{A}$ is the intercept parameter and c is the slope parameter of this equation. When c increases, the straight line representing the equation of aggregate demand will swing upwards. On the other hand, as $\bar{A}$ increases, the straight line will shift in parallel upwards. However, $\bar{A}$ is only a composite term, representing the sum of $\bar{C}$ and $\bar{I}$, which are, therefore, the truly shifted parameters of the AD line. Suppose $\bar{I}$ increases from 10 to 20. What will happen to equilibrium output and aggregate demand?

Figure 4.5 above depicts the situation. The lines AD_1 and AD_2 correspond to the two values of $\bar{A}$, viz. $\bar{A}_1$ and $\bar{A}_2$, respectively. These values differ by $\Delta\bar{I} = 10$, the increment in the autonomous investment. Slope of the AD lines is $0 < c < 1$ and their intercepts on the vertical axis are $\bar{A}_1$ and $\bar{A}_2$, respectively. Note that, AD lines are flatter than the 45° line since the slope of the latter line is equal to 1 (tan 45° = 1). The 45° line represents points at which aggregate demand and output are equal. Thus, when the level of autonomous expenditure in the economy is A_1, the AD_1 line intersects the 45° line at E_1, which is, therefore, the equilibrium point. The equilibrium values of output and aggregate demand are Y_1^* and AD_1^* (= 250), respectively.



Equilibrium Output and Aggregate Demand in the Fixed Price Model

When autonomous investment increases, the AD_1 line shifts in parallel upwards and assumes the position AD_2. The value of aggregate demand at output Y_1^* is Y_1^*F, which is greater than the value of output $0Y_1^* = Y_1^*E_1$ by an amount E_1F. E_1F measures the amount of excess demand that emerges in the economy as a result of the increase in autonomous expenditure. Thus, E_1 no longer represents the equilibrium. To find the new equilibrium in the final goods market we must look for the point where the new aggregate demand line, AD_2, intersects the 45° line. That occurs at point E_2, which is, therefore, the new equilibrium point. The new equilibrium values of output and aggregate demand are Y_2^* and AD_2^*, respectively.

Note that in the new equilibrium, output and aggregate demand have increased by an amount $E_1G = E_2G$, which is greater than the initial increment in autonomous expenditure, $\Delta\bar{I} = E_1F = E_2J$. Thus an initial increment in the

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autonomous expenditure seems to have a spill-over effect on the equilibrium values of aggregate demand and output. What causes aggregate demand and output to increase by an amount larger than the size of the initial increment in autonomous expenditure? We discuss it in section 4.3.3.

4.3.3 The Multiplier Mechanism

Clearly, 250 is no longer the equilibrium value of output or aggregate demand. With $\bar{I}$ = 20, aggregate demand in the economy will be equal to 40 + 20 + (0.8) 250 = 260 from equation (4.4), which is greater than the output Y = 250 by the amount of the increment in the autonomous investment ($\Delta \bar{I}$ = 10). There is excess demand in the economy and producers will have to run down their inventory to meet this extra demand. Thus, in the next production cycle, they revise their production plan upwards, i.e. increase the value of their planned supply of output by 10 to restore equilibrium in the final goods market.

In the absence of a government imposing indirect taxes or disbursing subsidies, the value of the total output of final goods or GDP is equal to National Income. The production of final goods employs factors such as labour, capital, land and entrepreneurship. In the absence of indirect taxes or subsidies, the total value of the final goods output is disbursed among different factors of production – wages to labour, interest to capital, rent to land etc. Whatever is left over is appropriated by the entrepreneur and is called profit. Thus the sum total of aggregate factor payments in the economy, National Income, is equal to the aggregate value of the output of final goods, GDP. In the above example the value of the extra output, 10, is distributed among various factors as factor payments and hence the income of the economy goes up by 10. When income increases by 10, consumption expenditure goes up by (0.8)10, since people spend 0.8 (= mpc) fraction of their additional income on consumption. Hence, in the next round, aggregate demand in the economy goes up by (0.8)10 and there again emerges an excess demand equal to (0.8)10. Therefore, in the next production cycle, producers increase their planned output further by (0.8)10 to restore equilibrium. When this extra output is distributed among factors, the income of the economy goes up by (0.8)10 and consumption demand increases further by $(0.8)^2$10, once again creating excess demand of the same amount. This process goes on, round after round, with producers increasing their output to clear the excess demand in each round and consumers spending a part of their additional income from this extra production on consumption items – thereby creating further excess demand in the next round.

Let us register the changes in the values of aggregate demand and output at each round in Table 4.1.

Table 4.1: The Multiplier Mechanism in the Final Goods Market

	Consumption	*Aggregate Demand*	*Output/Income*
Round 1	0	10 (Autonomous Increment)	10
Round 2	(0.8)10	(0.8)10	(0.8)10
Round 3	$(0.8)^2$10	$(0.8)^2$10	$(0.8)^2$10
Round 4	$(0.8)^3$10	$(0.8)^3$10	$(0.8)^3$10
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	etc.

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The last column measures the increments in the value of the output of final goods (and hence the income of the economy) in each round. The second and third columns measure the increments in total consumption expenditure in the economy and increments in the value of aggregate demand in a similar way. Note that the increments in final goods output in successive rounds are gradually diminishing. After a large number of rounds, therefore, the size of the increments will be virtually indistinguishable from zero and subsequent round effects will not practically contribute anything in the total volume of output. We say that the round effects on final goods output represent a convergent process. In order to find out the total increase in output of the final goods, we must add up the infinite geometric series in the last column, i.e.

$$10 + (0.8)10 + (0.8)^2 10 + \cdots\cdots\infty$$

$$= 10\{1 + (0.8) + (0.8)^2 + \cdots\cdots\infty\} = \frac{10}{1-0.8} = 50$$

The increment in equilibrium value of total output thus exceeds the initial increment in autonomous expenditure. The ratio of the total increment in equilibrium value of final goods output to the initial increment in autonomous expenditure is called the **output multiplier** of the economy. Recalling that 10 and 0.8 represent the values of $\Delta \bar{I} = \Delta \bar{A}$ and mpc, respectively, the expression for the multiplier can be written as

$$\text{The output multiplier} = \frac{\Delta Y}{\Delta \bar{A}} = \frac{1}{1-c} \qquad (4.5)$$

where ΔY is the total increment in final goods output and c = mpc. Observe that the size of the multiplier depends on the value of c. As c becomes larger the multiplier increases.

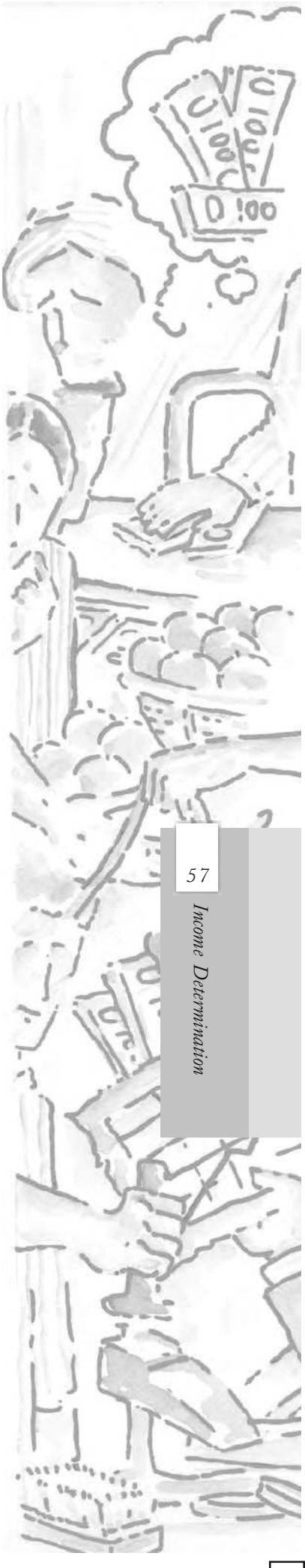
Referring back to our example, an increment in autonomous expenditure by 10 increases total output and aggregate demand in the economy by 50. The value of the multiplier is 5. To cross check our calculation, let us compute the value of aggregate demand and output at the new equilibrium with $\bar{I} = 20$. From equation (4.4) the value of output in the new equilibrium will be equal to

$$Y_2^* = \frac{40 + 20}{1-0.8} = 300$$

This shows that our computation of the multiplier is indeed correct.

We shall conclude the fixed price-interest rate analysis of the final goods market with an interesting counter-intuitive fact – or a 'paradox'. If all the people of the economy increase the proportion of income they save (i.e. if the mps of the economy increases) the total value of savings in the economy will not increase – it will either decline or remain unchanged. This result is known as the **Paradox of Thrift** – which states that as people become more thrifty they end up saving less or same as before. This result, though sounds apparently impossible, is actually a simple application of the model we have learnt.

Let us continue with the example. Suppose at the initial equilibrium of $Y = 250$, there is an exogenous or autonomous shift in peoples' expenditure pattern – they suddenly become more thrifty. This may happen due to a new information regarding an imminent war or some other impending disaster, which makes people more circumspect and conservative about their expenditures. Hence the mps of the economy increases, or, alternatively, the mpc decreases from 0.8 to 0.5. At the initial income level of $AD_1^* = Y_1^* = 250$, this sudden decline in mpc will imply a decrease in aggregate consumption



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spending and hence in aggregate demand, $AD = \bar{A} + cY$, by an amount equal to (0.8 – 0.5) 250 = 75. This can be regarded as an autonomous reduction in consumption expenditure, to the extent that the change in mpc is occurring from some exogenous cause and is not a consequence of changes in the variables of the model. But as aggregate demand decreases by 75, it falls short of the output $Y_1^* = 250$ and there emerges an excess supply equal to 75 in the economy. Stocks are piling up in warehouses and producers decide to cut the value of production by 75 in the next round to restore equilibrium in the market. But that would mean a reduction in factor payments in the next round and hence a reduction in income by 75. As income decreases people reduce consumption proportionately but, this time, according to the new value of mpc which is 0.5. Consumption expenditure, and hence aggregate demand, decreases by (0.5)75, which creates again an excess supply in the market. In the next round, therefore, producers reduce output further by (0.5)75. Income of the people decreases accordingly and consumption expenditure and aggregate demand goes down again by $(0.5)^2 75$. The process goes on. However, as can be inferred from the dwindling values of the successive round effects, the process is convergent. What is the total decrease in the value of output and aggregate demand? Add up the infinite series $75 + (0.5)\,75 + (0.5)^2 75 + \cdots \infty$ and the total reduction in output turns out to be

$$\frac{75}{1-0.5} = 150$$

But that means the new equilibrium output of the economy is only $Y_2^* = 100$. People are now saving $S_2^* = Y_2^* - C_2^* = Y_2^* - (\bar{C} + c_2.Y_2^*) = 100 - (40 + 0.5 \times 100) = 10$ in aggregate, whereas under the previous equilibrium they were saving $S_1^* = Y_1^* - C_1^* = Y_1^* - (\bar{C} + c_1.Y_1^*) = 250 - (40 + 0.8 \times 250) = 10$ at the previous mpc, $c_1 = 0.8$. Total value of savings in the economy has, therefore, remained unchanged.

In section 4.3.2, we had talked about two types of parametric changes in the position of the *AD* line. When $\bar{A}$ changes the line shifts upwards or downwards in parallel. When *c* changes, however, the line swings up or down. An increase in mps, or a decline in mpc, reduces the slope of the *AD* line and it swings downwards. We depict the situation in Fig. 4.6.

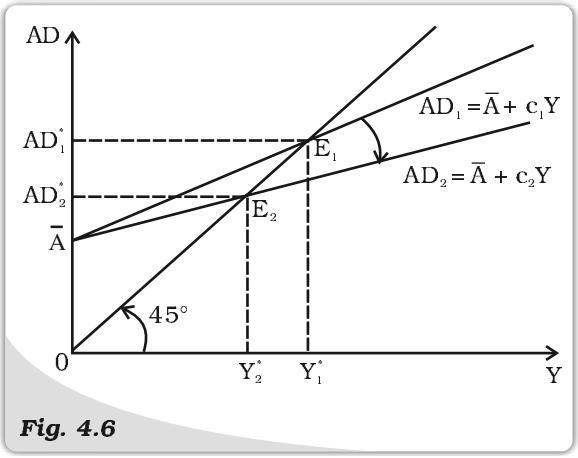


Fig. 4.6

Paradox of Thrift – Downward Swing of AD Line

At the initial values of the parameters, $\bar{A} = 50$ and $c = 0.8$, the equilibrium value of the output and aggregate demand from equation (4.4) was

$$Y_1^* = \frac{50}{1-0.8} = 250$$

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Under the changed value of the parameter $c = 0.5$, the new equilibrium value of output and aggregate demand is

$$Y_2^* = \frac{50}{1 - 0.5} = 100$$

The equilibrium output and aggregate demand have declined by 150. As explained above, this, in turn, implies that there is no change in the total value of savings.

Summary

When, at a particular price level, aggregate demand for final goods equals aggregate supply of final goods, the final goods or product market reaches its equilibrium. Aggregate demand for final goods consists of ex ante consumption, ex ante investment, government spending etc. The rate of increase in ex ante consumption due to a unit increment in income is called marginal propensity to consume. For simplicity we assume a constant final goods price and constant rate of interest over short run to determine the level of aggregate demand for final goods in the economy. We also assume that the aggregate supply is perfectly elastic at this price. Under such circumstances, aggregate output is determined solely by the level of aggregate demand. This is known as effective demand principle. An increase (decrease) in autonomous spending causes aggregate output of final goods to increase (decrease) by a larger amount through the multiplier process.

Key Concepts

Aggregate demand
Aggregate supply
Equilibrium
Ex ante
Ex post
Ex ante consumption
Marginal propensity to consume
Ex ante investment
Unintended changes in inventories
Autonomous change
Parametric shift
Effective demand principle
Paradox of thrift
Autonomous expenditure multiplier

Exercises

1. What is marginal propensity to consume? How is it related to marginal propensity to save?
2. What is the difference between ex ante investment and ex post investment?
3. What do you understand by 'parametric shift of a line'? How does a line shift when its (i) slope decreases, and (ii) its intercept increases?
4. What is 'effective demand'? How will you derive the autonomous expenditure multiplier when price of final goods and the rate of interest are given?
5. Measure the level of ex-ante aggregate demand when autonomous investment and consumption expenditure (A) is Rs 50 crores, and MPS is 0.2 and level of income (Y) is Rs 4000 crores. State whether the economy is in equilibrium or not (cite reasons).
6. Explain 'Paradox of Thrift'.

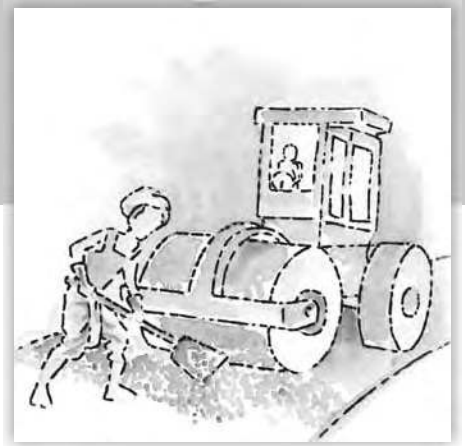
Suggested Readings

1. Dornbusch, R. and S. Fischer. 1990. *Macroeconomics*, (fifth edition) pages 63 – 105, McGraw Hill, Paris.



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Chapter 5



The Government: Functions and Scope

In a mixed economy, apart from the private sector, there is the government which plays a very important role. In this chapter, we shall not deal with the myriad ways in which it influences economic life but limit ourselves to three distinct functions that operate through the revenue and expenditure measures of the government budget.

First, certain goods, referred to as **public goods** (such as national defence, roads, government administration), as distinct from **private goods** (like clothes, cars, food items), cannot be provided through the market mechanism, i.e. by transactions between individual consumers and producers and must be provided by the government. This is the **allocation function**.

Second, through its tax and expenditure policy, the government attempts to bring about a distribution of income that is considered 'fair' by society. The government affects the personal disposable income of households by making transfer payments and collecting taxes and, therefore, can alter the income distribution. This is the **distribution function**.

Third, the economy tends to be subject to substantial fluctuations and may suffer from prolonged periods of unemployment or inflation. The overall level of employment and prices in the economy depends upon the level of aggregate demand which is a function of the spending decisions of millions of private economic agents apart from the government. These decisions, in turn, depend on many factors such as income and credit availability. In any period, the level of expenditures may not be sufficient for full utilisation of labour and other resources of the economy. Since wages and prices are generally rigid downwards (they do not fall below a level), employment cannot be restored automatically. Hence, policy measures are needed to raise aggregate demand. On the other hand, there may be times when expenditures exceed the available output under conditions of high employment and thus may cause inflation. In such situations, restrictive conditions are needed to reduce demand. These constitute the *stabilisation* requirements of the domestic economy.

To understand the need for governmental provision of public goods, we must consider what distinguishes them from private goods. There are two major differences. One, the benefits of public goods are not limited to one particular consumer, as in the case of private goods, but become available to all. For instance, if a

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person consumes a chocolate or wears a shirt, these will not be available to other individuals. This person's consumption stands in a rival relationship to the consumption of others. However, if we consider a public park or measures to reduce air pollution, the benefits will be available to all. The consumption of such products by several individuals is not 'rivalrous' in the sense that a person can enjoy the benefits without reducing their availablity to others. Two, in case of private goods anyone who does not pay for the good can be excluded from enjoying its benefits. If you do not buy a ticket, you are excluded from watching a film at a local theatre. However, in case of public goods, there is no feasible way of excluding anyone from enjoying the benefits of the good (they are non-excludable). Since non-paying users usually cannot be excluded, it becomes difficult or impossible to collect fees for the public good. This is what is called the 'free-rider' problem. Consumers will not voluntarily pay for what they can get for free and for which there is no exclusive title to the property being enjoyed. The link between the producer and the consumer is broken and the government must step in to provide for such goods. Public provision, however, is not the same as public production. **Public provision** means that they are financed through the budget and made available free of any direct payment. These goods may be produced directly under government management or by the private sector.

The chapter proceeds as follows. In section 5.1, we present the components of the government budget to bring out the sources of government revenue and the avenues of government spending. In section 5.2, we discuss the issue of government deficit, when expenditures exceed revenue collection. Section 5.3 deals with fiscal policy and the multiplier process within the income expenditure approach described earlier. Government borrowing to cover deficits leads to debt accumulation – what the government owes. The chapter concludes with an analysis of the debt issue.

5.1 Components of the Government Budget

There is a constitutional requirement in India (Article 112) to present before the Parliament a statement of estimated receipts and expenditures of the government in respect of every financial year which runs from 1 April to 31 March. This 'Annual Financial Statement' constitutes the main budget document. Further, the budget must distinguish expenditure on the revenue account from other expenditures. Therefore, the budget comprises of the (a) Revenue Budget and the (b) Capital Budget (Refer Chart 1).

5.1.1 The Revenue Account

The Revenue Budget shows the current receipts of the government and the expenditure that can be met from these receipts.

Revenue Receipts: Revenue receipts are divided into tax and non-tax revenues. Tax revenues consist of the proceeds of taxes and other duties levied by the central government. Tax revenues, an important component of revenue receipts, comprise of direct taxes – which fall directly on individuals (personal income tax) and firms (corporation tax), and indirect taxes like excise taxes (duties levied on goods produced within the country), customs duties (taxes imposed on goods imported into and exported out of India) and service tax. Excise taxes are the single largest revenue earner contributing 35.7 per cent of total tax revenue in 2003-04. Other direct taxes like wealth tax, gift tax and estate

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duty (now abolished) have never been of much significance in terms of revenue yield and have thus been referred to as 'paper taxes'. Two new taxes – the fringe benefits tax (on those benefits enjoyed collectively by the employees) and on cash withdrawals from banks over a certain threshold in a day – were introduced in the budget for 2005-06. The share of direct taxes in gross tax revenue has increased from 19.1 per cent in 1990-91 to 41.3 per cent in 2003-04. There has been a reduction in the share of indirect tax revenue, falling from 78.4 per cent in 1990-91 to 57.9 per cent in 2003-04.

The redistribution objective is sought to be achieved through progressive income taxation, in which higher the income, higher is the tax rate. Firms are taxed on a proportional basis, where the tax rate is a particular proportion of profits. With respect to excise taxes, necessities of life are exempted or taxed at low rates, comforts and semi-luxuries are moderately taxed, and luxuries, tobacco and petroleum products are taxed heavily.

Non-tax revenue of the central government mainly consists of interest receipts (on account of loans by the central government which constitutes the single largest item of non-tax revenue), dividends and profits on investments made by the government, fees and other receipts for services rendered by the government. Cash grants-in-aid from foreign countries and international organisations are also included.

The estimates of revenue receipts take into account the effects of tax proposals made in the Finance Bill[1].

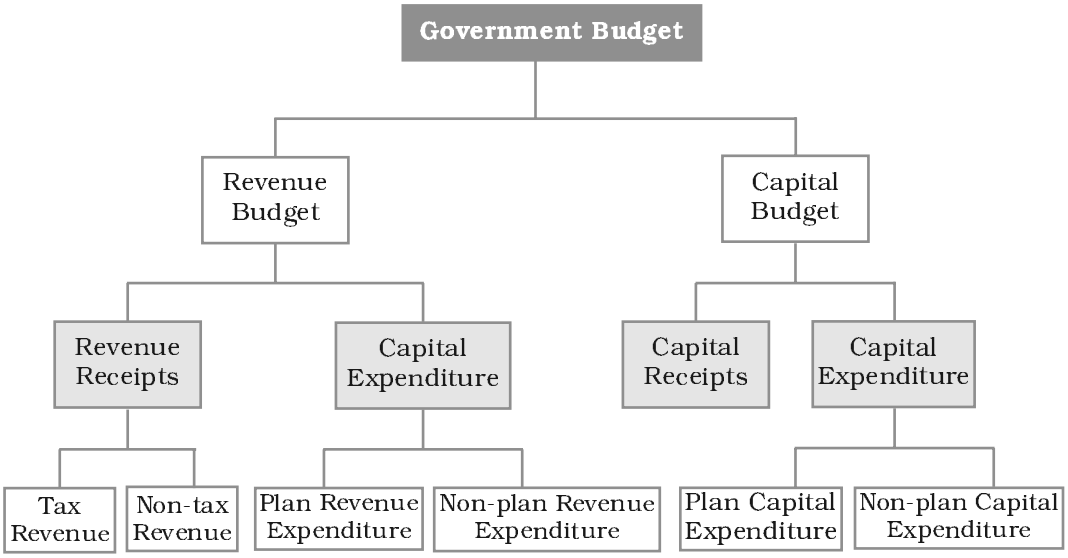


Chart 1: *The Components of the Government Budget*

Revenue Expenditure: Broadly speaking, revenue expenditure consists of all those expenditures of the government which do not result in creation of physical or financial assets. It relates to those expenses incurred for the normal functioning of the government departments and various services, interest payments on debt incurred by the government, and grants given to state governments and other parties (even though some of the grants may be meant for creation of assets).

[1]A Finance Bill, presented along with the Annual Financial Statement, provides details of the imposition, abolition, remission, alteration or regulation of taxes proposed in the Budget.

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Budget documents classify total revenue expenditure into **plan and non-plan expenditure**. Plan revenue expenditure relates to central Plans (the Five-Year Plans) and central assistance for State and Union Territory Plans. Non-plan expenditure, the more important component of revenue expenditure, covers a vast range of general, economic and social services of the government. The main items of non-plan expenditure are interest payments, defence services, subsidies, salaries and pensions.

Interest payments on market loans, external loans and from various reserve funds constitute the single largest component of non-plan revenue expenditure. They used up 41.5 per cent of revenue receipts in 2004-05. Defence expenditure, the second largest component of non-plan expenditure, is committed expenditure in the sense that given the national security concerns, there exists little scope for drastic reduction. Subsidies are an important policy instrument which aim at increasing welfare. Apart from providing implicit subsidies through under-pricing of public goods and services like education and health, the government also extends subsidies explicitly on items such as exports, interest on loans, food and fertilisers. The amount of subsidies as a per cent of GDP has been falling from 1.7 per cent in 1990-91 to 1.66 per cent in 2002-03 to 1.45 per cent in 2004-05.

5.1.2 The Capital Account

The Capital Budget is an account of the assets as well as liabilities of the central government, which takes into consideration changes in capital. It consists of capital receipts and capital expenditure of the government. This shows the capital requirements of the government and the pattern of their financing.

Capital Receipts: The main items of capital receipts are loans raised by the government from the public which are called market borrowings, borrowing by the government from the Reserve Bank and commercial banks and other financial institutions through the sale of treasury bills, loans received from foreign governments and international organisations, and recoveries of loans granted by the central government. Other items include small savings (Post-Office Savings Accounts, National Savings Certificates, etc), provident funds and net receipts obtained from the sale of shares in Public Sector Undertakings (PSUs).

Capital Expenditure: This includes expenditure on the acquisition of land, building, machinery, equipment, investment in shares, and loans and advances by the central government to state and union territory governments, PSUs and other parties. Capital expenditure is also categorised as plan and non-plan in the budget documents. Plan capital expenditure, like its revenue counterpart, relates to central plan and central assistance for state and union territory plans. Non-plan capital expenditure covers various general, social and economic services provided by the government.

The budget is not merely a statement of receipts and expenditures. Since Independence, with the launching of the Five-Year Plans, it has also become a significant national policy statement. The budget, it has been argued, reflects and shapes, and is, in turn, shaped by the country's economic life. Along with the budget, three policy statements are mandated by the Fiscal Responsibility and Budget Management Act, 2003 (FRBMA). The Medium-term Fiscal Policy Statement sets a three-year rolling target for specific fiscal indicators and examines whether revenue expenditure can be financed through revenue receipts on a sustainable basis and how productively capital receipts including market

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borrowings are being utilised. The Fiscal Policy Strategy Statement sets the priorities of the government in the fiscal area, examining current policies and justifying any deviation in important fiscal measures. The Macroeconomic Framework Statement assesses the prospects of the economy with respect to the GDP growth rate, fiscal balance of the central government and external balance[2].

5.1.3 Measures of Government Deficit

When a government spends more than it collects by way of revenue, it incurs a budget deficit[3]. There are various measures that capture government deficit and they have their own implications for the economy.

Revenue Deficit: The revenue deficit refers to the excess of government's revenue expenditure over revenue receipts

Revenue deficit = Revenue expenditure – Revenue receipts

The revenue deficit includes only such transactions that affect the current income and expenditure of the government. When the government incurs a revenue deficit, it implies that the government is dissaving and is using up the savings of the other sectors of the economy to finance a part of its consumption expenditure. This situation means that the government will have to borrow not only to finance its investment but also its consumption requirements. This will lead to a build up of stock of debt and interest liabilities and force the government, eventually, to cut expenditure. Since a major part of revenue expenditure is committed expenditure, it cannot be reduced. Often the government reduces productive capital expenditure or welfare expenditure. This would mean lower growth and adverse welfare implications.

Fiscal Deficit: Fiscal deficit is the difference between the government's total expenditure and its total receipts excluding borrowing

Gross fiscal deficit = Total expenditure – (Revenue receipts + Non-debt creating capital receipts)

Non-debt creating capital receipts are those receipts which are not borrowings and, therefore, do not give rise to debt. Examples are recovery of loans and the proceeds from the sale of PSUs. The fiscal deficit will have to be financed through borrowing. Thus, it indicates the total borrowing requirements of the government from all sources. From the financing side

Gross fiscal deficit = Net borrowing at home + Borrowing from RBI + Borrowing from abroad

Net borrowing at home includes that directly borrowed from the public through debt instruments (for example, the various small savings schemes) and indirectly from commercial banks through Statutory Liquidity Ratio (SLR). The fiscal deficit of the central government, after declining from 6.6 per cent of GDP in 1990-91 to 4.1 per cent in 1996-97 rose to 6.2 per cent

[2]The 2005-06 Indian Budget introduced a statement highlighting the gender sensitivities of the budgetary allocations. Gender budgeting is an exercise to translate the stated gender commitments of the government into budgetary commitments, involving special initiatives for empowering women and examination of the utilisation of resources allocated for women and the impact of public expenditure and policies of the government on women. The 2006-07 budget enlarged the earlier statement.

[3]More formally, it refers to the excess of total expenditure (both revenue and capital) over total receipts (both revenue and capital). From the 1997-98 budget, the practice of showing budget deficit has been discontinued in India.

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in 2001-02 (Table 5.1). Under the constraint imposed by the FRBMA, the fiscal deficit as well as the revenue deficit have fallen to 4.1 per cent and 2.5 per cent respectively in 2004-05 (provisional figures). The increasing share of the revenue deficit as a proportion of the fiscal deficit (which was 49.4 per cent in 1990-91 but has increased to 79.7 in 2003-04) indicates the rapid decline in the quality of the deficit.

Table 5.1: Receipts and Expenditures of the Central Government

(As per cent of GDP)	*1990 -91*	*2000 -01*	*2001 -02*	*2002 -03*	*2003 -04*
1. Revenue Receipts(a+b)	9.7	9.1	8.8	9.4	9.6
(a) Tax revenue(net of states' share)	7.6	6.5	5.9	6.5	6.8
(b) Non-tax revenue	2.1	2.7	3.0	3.0	2.8
2. Revenue Expenditure	12.9	13.2	13.2	13.8	13.1
(a) Interest payments	3.8	4.7	4.7	4.8	4.5
(b) Major subsidies	1.7	1.2	1.3	1.7	1.6
(c) Defence expenditure	1.9	1.8	1.7	1.7	1.6
3. Revenue Deficit(2–1)	3.3	4.0	4.4	4.4	3.6
4. Capital Receipts(a+b+c)	5.6	6.3	7.1	7.4	7.5
(a) Recovery of loans	1.0	0.6	0.7	1.4	2.4
(b) Other receipts(mainly PSU disinvestment)	0.0	0.1	0.2	0.1	0.6
(c) Borrowings and other liabilities	4.6	5.6	6.2	5.9	4.5
5. Capital Expenditure	4.4	2.3	2.7	3.0	4.0
6. Total Expenditure [(2+5=6(a)+6(b)]	17.3	15.4	15.9	16.9	17.1
(a) Plan expenditure	5.0	3.9	4.4	4.6	4.4
(b) Non-plan expenditure	12.3	11.5	11.4	12.3	12.6
7. Fiscal Deficit [6–1–4(a)–4(b)]	6.6	5.6	6.2	5.9	4.5
8. Primary Deficit [7–2(a)]	2.8	0.9	1.5	1.1	0.0

Source: *Economic Survey*, 2005-06

***Primary Deficit*:** We must note that the borrowing requirement of the government includes interest obligations on accumulated debt. To obtain an estimate of borrowing on account of current expenditures exceeding revenues, we need to calculate what has been called the primary deficit. It is simply the fiscal deficit minus the interest payments

Gross primary deficit = Gross fiscal deficit – net interest liabilities

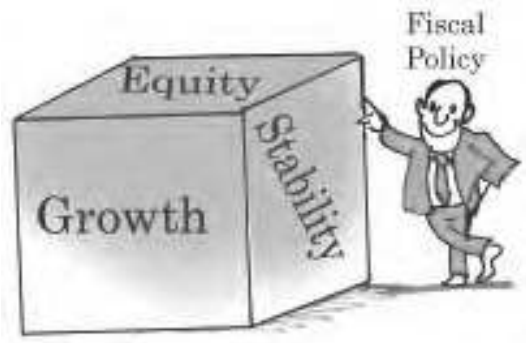
Net interest liabilities consist of interest payments minus interest receipts by the government on net domestic lending.

5.2 Fiscal Policy

One of Keynes's main ideas in *The General Theory of Employment, Interest and Money* was that government fiscal policy should be used to stabilise the level of output and employment. Through changes in its expenditure and taxes, the government attempts to increase output and income and seeks to stabilise the ups and downs in the economy. In the process, fiscal policy creates a *surplus* (when total receipts exceed expenditure) or a *deficit budget* (when total



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How does the Fiscal Policy try to achieve its three basic objectives?

expenditure exceed receipts) rather than a *balanced budget* (when expenditure equals receipts). In what follows, we study the effects of introducing the government sector in our earlier analysis of the determination of income.

The government directly affects the level of equilibrium income in two specific ways – government purchases of goods and services (G) increase aggregate demand and taxes, and transfers affect the relation between income (Y) and disposable income (YD) – the income available for consumption and saving with the households.

We take taxes first. We assume that the government imposes taxes that do not depend on income, called **lump-sum taxes** equal to T. We assume throughout the analysis that government makes a constant amount of transfers, $\bar{TR}$. The consumption function is now

$$C = \bar{C} + cYD = \bar{C} + c(Y - T + \bar{TR}) \tag{5.1}$$

where YD = disposable income.

We note that taxes lower disposable income and consumption. For instance, if one earns Rs 1 lakh and has to pay Rs 10,000 in taxes, she has the same disposable income as someone who earns Rs 90,000 but pays no taxes. The definition of aggregate demand augmented to include the government will be

$$AD = \bar{C} + c(Y - T + \bar{TR}) + I + G \tag{5.2}$$

Graphically, we find that the lump-sum tax shifts the consumption schedule downward in a parallel way and hence the aggregate demand curve shifts in a similar fashion. The income determination condition in the product market will be $Y = AD$, which can be written as

$$Y = \bar{C} + c(Y - T + \bar{TR}) + I + G \tag{5.3}$$

Solving for the equilibrium level of income, we get

$$Y^* = \frac{1}{1-c}(\bar{C} - cT + c\,\bar{TR} + I + G) \tag{5.4}$$

5.2.1 Changes in Government Expenditure

We consider the effects of increasing government purchases (G) keeping taxes constant. When G exceeds T, the government runs a deficit. Because G is a component of aggregate spending, planned aggregate expenditure will increase. The aggregate demand schedule shifts up to AD'. At the initial level of output, demand exceeds supply and firms expand production. The new equilibrium is at E'. The multiplier mechanism (described in Chapter 4) is in operation. The government spending multiplier is given by

$$\Delta Y = \frac{1}{1-c}\Delta G \tag{5.5}$$

or

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1-c} \tag{5.6}$$

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In Fig. 5.1, government expenditure increases from G to G' and causes equilibrium income to increase from Y to Y'.

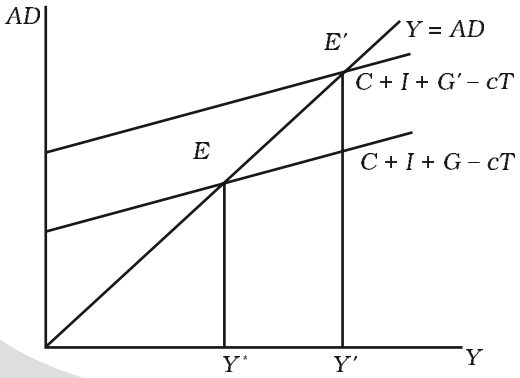


Fig. 5.1

Effect of Higher Government Expenditure

5.2.2 Changes in Taxes

We find that a cut in taxes increases disposable income $(Y-T)$ at each level of income. This shifts the aggregate expenditure schedule upwards by a fraction c of the decrease in taxes. This is shown in Fig 5.2.

From equation 5.3, we have

$$\Delta Y^* = \frac{1}{1-c}(-c)\Delta T \qquad (5.7)$$

The tax multiplier

$$= \frac{\Delta Y}{\Delta T} = \frac{-c}{1-c} \qquad (5.8)$$

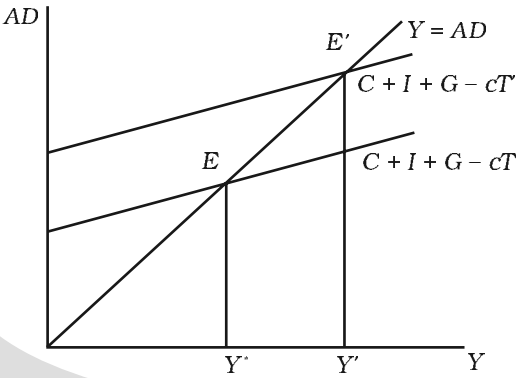


Fig. 5.2

Effect of a Reduction in Taxes

Because a tax cut (increase) will cause an increase (reduction) in consumption and output, the tax multiplier is a negative multiplier. Comparing equation (5.6) and (5.8), we find that the tax multiplier is smaller in absolute value compared to the government spending multiplier. This is because an increase in government spending directly affects total spending whereas taxes enter the multiplier process through their impact on disposable income, which influences household consumption (which is a part of total spending). Thus, with a ΔT reduction in taxes, consumption, and hence total spending, increases in the first instance by $c\Delta T$. To understand how the two multipliers differ, we consider the following example.



Why is the poor man crying? Suggest measures to wipe off his tears.

EXAMPLE 5.1

Assume that the marginal propensity to consume is 0.8. The government expenditure multiplier will then be $\frac{1}{1-c} = \frac{1}{1-0.8} = \frac{1}{0.2} = 5$. For an increase in government spending by 100, the equilibrium income will increase by 500 $(\frac{1}{1-c}\Delta G = 5 \times 100)$. The tax multiplier is given by $\frac{-c}{1-c} = \frac{-0.8}{1-0.8} = \frac{-0.8}{0.2} = -4$. A tax cut of 100 ($\Delta T = -100$) will increase

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equilibrium income by 400 ($\frac{-c}{1-c}\Delta T = -4 \times -100$). Thus, the equilibrium income increases in this case by less than the amount by which it increased under a G increase.

Within the present framework, if we take different values of the marginal propensity to consume and calculate the values of the two multipliers, we find that the tax multiplier is always one less in absolute value than the government expenditure multiplier. This has an interesting implication. If an increase in government spending is matched by an equal increase in taxes, so that the budget remains balanced, output will rise by the amount of the increase in government spending. Adding the two policy multipliers gives

$$\text{The balanced budget multiplier} = \frac{\Delta Y^*}{\Delta G} = \frac{1}{1-c} + \frac{-c}{1-c} = \frac{1-c}{1-c} = 1 \qquad (5.9)$$

A balanced budget multiplier of unity implies that a 100 increase in G financed by 100 increase in taxes increases income by just 100. This can be seen from Example 1 where an increase in G by 100 increases output by 500. A tax increase would reduce income by 400 with the net increase of income equal to 100. The equilibrium income refers to the final income that one arrives at in a period sufficiently long for all the rounds of the multipliers to work themselves out. We find that output increases by exactly the amount of increased G with no induced consumption spending due to increase in taxes. To see what must be at work, we examine the multiplier process. The increase in government spending by a certain amount raises income by that amount directly and then indirectly through the multiplier chain increasing income by

$$\Delta Y = \Delta G + c\Delta G + c^2\Delta G + \ldots = \Delta G\,(1 + c + c^2 + \ldots) \qquad (5.10)$$

But the tax increase only enters the multiplier process when the cut in disposable income reduces consumption by c times the reduction in taxes. Thus the effect on income of the tax increase is given by

$$\Delta Y = -c\Delta T - c^2\Delta T + \ldots = -\Delta T(c + c^2 + \ldots) \qquad (5.11)$$

The difference between the two gives the net effect on income. Since $\Delta G = \Delta T$, from 5.10 and 5.11, we get $\Delta Y = \Delta G$, that is, income increases by the amount by which government spending increases and the balanced budget multiplier is unity. This multiplier can also be derived from equation 5.3 as follows

$$\Delta Y = \Delta \bar{G} + c\,(\Delta Y - \Delta T) \text{ since investment does not change } (\Delta I = 0) \qquad (5.12)$$

Since $\Delta \bar{G} = \Delta T$, we have

$$\frac{\Delta Y}{\Delta G} = \frac{1-c}{1-c} = 1 \qquad (5.13)$$

Case of Proportional Taxes: A more realistic assumption would be that the government collects a constant fraction, t, of income in the form of taxes so that $T = tY$. The consumption function with proportional taxes is given by

$$C = \bar{C} + c\,(Y - tY + \bar{TR}) = \bar{C} + c\,(1-t)\,Y + c\bar{TR} \qquad (5.14)$$

We note that proportional taxes not only lower consumption at each level of income but also lower the slope of the consumption function. The mpc out of income falls to $c\,(1-t)$. The new aggregate demand schedule, AD', has a larger intercept but is flatter as shown in Fig. 5.3.

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Now we have

$$AD = \bar{C} + c(1-t)Y + c\bar{TR} + I + G = \bar{A} + c(1-t)Y \qquad (5.15)$$

Where $\bar{A}$ = autonomous expenditure and equals $\bar{C} + c\bar{TR} + I + G$. Income determination condition in the product market is, $Y = AD$, which can be written as

$$Y = \bar{A} + c(1-t)Y \qquad (5.16)$$

Solving for the equilibrium level of income

$$Y^* = \frac{1}{1-c(1-t)}\bar{A} \qquad (5.17)$$

so that the multiplier is given by

$$\frac{\Delta Y}{\Delta \bar{A}} = \frac{1}{1-c(1-t)} \qquad (5.18)$$

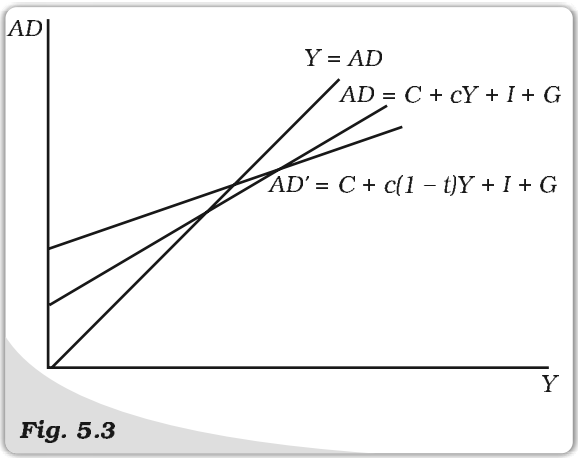


Fig. 5.3

Government and Aggregate Demand (proportional taxes make the AD schedule flatter)

Comparing this with the value of the multiplier with lump-sum taxes case, we find that the value has become smaller. When income rose as a result of an increase in government spending in the case of lump-sum taxes, consumption increased by c times the increase in income. With proportional taxes, consumption will rise by less, $(c - ct = c(1 - t))$ times the increase in income.

For changes in G, the multiplier will now be given by

$$\Delta Y = \Delta \bar{G} + c(1-t)\Delta Y \qquad (5.19)$$

$$\Delta Y = \frac{1}{1-c(1-t)}\Delta \bar{G} \qquad (5.20)$$

The income increases from Y^* to Y' as shown in Fig. 5.4.

The decrease in taxes works in effect like an increase in propensity to consume as shown in Fig. 5.5. The AD curve shifts up to AD'. At the initial level of income, aggregate demand for goods exceeds output because the tax reduction causes increased consumption. The new higher level of income is Y'.

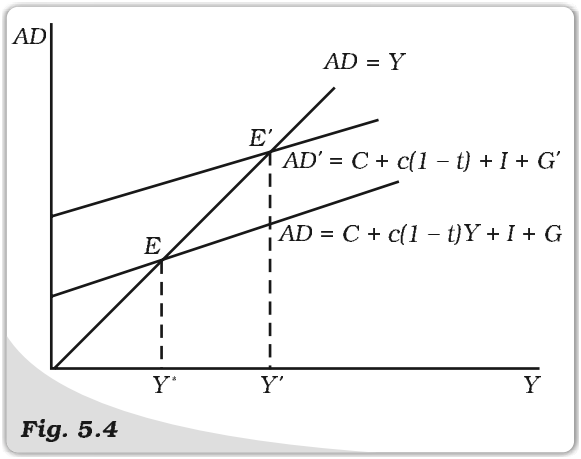


Fig. 5.4

Increase in Government Expenditure (with proportional taxes)

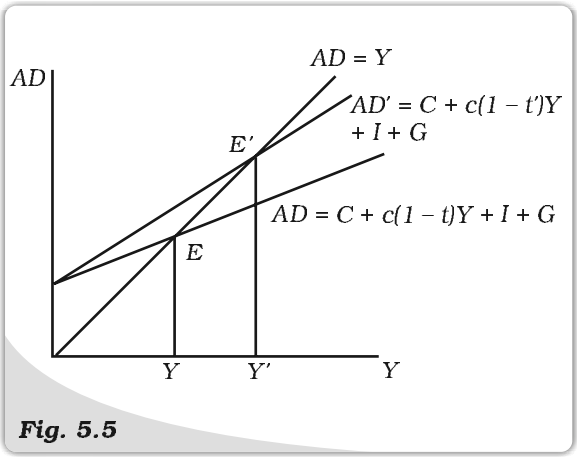


Fig. 5.5

Effects of a Reduction in the Proportional Tax Rate

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EXAMPLE 5.2

In Example 5.1, if we take a tax rate of 0.25, we find consumption will now rise by 0.60 ($c(1-t) = 0.8 \times 0.75$) for every unit increase in income instead of the earlier 0.80. Thus, consumption will increase by less than before. The government expenditure multiplier will be $\frac{1}{1-c(1-t)} = \frac{1}{1-0.6} = \frac{1}{0.4} = 2.5$ which is smaller than that obtained with lump-sum taxes. If government expenditure rises by 100, output will rise by the multiplier times the rise in government expenditure, that is, by $2.5 \times 100 = 250$. This is smaller than the increase in output with lump-sum taxes.

The proportional income tax, thus, acts as an **automatic stabiliser** – a shock absorber because it makes disposable income, and thus consumer spending, less sensitive to fluctuations in GDP. When GDP rises, disposable income also rises but by less than the rise in GDP because a part of it is siphoned off as taxes. This helps limit the upward fluctuation in consumption spending. During a recession when GDP falls, disposable income falls less sharply, and consumption does not drop as much as it otherwise would have fallen had the tax liability been fixed. This reduces the fall in aggregate demand and stabilises the economy.

We note that these fiscal policy instruments can be varied to offset the effects of undesirable shifts in investment demand. That is, if investment falls from I_0 to I_1, government spending can be raised from G_0 to G_1 so that autonomous expenditure ($C + I_0 + G_0 = C + I_1 + G_1$) and equilibrium income remain the same. This deliberate action to stabilise the economy is often referred to as **discretionary fiscal policy** to distinguish it from the inherent automatic stabilising properties of the fiscal system. As discussed earlier, proportional taxes help to stabilise the economy against upward and downward movements. Welfare transfers also help to stabilise income. During boom years, when employment is high, tax receipts collected to finance such expenditure increase exerting a stabilising pressure on high consumption spending; conversely, during a slump, these welfare payments help sustain consumption. Further, even the private sector has built-in stabilisers. Corporations maintain their dividends in the face of a change in income in the short run and households try to maintain their previous living standards. All these work as shock absorbers without the need for any decision-maker to take action. That is, they work automatically. The built-in stabilisers, however, reduce only part of the fluctuation in the economy, the rest must be taken care of by deliberate policy initiative.

Transfers: We suppose that instead of raising government spending in goods and services, government increases transfer payments, $\bar{TR}$. Autonomous spending, $\bar{A}$, will increase by $c\Delta\bar{TR}$, so output will rise by less than the amount by which it increases when government expenditure increases because a part of any increase in transfer payments is saved. The change in equilibrium income for a change in transfers is given by

$$\Delta Y = \frac{c}{1-c}\Delta TR \tag{5.21}$$

or

$$\frac{\Delta Y}{\Delta TR} = \frac{c}{1-c} \tag{5.22}$$

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EXAMPLE 5.3

We suppose that the marginal propensity to consume is 0.75 and we have lump-sum taxes. The change in equilibrium income when government purchases increase by 20 is given by $\Delta Y = \frac{1}{1-0.75}\Delta G = 4 \times 20 = 80$. When taxes increase by 30, equilibrium income will decrease by 90 because $\Delta Y = \frac{-0.75}{1-0.75}\Delta T = -3 \times 30 = -90$. An increase in transfers of 20 will raise equilibrium income by $\Delta Y = \frac{0.75}{1-0.75}\Delta TR = 3 \times 20 = 60$. Thus, we find that income increases by less than it increased with a rise in government purchases.

5.2.3 Debt

Budgetary deficits must be financed by either taxation, borrowing or printing money. Governments have mostly relied on borrowing, giving rise to what is called government debt. The concepts of deficits and debt are closely related. Deficits can be thought of as a *flow* which add to the *stock* of debt. If the government continues to borrow year after year, it leads to the accumulation of debt and the government has to pay more and more by way of interest. These interest payments themselves contribute to the debt.

Perspectives on the Appropriate Amount of Government Debt: There are two interlinked aspects of the issue. One is whether government debt is a burden and two, the issue of financing the debt. The burden of debt must be discussed keeping in mind that what is true of one small trader's debt may not be true for the government's debt, and one must deal with the 'whole' differently from the 'part'. Unlike any one trader, the government can raise resources through taxation and printing money.

By borrowing, the government transfers the burden of reduced consumption on future generations. This is because it borrows by issuing bonds to the people living at present but may decide to pay off the bonds some twenty years later by raising taxes. These may be levied on the young population that have just entered the work force, whose disposable income will go down and hence consumption. Thus, national savings, it was argued, would fall. Also, government borrowing from the people reduces the savings available to the private sector. To the extent that this reduces capital formation and growth, debt acts as a 'burden' on future generations.

Traditionally, it has been argued that when a government cuts taxes and runs a budget deficit, consumers respond to their after-tax income by spending more. It is possible that these people are short-sighted and do not understand the implications of budget deficits. They may not realise that at some point in the future, the government will have to raise taxes to pay off the debt and accumulated interest. Even if they comprehend this, they may expect the future taxes to fall not on them but on future generations.

A counter argument is that consumers are forward-looking and will base their spending not only on their current income but also on their expected future income. They will understand that borrowing today means higher taxes in the future. Further, the consumer will be concerned about future generations because they are the children and grandchildren of the present generation and the family which is the relevant decision making unit, continues living. They would increase savings now, which will fully offset the increased government dissaving so that national savings do not change. This



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view is called **Ricardian equivalence** after one of the greatest nineteenth century economists, David Ricardo, who first argued that in the face of high deficits, people save more. It is called 'equivalence' because it argues that taxation and borrowing are equivalent means of financing expenditure. When the government increases spending by borrowing today, which will be repaid by taxes in the future, it will have the same impact on the economy as an increase in government expenditure that is financed by a tax increase today.

It has often been argued that 'debt does not matter because we owe it to ourselves'. This is because although there is a transfer of resources between generations, purchasing power remains within the nation. However, any debt that is owed to foreigners involves a burden since we have to send goods abroad corresponding to the interest payments.

***Other Perspectives on Deficits and Debt*:** One of the main criticisms of deficits is that they are inflationary. This is because when government increases spending or cuts taxes, aggregate demand increases. Firms may not be able to produce higher quantities that are being demanded at the ongoing prices. Prices will, therefore, have to rise. However, if there are unutilised resources, output is held back by lack of demand. A high fiscal deficit is accompanied by higher demand and greater output and, therefore, need not be inflationary.

It has been argued that there is a decrease in investment due to a reduction in the amount of savings available to the private sector. This is because if the government decides to borrow from private citizens by issuing bonds to finance its deficits, these bonds will compete with corporate bonds and other financial instruments for the available supply of funds. If some private savers decide to buy bonds, the funds remaining to be invested in private hands will be smaller. Thus, some private borrowers will get 'crowded out' of the financial markets as the government claims an increasing share of the economy's total savings. However, one must note that the economy's flow of savings is not really fixed unless we assume that income cannot be augmented. If government deficits succeed in their goal of raising production, there will be more income and, therefore, more saving. In this case, both government and industry can borrow more.

Also, if the government invests in infrastructure, future generations may be better off, provided the return on such investments is greater than the rate of interest. The actual debt could be paid off by the growth in output. The debt should not then be considered burdensome. The growth in debt will have to be judged by the growth of the economy as a whole.

***Deficit Reduction*:** Government deficit can be reduced by an increase in taxes or reduction in expenditure. In India, the government has been trying to increase tax revenue with greater reliance on direct taxes (indirect taxes are regressive in nature – they impact all income groups equally). There has also been an attempt to raise receipts through the sale of shares in PSUs. However, the major thrust has been towards reduction in government expenditure. This could be achieved through making government activities more efficient through better planning of programmes and better administration. A recent study[4] by the Planning Commission has estimated that to transfer Re1 to the poor, government spends Rs 3.65 in the form of food subsidy, showing that cash transfers would lead to increase in welfare. The other way is to change the scope of the government by withdrawing from some of the areas where it

[4]"Performance Evaluation of the Targeted Public Distribution System" by the Programme Evaluation Organisation, Planning Commission.

operated before. Cutting back government programmes in vital areas like agriculture, education, health, poverty alleviation, etc. would adversely affect the economy. Governments in many countries run huge deficits forcing them to eventually put in place self-imposed constraints of not increasing expenditure over pre-determined levels (Box 5.1 gives the main features of the FRBMA in India). These will have to be examined keeping in view the above factors. We must note that larger deficits do not always signify a more expansionary fiscal policy. The same fiscal measures can give rise to a large or small deficit, depending on the state of the economy. For example, if an economy experiences a recession and GDP falls, tax revenues fall because firms and households pay lower taxes when they earn less. This means that the deficit increases in a recession and falls in a boom, even with no change in fiscal policy.



Summary

1. Public goods, as distinct from private goods, are collectively consumed. Two important features of public goods are – they are non-rivalrous in that one person can increase her satisfaction from the good without reducing that obtained by others and they are non-excludable, and there is no feasible way of excluding anyone from enjoying the benefits of the good. These make it difficult to collect fees for their use and private enterprise will in general not provide these goods. Hence, they must be provided by the government.
2. The three functions of allocation, redistribution and stabilisation operate through the expenditure and receipts of the government.
3. The budget, which gives a statement of the receipts and expenditure of the government, is divided into the revenue budget and capital budget to distinguish between current financial needs and investment in the country's capital stock.
4. The growth of revenue deficit as a percentage of fiscal deficit points to a deterioration in the quality of government expenditure involving lower capital formation.
5. Proportional taxes reduce the autonomous expenditure multiplier because taxes reduce the marginal propensity to consume out of income.
6. Public debt is burdensome if it reduces future growth in output.

Key Concepts

Public goods
Automatic stabiliser
Discretionary fiscal policy
Ricardian equivalence

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Box 5.1: Fiscal Responsibility and Budget Management Act, 2003 (FRBMA)

In a multi-party parliamentary system, electoral concerns play an important role in determining expenditure policies. A legislative provision, it is argued, that is applicable to all governments – present and future – is likely to be effective in keeping deficits under control. The enactment of the FRBMA, in August 2003, marked a turning point in fiscal reforms, binding the

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government through an institutional framework to pursue a prudent fiscal policy. The central government must ensure inter-generational equity, long-term macro-economic stability by achieving sufficient revenue surplus, removing fiscal obstacles to monetary policy and effective debt management by limiting deficits and borrowing. The rules under the Act were notified with effect from July, 2004.

Main Features

1. The Act mandates the central government to take appropriate measures to reduce fiscal deficit and revenue deficits so as to eliminate the revenue deficit by March 31, 2009 and thereafter build up adequate revenue surplus.
2. It requires the reduction in fiscal deficit by 0.3 per cent of GDP each year and the revenue deficit by 0.5 per cent. If this is not achieved through tax revenues, the necessary adjustment has to come from a reduction in expenditure.
3. The actual deficits may exceed the targets specified only on grounds of national security or natural calamity or such other exceptional grounds as the central government may specify.
4. The central government shall not borrow from the Reserve Bank of India except by way of advances to meet temporary excess of cash disbursements over cash receipts.
5. The Reserve Bank of India must not subscribe to the primary issues of central government securities from the year 2006-07.
6. Measures to be taken to ensure greater transparency in fiscal operations.
7. The central government to lay before both Houses of Parliament three statements–Medium-term Fiscal Policy Statement, The Fiscal Policy Strategy Statement, The Macroeconomic Framework Statement along with the Annual Financial Statement.
8. Quarterly review of the trends in receipts and expenditure in relation to the budget be placed before both Houses of Parliament.

The Act applies only to the central government. Though few states like Karnataka, Kerala, Punjab, Tamil Nadu and Uttar Pradesh have enacted fiscal responsibility legislations, the objective of fiscal consolidation, growth and macroeconomic stability will not be achieved if all the states do not participate. However, though there has been an effort by the government to widen the tax net and ensure better compliance, there have been fears that welfare expenditure may get reduced to meet the targets mandated by the Act.

Exercises

1. Explain why public goods must be provided by the government.
2. Distinguish between revenue expenditure and capital expenditure.
3. 'The fiscal deficit gives the borrowing requirement of the government'. Elucidate.
4. Give the relationship between the revenue deficit and the fiscal deficit.
5. Suppose that for a particular economy, investment is equal to 200, government purchases are 150, net taxes (that is lump-sum taxes minus transfers) is 100 and consumption is given by $C = 100 + 0.75Y$ (a) What is the level of equilibrium income? (b) Calculate the value of the government expenditure multiplier and the tax multiplier. (c) If government expenditure increases by 200, find the change in equilibrium income.
6. Consider an economy described by the following functions: $C = 20 + 0.80Y$, $I = 30$, $G = 50$, $TR = 100$ (a) Find the equilibrium level of income and the

autonomous expenditure multiplier in the model. (b) If government expenditure increases by 30, what is the impact on equilibrium income? (c) If a lump-sum tax of 30 is added to pay for the increase in government purchases, how will equilibrium income change?

7. In the above question, calculate the effect on output of a 10 per cent increase in transfers, and a 10 per cent increase in lump-sum taxes. Compare the effects of the two.
8. We suppose that $C = 70 + 0.70Y\ D$, $I = 90$, $G = 100$, $T = 0.10Y$ (a) Find the equilibrium income. (b) What are tax revenues at equilibrium income? Does the government have a balanced budget?
9. Suppose marginal propensity to consume is 0.75 and there is a 20 per cent proportional income tax. Find the change in equilibrium income for the following (a) Government purchases increase by 20 (b) Transfers decrease by 20.
10. Explain why the tax multiplier is smaller in absolute value than the government expenditure multiplier.
11. Explain the relation between government deficit and government debt.
12. Does public debt impose a burden? Explain.
13. Are fiscal deficits necessarily inflationary?
14. Discuss the issue of deficit reduction.

Suggested Readings

1. Dornbusch, R. and S. Fischer, 1994. *Macroeconomics*, sixth edition, McGraw-Hill, Paris.
2. Mankiw, N.G., 2000. *Macroeconomics*, fourth edition, Macmillan Worth publishers, New York.
3. *Economic Survey*, Government of India, various issues.

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Chapter 6



Open Economy Macroeconomics

So far, we have simplified the analysis of income determination by assuming a closed economy. In reality, most modern economies are open. Interaction with other economies of the world widens choice in three broad ways

(i) Consumers and firms have the opportunity to choose between domestic and foreign goods. This is the product market linkage which occurs through international trade.

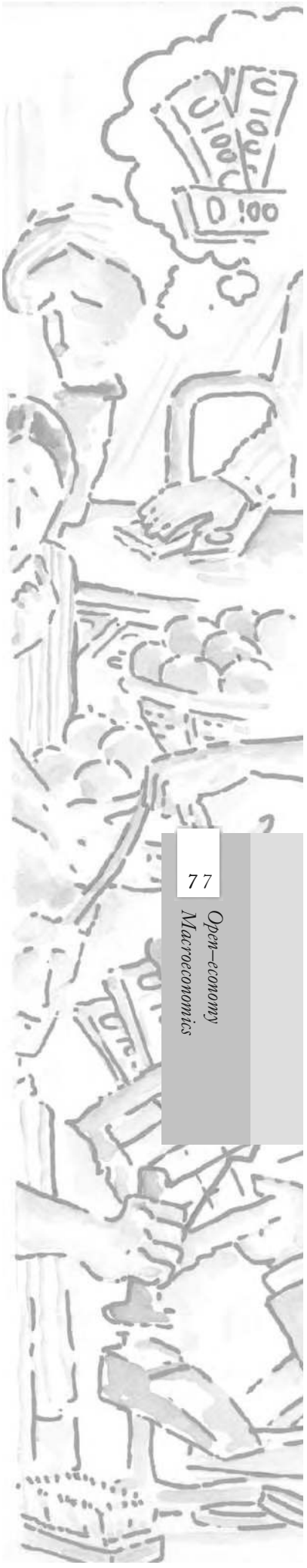
(ii) Investors have the opportunity to choose between domestic and foreign assets. This constitutes the financial market linkage.

(iii) Firms can choose where to locate production and workers to choose where to work. This is the factor market linkage. Labour market linkages have been relatively less due to various restrictions on the movement of people through immigration laws. Movement of goods has traditionally been seen as a substitute for the movement of labour. We focus here on the first two linkages.

An **open economy** is one that trades with other nations in goods and services and, most often, also in financial assets. Indians, for instance, enjoy using products produced around the world and some of our production is exported to foreign countries. Foreign trade, therefore, influences Indian aggregate demand in two ways. First, when Indians buy foreign goods, this spending escapes as a **leakage** from the circular flow of income decreasing aggregate demand. Second, our exports to foreigners enter as an **injection** into the circular flow, increasing aggregate demand for domestically produced goods. Total foreign trade (exports + imports) as a proportion of GDP is a common measure of the **degree of openness** of an economy. In 2004-2005, this was 38.9 per cent for the Indian economy (imports constituted 17.1 per cent and exports 11.8 per cent of GDP). This is substantially higher than a total of 16 per cent that prevailed in 1985-86. However, in comparison to other countries, India is relatively less open. There are several countries whose foreign trade proportions are above 50 per cent of GDP.

Now, when goods move across national borders, **money** must move in the opposite direction. At the international level, there is no single currency that is issued by a central authority. Foreign economic agents will accept a national currency only if they are convinced that the currency will maintain a stable purchasing power. Without this confidence, a currency will not be used as an

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international medium of exchange and unit of account since there is no international authority with the power to force the use of a particular currency in international transactions. Governments have tried to gain confidence of potential users by announcing that the national currency will be freely convertible at a fixed price into another asset, over whose value the issuing authority has no control. This other asset most often has been gold, or other national currencies. There are two aspects of this commitment that has affected its credibility – the ability to convert freely in unlimited amounts and the price at which conversion takes place. The **international monetary system** has been set up to handle these issues and ensure stability in international transactions. A nation's commitment regarding the above two issues will affect its trade and financial interactions with the rest of the world.

We begin section 6.1 with the accounting of international trade and financial flows. The next section examines the determination of price at which national currencies are exchanged for each other. In section 6.3, the closed economy income-expenditure model is amended to include international effects.

6.1 The Balance of Payments

The balance of payments (BoP) record the transactions in goods, services and assets between residents of a country with the rest of the world. There are two main accounts in the BoP – the current account and the capital account.

The **current account** records exports and imports in goods and services and transfer payments. Trade in services denoted as invisible trade (because they are not seen to cross national borders) includes both factor income (payment for inputs-investment income, that is, the interest, profits and dividends on our assets abroad minus the income foreigners earn on assets they own in India) and non-factor income (shipping, banking, insurance, tourism, software services, etc.). Transfer payments are receipts which the residents of a country receive 'for free', without having to make any present or future payments in return. They consist of remittances, gifts and grants. They could be official or private. The balance of exports and imports of goods is referred to as the **trade balance**. Adding trade in services and net transfers to the trade balance, we get the **current account balance**. The capital account records all international purchases and sales of assets such as money, stocks, bonds, etc. We note that any transaction resulting in a payment to foreigners is entered as a **debit** and is given a negative sign. Any transaction resulting in a receipt from foreigners is entered as a **credit** and is given a positive sign.

6.1.1 BoP Surplus and Deficit

The essence of international payments is that just like an individual who spends more than her income must finance the difference by selling assets or by borrowing, a country that has a deficit in its current account (spending more abroad than it receives from sales to the rest of the world) must finance it by selling assets or by borrowing abroad. Thus, any current account deficit is of necessity **financed** by a net capital inflow. Table 6.1 (given at the end of chapter) shows that there has been a trade deficit throughout the period and a surplus in invisibles except for 1990-91. The current account deficit (which has been observed for 24 years from 1977-78) had started shrinking and turned into surplus from 2001-02. The surplus continued till 2003-04, but turned into a deficit in 2004-05. The large trade deficit could not be bridged by the invisibles surplus. In April-September 2005-06, the current account deficit of

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US$13 billion was financed by a capital inflow of US$19.5 billion, the extra capital inflow of US$ 6.5 billion being added to our stock of foreign exchange.

Alternatively, the country could engage in **official reserve transactions**, running down its reserves of foreign exchange, in the case of a deficit by selling foreign currency in the foreign exchange market. The decrease (increase) in official reserves is called the overall balance of payments deficit (surplus). The basic premise is that the monetary authorities are the ultimate financiers of any deficit in the balance of payments (or the recipients of any surplus). A country is said to be in balance of payments equilibrium when the sum of its current account and its non-reserve capital account equals zero, so that the current account balance is financed entirely by international lending without reserve movements. We note that the official reserve transactions are more relevant under a regime of pegged exchange rates than when exchange rates are floating.

***Autonomous and Accommodating Transactions*:** International economic transactions are called **autonomous** when transactions are made independently of the state of the BoP (for instance due to profit motive). These items are called 'above the line' items in the BoP. The balance of payments is said to be in surplus (deficit) if autonomous receipts are greater (less) than autonomous payments. **Accommodating transactions** (termed 'below the line' items), on the other hand, are determined by the net consequences of the autonomous items, that is, whether the BoP is in surplus or deficit. The official reserve transactions are seen as the accommodating item in the BoP (all others being autonomous).

Errors and Omissions constitute the third element in the BoP (apart from the current and capital accounts) which is the 'balancing item' reflecting our inability to record all international transactions accurately.

6.2 The Foreign Exchange Market

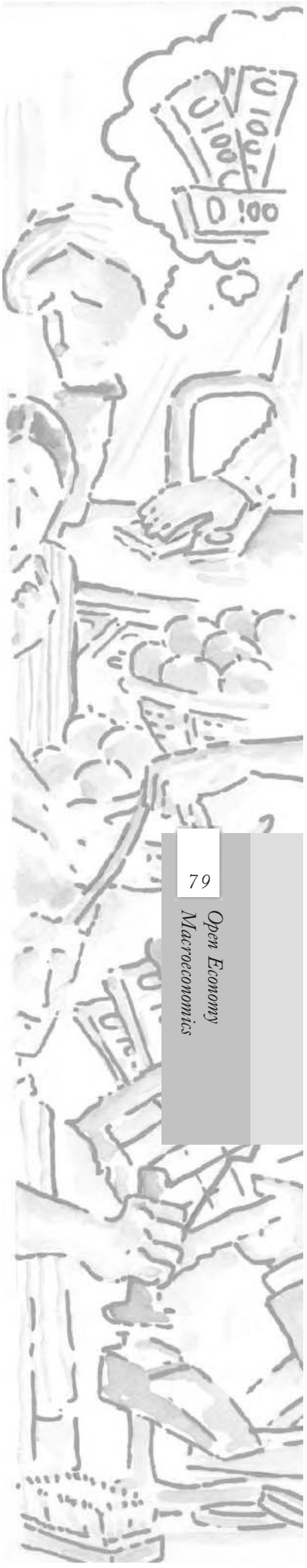


Your currency in exchange for the dollar? Should exchange rates between two currencies continue like this? Discuss.

Having considered accounting of international transactions on the whole, we will now take up a single transaction. Let us assume that an Indian resident wants to visit London on a vacation (an import of tourist services). She will have to pay in pounds for her stay there. She will need to know *where* to obtain the pounds and at what price. Her demand for pounds would constitute a demand for *foreign exchange* which would be supplied in the *foreign exchange market* – the market in which national currencies are traded for one another. The major participants in this market are commercial banks, foreign exchange brokers and other authorised dealers and the monetary authorities. It is important to note that, although the participants themselves may have their own trading centres, the market itself is world-wide. There is close and continuous contact between the trading centres and the participants deal in more than one market.

The price of one currency in terms of the other is known as the **exchange rate**. Since there is a symmetry between the two currencies, the exchange rate may be defined in one of the two ways. First, as the amount of domestic currency required to buy one unit of foreign currency, i.e. a rupee-dollar exchange rate of

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Rs 50 means that it costs Rs 50 to buy one dollar, and second, as the cost in foreign currency of purchasing one unit of domestic currency. In the above case, we would say that it costs 2 cents to buy a rupee. The practice in economic literature, however, is to use the former definition – as the price of foreign currency in terms of domestic currency. This is the bilateral **nominal exchange rate** – bilateral in the sense that they are exchange rates for one currency against another and they are nominal because they quote the exchange rate in money terms, i.e. so many rupees per dollar or per pound.

However, returning to our example, if one wants to plan a trip to London, she needs to know how expensive British goods are relative to goods at home. The measure that captures this is the **real exchange rate** – the ratio of foreign to domestic prices, measured in the same currency. It is defined as

$$\text{Real exchange rate} = \frac{eP_f}{P} \qquad (6.1)$$

where P and P_f are the price levels here and abroad, respectively, and e is the rupee price of foreign exchange (the nominal exchange rate). The numerator expresses prices abroad measured in rupees, the denominator gives the domestic price level measured in rupees, so the real exchange rate measures prices abroad relative to those at home. If the real exchange rate is equal to one, currencies are at **purchasing power parity**. This means that goods cost the same in two countries when measured in the same currency. For instance, if a pen costs $4 in the US and the nominal exchange rate is Rs 50 per US dollar, then with a real exchange rate of 1, it should cost Rs 200 ($eP_f = 50 \times 4$) in India. If the real exchange rises above one, this means that goods abroad have become more expensive than goods at home. The real exchange rate is often taken as a measure of a country's **international competitiveness**.

Since a country interacts with many countries, we may want to see the movement of the domestic currency relative to all other currencies in a single number rather than by looking at bilateral rates. That is, we would want an index for the exchange rate against other currencies, just as we use a price index to show how the prices of goods in general have changed. This is calculated as the **Nominal Effective Exchange Rate** (NEER) which is a multilateral rate representing the price of a representative basket of foreign currencies, each weighted by its importance to the domestic country in international trade (the average of export and import shares is taken as an indicator of this). The **Real Effective Exchange Rate** (REER) is calculated as the weighted average of the real exchange rates of all its trade partners, the weights being the shares of the respective countries in its foreign trade. It is interpreted as the quantity of domestic goods required to purchase one unit of a given basket of foreign goods.

6.2.1 Determination of the Exchange Rate

The question arises as to why the foreign exchange rate[1] is at this level and what causes its movements? To understand the economic principles that lie behind exchange rate determination, we study the major exchange rate regimes[2] that have characterised the international monetary system. There has been a move from a regime of commitment of fixed-price convertibility to one without commitments where residents enjoy greater freedom to convert domestic currency into foreign currencies but do not enjoy a price guarantee.

[1]Between any two currencies

[2]An exchange rate regime or system is a set of international rules governing the setting of exchange rates.

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6.2.2 Flexible Exchange Rates

In a system of **flexible exchange rates** (also known as **floating exchange rates**), the exchange rate is determined by the forces of market demand and supply. In a completely flexible system, the central banks follow a simple set of rules – they do nothing to directly affect the level of the exchange rate, in other words they do not intervene in the foreign exchange market (and therefore, there are no official reserve transactions). The link between the balance of payments accounts and the transactions in the foreign exchange market is evident when we recognise that all expenditures by domestic residents on foreign goods, services and assets and all foreign transfer payments (debits in the BoP accounts) also represent demand for foreign exchange. The Indian resident buying a Japanese car pays for it in rupees but the Japanese exporter will expect to be paid in yen. So rupees must be exchanged for yen in the foreign exchange market. Conversely, all exports by domestic residents reflect equal earnings of foreign exchange. For instance, Indian exporters will expect to be paid in rupees and, to buy our goods, foreigners must sell their currency and buy rupees. Total credits in the BoP accounts are then equal to the supply of foreign exchange. Another reason for the demand for foreign exchange is for speculative purposes.

Let us assume, for simplicity, that India and the United States are the only countries in the world, so that there is only one exchange rate to be determined. The demand curve (DD) is downward sloping because a rise in the price of foreign exchange will increase the cost in terms of rupees of purchasing foreign goods. Imports will therefore decline and less foreign exchange will be demanded. For the supply of foreign exchange to increase as the exchange rate rises, the foreign demand for our exports must be more than **unit elastic**, meaning simply that a one per cent increase in the exchange rate (which results in a one per cent decline in the price of the export good to the foreign country buying our good) must result in an increase in demand of more than one per cent. If this condition is met, the rupee volume of our exports will rise more than proportionately to the rise in the exchange rate, and earnings in dollars (the supply of foreign exchange) will increase as the exchange rate rises. However, a vertical supply curve (with a unit elastic foreign demand for Indian exports) would not change the analysis. We note that here we are holding all prices other than the exchange rate constant.

In this case of flexible exchange rates without central bank intervention, the exchange rate moves to clear the market, to equate the demand for and supply of foreign exchange. In Fig.6.1, the equilibrium exchange rate is e^*.

If the demand for foreign exchange goes up due to Indians travelling abroad more often, or increasingly showing a preference for imported goods, the DD curve will shift upward and rightward. The resulting intersection would be at a higher exchange rate. Changes in the price of foreign exchange under flexible exchange

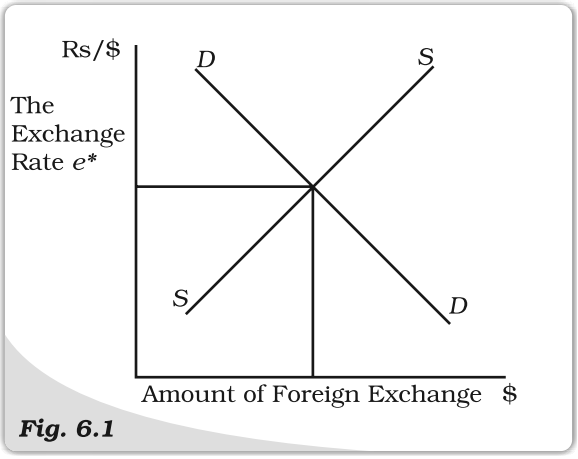


Fig. 6.1
Equilibrium under Flexible Exchange Rates

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rates are referred to as currency depreciation or appreciation. In the above case, the domestic currency (rupee) has **depreciated** since it has become less expensive in terms of foreign currency. For instance, if the equilibrium rupee-dollar exchange rate was Rs 45 and now it has become Rs 50 per dollar, the rupee has depreciated against the dollar. By contrast, the currency **appreciates** when it becomes more expensive in terms of foreign currency.

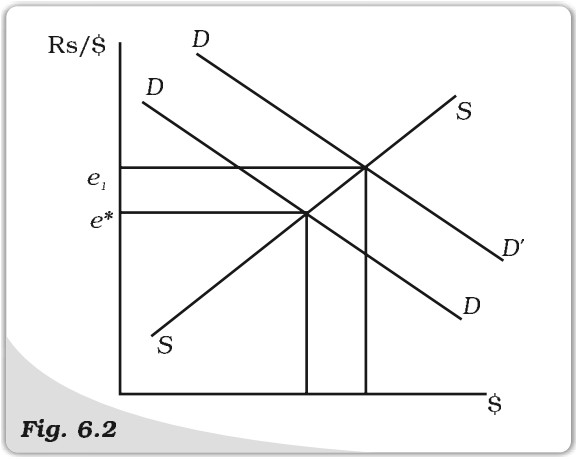


Fig. 6.2

Effect of an Increase in Demand for Imports in the Foreign Exchange Market

At the initial equilibrium exchange rate e^*, there is now an excess demand for foreign exchange. To clear the market, the exchange rate must rise to the equilibrium value e_1 as shown in Fig. 6.2. The rise in exchange rate (depreciation) will cause the quantity of import demand to fall since the rupee price of imported goods rises with the exchange rate. Also, the quantity of exports demanded will increase since the rise in the exchange rate makes exports less expensive to foreigners. At the new equilibrium with e_1, the supply and demand for foreign exchange is again equal.

***Speculation*:** Exchange rates in the market depend not only on the demand and supply of exports and imports, and investment in assets, but also on foreign exchange speculation where foreign exchange is demanded for the possible gains from appreciation of the currency. Money in any country is an asset. If Indians believe that the British pound is going to increase in value relative to the rupee, they will want to hold pounds. For instance, if the current exchange rate is Rs 80 to a pound and investors believe that the pound is going to appreciate by the end of the month and will be worth Rs 85, investors think if they took Rs 80,000 and bought 1,000 pounds, at the end of the month, they would be able to exchange the pounds for Rs 85,000, thus making a profit of Rs 5,000. This expectation would increase the demand for pounds and cause the rupee-pound exchange rate to increase in the present, making the beliefs self-fulfilling.

The above analysis assumes that interest rates, incomes and prices remain constant. However, these may change and that will shift the demand and supply curves for foreign exchange.

***Interest Rates and the Exchange Rate*:** In the short run, another factor that is important in determining exchange rate movements is the **interest rate differential** i.e. the difference between interest rates between countries. There are huge funds owned by banks, multinational corporations and wealthy individuals which move around the world in search of the highest interest rates. If we assume that government bonds in country A pay 8 per cent rate of interest whereas equally safe bonds in country B yield 10 per cent, the interest rate diferential is 2 per cent. Investors from country A will be attracted by the high interest rates in country B and will buy the currency of country B selling their own currency. At the same time investors in country B will also find investing in their own country more attractive and will therefore demand less



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of country A's currency. This means that the demand curve for country A's currency will shift to the left and the supply curve will shift to the right causing a depreciation of country A's currency and an appreciation of country B's currency. Thus, *a rise in the interest rates at home often leads to an appreciation of the domestic currency.* Here, the implicit assumption is that no restrictions exist in buying bonds issued by foreign governments.

***Income and the Exchange Rate*:** When income increases, consumer spending increases. Spending on imported goods is also likely to increase. When imports increase, the demand curve for foreign exchange shifts to the right. There is a depreciation of the domestic currency. If there is an increase in income abroad as well, domestic exports will rise and the supply curve of foreign exchange shifts outward. On balance, the domestic currency may or may not depreciate. What happens will depend on whether exports are growing faster than imports. In general, other things remaining equal, a country whose aggregate demand grows faster than the rest of the world's normally finds its currency depreciating because its imports grow faster than its exports. Its demand curve for foreign currency shifts faster than its supply curve.

***Exchange Rates in the Long Run*:** The Purchasing Power Parity (PPP) theory is used to make long-run predictions about exchange rates in a flexible exchange rate system. According to the theory, as long as there are no barriers to trade like tariffs (taxes on trade) and quotas (quantitative limits on imports), exchange rates should eventually adjust so that the same product costs the same whether measured in rupees in India, or dollars in the US, yen in Japan and so on, except for differences in transportation. Over the long run, therefore, exchange rates between any two national currencies adjust to reflect differences in the price levels in the two countries.

EXAMPLE 6.1

If a shirt costs $8 in the US and Rs 400 in India, the rupee-dollar exchange rate should be Rs 50. To see why, at any rate higher than Rs 50, say Rs 60, it costs Rs 480 per shirt in the US but only Rs 400 in India. In that case, all foreign customers would buy shirts from India. Similarly, any exchange rate below Rs 50 per dollar will send all the shirt business to the US. Next, we suppose that prices in India rise by 20 per cent while prices in the US rise by 50 per cent. Indian shirts would now cost Rs 480 per shirt while American shirts cost $12 per shirt. For these two prices to be equivalent, $12 must be worth Rs 480, or one dollar must be worth Rs 40. The dollar, therefore, has depreciated.

According to the PPP theory, differences in the domestic inflation and foreign inflation are a major cause of adjustment in exchange rates. *If one country has higher inflation than another, its exchange rate should be depreciating.*

However, we note that if American prices rise faster than Indian prices and, at the same time, countries erect tariff barriers to keep Indian shirts out (but not American ones), the dollar may not depreciate. Also, there are many goods that are not tradeable and inflation rates for them will not matter. Further, few goods that different countries produce and trade are uniform or identical. Most economists contend that other factors are more important than relative prices for exchange rate determination in the short run. However, in the long run, purchasing power parity plays an important role.

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6.2.3 Fixed Exchange Rates

Countries have had flexible exchange rate system ever since the breakdown of the Bretton Woods system in the early 1970s. Prior to that, most countries had fixed or what is called **pegged exchange rate system**, in which the exchange rate is pegged at a particular level. Sometimes, a distinction is made between the fixed and pegged exchange rates. It is argued that while the former is fixed, the latter is maintained by the monetary authorities, in that the value at which the exchange rate is pegged (the par value) is a policy variable – it may be changed. There is a common element between the two systems. Under a fixed exchange rate system, such as the gold standard, adjustment to BoP surpluses or deficits cannot be brought about through changes in the exchange rate. Adjustment must either come about 'automatically' through the workings of the economic system (through the mechanism explained by Hume, given below) or be brought about by the government. A pegged exchange rate system may, as long as the exchange rate is not changed, and is not expected to change, display the same characteristics. However, there is another option open to the government – it may change the exchange rate. A **devaluation** is said to occur when the exchange rate is increased by social action under a pegged exchange rate system. The opposite of devaluation is a **revaluation**. Or, the government may choose to leave the exchange rate unchanged and deal with the BoP problem by the use of monetary and fiscal policy. Most governments change the exchange rate very infrequently. In our analysis, we use the terms fixed and pegged exchange rates interchangeably to denote an exchange rate regime where the exchange rate is set by government decisions and maintained by government actions.

We examine the way in which a country can 'peg' or fix the level of its exchange rate. We assume that Reserve bank of India (RBI) wishes to fix an exact par value for the rupee at Rs 45 per dollar (e_1 in Fig. 6.3). Assuming that this official exchange rate is below the equilibrium exchange rate (here e^* = Rs 50) of the flexible exchange rate system, the rupee will be **overvalued** and the dollar **undervalued**. This means that if the exchange rate were market determined, the price of dollars in terms of rupees would have to rise to clear the market. At Rs 45 to a dollar, the rupee is more expensive than it would be at Rs 50 to a dollar (thinking of the rate in dollar-rupee terms, now each rupee costs 2.22 cents instead of 2 cents). At this rate, the demand for dollars is higher than the supply of dollars. Since the demand and supply schedules were constructed from the BoP accounts (measuring only autonomous transactions), this excess demand implies a deficit in the BoP. The deficit is bridged by central bank intervention. In this case, the RBI would sell dollars for rupees in the foreign exchange market to meet this excess demand AB, thus neutralising the upward pressure on the exchange rate. The RBI stands ready to buy and sell dollars at that rate to prevent the exchange

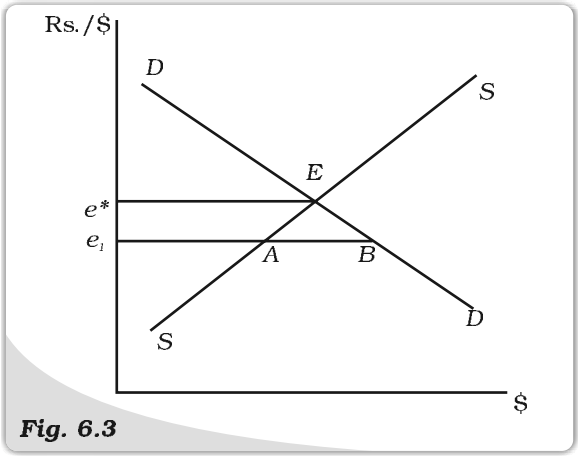


Fig. 6.3

Foreign Exchange Market with Pegged Exchange Rate

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rate from rising (since no one would buy at more) or falling (since no one would sell for less).

Now the RBI might decide to fix the exchange rate at a higher level – Rs 47 per dollar – to bridge part of the deficit in BoP. This devaluation of the domestic currency would make imports expensive and our exports cheaper, leading to a narrowing of the trade deficit. It is important to note that repeated central bank intervention to finance deficits and keep the exchange rate fixed will eventually exhaust the official reserves. This is the main flaw in the system of fixed exchange rates. Once speculators believe that the exchange rate cannot be held for long they would buy foreign exchange (say, dollars) in massive amounts. The demand for dollars will rise sharply causing a BoP deficit. Without sufficient reserves, the central bank will have to allow the exchange rate to reach its equilibrium level. This might amount to an even larger devaluation than would have been required before the speculative 'attack' on the domestic currency began.

International experience shows that it is precisely this that has led many countries to abandon the system of fixed exchange rates. Fear of such an attack induced the US to let its currency float in 1971, one of the major events which precipitated the breakdown of the Bretton Woods system.

6.2.4 Managed Floating

Without any formal international agreement, the world has moved on to what can be best described as a **managed floating** exchange rate system. It is a mixture of a flexible exchange rate system (the float part) and a fixed rate system (the managed part). Under this system, also called **dirty floating**, central banks intervene to buy and sell foreign currencies in an attempt to moderate exchange rate movements whenever they feel that such actions are appropriate. Official reserve transactions are, therefore, not equal to zero.

6.2.5 Exchange Rate Management: The International Experience

The Gold Standard: From around 1870 to the outbreak of the First World War in 1914, the prevailing system was the gold standard which was the epitome of the **fixed exchange rate system**. All currencies were defined in terms of gold; indeed some were actually made of gold. Each participant country committed to guarantee the free convertibility of its currency into gold at a fixed price. This meant that residents had, at their disposal, a domestic currency which was freely convertible at a fixed price into another asset (gold) acceptable in international payments. This also made it possible for each currency to be convertible into all others at a fixed price. Exchange rates were determined by its worth in terms of gold (where the currency was made of gold, its actual gold content). For example, if one unit of say currency A was worth one gram of gold, one unit of currency B was worth two grams of gold, currency B would be worth twice as much as currency A. Economic agents could directly convert one unit of currency B into two units of currency A, without having to first buy gold and then sell it. The rates would fluctuate between an upper and a lower limit, these limits being set by the costs of melting, shipping and recoining between the two Currencies [3]. To maintain the official parity each country needed an adequate stock of gold reserves. All countries on the gold standard had stable exchange rates.

[3] If the difference in the rates were more than those transaction costs, profits could be made through arbitrage, the process of buying a currency cheap and selling it dear.

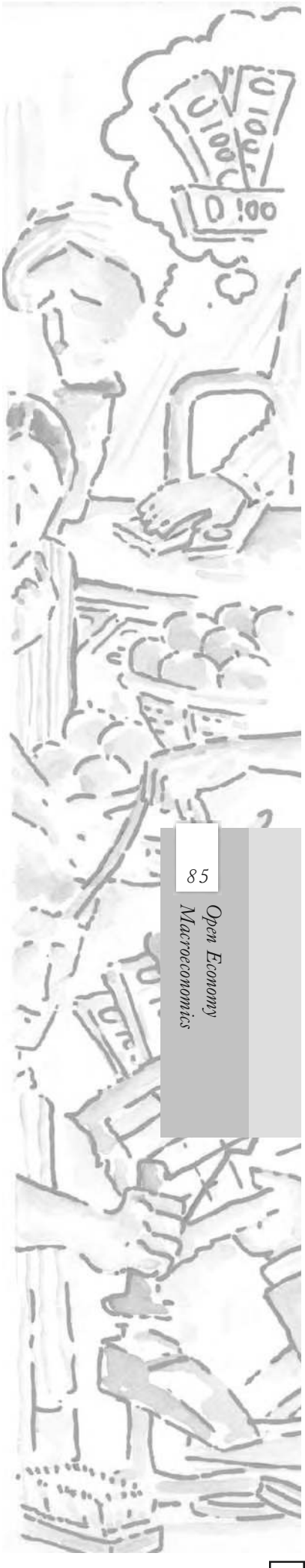
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The question arose – would not a country lose all its stock of gold if it imported too much (and had a BoP deficit)? The mercantilist[4] explanation was that unless the state intervened, through tariffs or quotas or subsidies, on exports, a country would lose its gold and that was considered one of the worst tragedies. David Hume, a noted philosopher writing in 1752, refuted this view and pointed out that if the stock of gold went down, all prices and costs would fall commensurately and no one in the country would be worse off. Also, with cheaper goods at home, imports would fall and exports rise (it is the real exchange rate which will determine competitiveness). The country from which we were importing and making payments in gold would face an increase in prices and costs, so their now expensive exports would fall and their imports of the first country's now cheap goods would go up. The result of this price-specie-flow (precious metals were referred to as 'specie' in the eighteenth century) mechanism is normally to improve the BoP of the country losing gold, and worsen that of the country with the favourable trade balance, until equilibrium in international trade is re-established at relative prices that keep imports and exports in balance with no further net gold flow. The equilibrium is stable and self-correcting, requiring no tariffs and state action. Thus, fixed exchange rates were maintained by an automatic equilibrating mechanism.

Several crises caused the gold standard to break down periodically. Moreover, world price levels were at the mercy of gold discoveries. This can be explained by looking at the crude Quantity Theory of Money, $M = kPY$, according to which, if output (GNP) increased at the rate of 4 per cent per year, the gold supply would have to increase by 4 per cent per year to keep prices stable. With mines not producing this much gold, price levels were falling all over the world in the late nineteenth century, giving rise to social unrest. For a period, silver supplemented gold introducing 'bimetallism'. Also, **fractional reserve banking** helped to economise on gold. Paper currency was not entirely backed by gold; typically countries held one-fourth gold against its paper currency. Another way of economising on gold was the **gold exchange standard** which was adopted by many countries which kept their money exchangeable at fixed prices with respect to gold but held little or no gold. Instead of gold, they held the currency of some large country (the United States or the United Kingdom) which was on the gold standard. All these and the discovery of gold in Klondike and South Africa helped keep deflation at bay till 1929. Some economic historians attribute the Great Depression to this shortage of liquidity. During 1914-45, there was no maintained universal system but this period saw both a brief return to the gold standard and a period of flexible exchange rates.

***The Bretton Woods System*:** The Bretton Woods Conference held in 1944 set up the International Monetary Fund (IMF) and the World Bank and reestablished a system of fixed exchange rates. This was different from the international gold standard in the choice of the asset in which national currencies would be convertible. A two-tier system of convertibility was established at the centre of which was the dollar. The US monetary authorities guaranteed the convertibility of the dollar into gold at the fixed price of $35 per ounce of gold. The second-tier of the system was the commitment of monetary authority of each IMF member participating in the system to convert their currency into dollars at a fixed price. The latter was called the official exchange rate. For instance, if French francs

[4]Mercantilist thought was associated with the rise of the nation-state in Europe during the sixteenth and seventeenth centuries.



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could be exchanged for dollars at roughly 5 francs per dollar, the dollars could then be exchanged for gold at $35 per ounce, which fixed the value of the franc at 175 francs per ounce of gold (5 francs per dollar times 35 dollars per ounce). A change in exchange rates was to be permitted only in case of a 'fundamental disequilibrium' in a nation's BoP – which came to mean a chronic deficit in the BoP of sizeable proportions.

Such an elaborate system of convertibility was necessary because the distribution of gold reserves across countries was uneven with the US having almost 70 per cent of the official world gold reserves. Thus, a credible gold convertibility of the other currencies would have required a massive redistribution of the gold stock. Further, it was believed that the existing gold stock would be insufficient to sustain the growing demand for international liquidity. One way to save on gold, then, was a two-tier convertible system, where the key currency would be convertible into gold and the other currencies into the key currency.

In the post-World War II scenario, countries devastated by the war needed enormous resources for reconstruction. Imports went up and their deficits were financed by drawing down their reserves. At that time, the US dollar was the main component in the currency reserves of the rest of the world, and those reserves had been expanding as a consequence of the US running a continued balance of payments deficit (other countries were willing to hold those dollars as a reserve asset because they were committed to maintain convertibility between their currency and the dollar).

The problem was that if the short-run dollar liabilities of the US continued to increase in relation to its holdings of gold, then the belief in the credibility of the US commitment to convert dollars into gold at the fixed price would be eroded. The central banks would thus have an overwhelming incentive to convert the existing dollar holdings into gold, and that would, in turn, force the US to give up its commitment. This was the Triffin Dilemma after Robert Triffin, the main critic of the Bretton Woods system. Triffin suggested that the IMF should be turned into a 'deposit bank' for central banks and a new 'reserve asset' be created under the control of the IMF. In 1967, gold was displaced by creating the Special Drawing Rights (SDRs), also known as 'paper gold', in the IMF with the intention of increasing the stock of international reserves. Originally defined in terms of gold, with 35 SDRs being equal to one ounce of gold (the dollar-gold rate of the Bretton Woods system), it has been redefined several times since 1974. At present, it is calculated daily as the weighted sum of the values in dollars of four currencies (euro, dollar, Japanese yen, pound sterling) of the five countries (France, Germany, Japan, the UK and the US). It derives its strength from IMF members being willing to use it as a reserve currency and use it as a means of payment between central banks to exchange for national currencies. The original installments of SDRs were distributed to member countries according to their quota in the Fund (the quota was broadly related to the country's economic importance as indicated by the value of its international trade).

The breakdown of the Bretton Woods system was preceded by many events, such as the devaluation of the pound in 1967, flight from dollars to gold in 1968 leading to the creation of a two-tiered gold market (with the official rate at $35 per ounce and the private rate market determined), and finally in August 1971, the British demand that US guarantee the gold value of its dollar holdings. This led to the US decision to give up the link between the dollar and gold.

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The 'Smithsonian Agreement' in 1971, which widened the permissible band of movements of the exchange rates to 2.5 per cent above or below the new 'central rates' with the hope of reducing pressure on deficit countries, lasted only 14 months. The developed market economies, led by the United Kingdom and soon followed by Switzerland and then Japan, began to adopt floating exchange rates in the early 1970s. In 1976, revision of IMF Articles allowed countries to choose whether to float their currencies or to peg them (to a single currency, a basket of currencies, or to the SDR). There are no rules governing pegged rates and no *de facto* supervision of floating exchange rates.

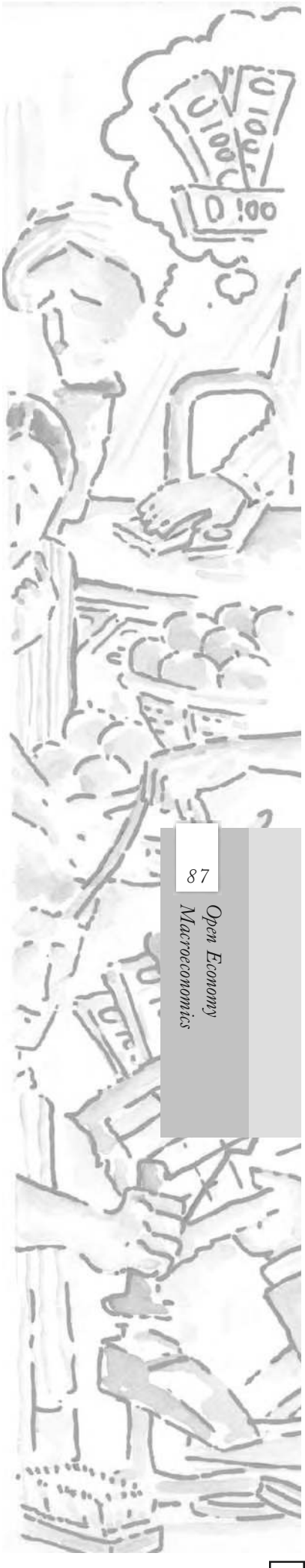
The Current Scenario: Many countries currently have fixed exchange rates. Some countries peg their currency to the dollar. The creation of the European Monetary Union in January, 1999, involved permanently fixing the exchange rates between the currencies of the members of the Union and the introduction of a new common currency, the Euro, under the management of the European Central Bank. From January, 2002, actual notes and coins were introduced. So far, 12 of the 25 members of the European Union have adopted the euro. Some countries pegged their currency to the French franc; most of these are former French colonies in Africa. Others peg to a basket of currencies, with the weights reflecting the composition of their trade. Often smaller countries also decide to fix their exchange rates relative to an important trading partner. Argentina, for example, adopted the **currency board** system in 1991. Under this, the exchange rate between the local currency (the peso) and the dollar was fixed by law. The central bank held enough foreign currency to back all the domestic currency and reserves it had issued. In such an arrangement, the country cannot expand the money supply at will. Also, if there is a domestic banking crisis (when banks need to borrow domestic currency) the central bank can no longer act as a lender of last resort. However, following a crisis, Argentina abandoned the currency board and let its currency float in January 2002.

Another arrangement adopted by Equador in 2000 was dollarisation when it abandoned the domestic currency and adopted the US dollar. All prices are quoted in dollar terms and the local currency is no longer used in transactions. Although uncertainty and risk can be avoided, Equador has given the control over its money supply to the Central Bank of the US – the Federal Reserve – which will now be based on economic conditions in the US.

On the whole, the international system is now characterised by a multiple of regimes. Most exchange rates change slightly on a day-to-day basis, and market forces generally determine the basic trends. Even those advocating greater fixity in exchange rates generally propose certain ranges within which governments should keep rates, rather than literally fix them. Also, there has been a virtual elimination of the role for gold. Instead, there is a free market in gold in which the price of gold is determined by its demand and supply coming mainly from jewellers, industrial users, dentists, speculators and ordinary citizens who view gold as a good store of value.

6.3 The Determination of Income in an Open Economy

With consumers and firms having an option to buy goods produced at home and abroad, we now need to distinguish between domestic demand for goods and the demand for domestic goods.



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6.3.1 National Income Identity for an Open Economy

In a closed economy, there are three sources of demand for domestic goods – Consumption (C), government spending (G), and domestic investment (I). We can write

$$Y = C + I + G \tag{6.2}$$

In an open economy, exports (X) constitute an additional source of demand for domestic goods and services that comes from abroad and therefore must be added to aggregate demand. Imports (M) supplement supplies in domestic markets and constitute that part of domestic demand that falls on foreign goods and services. Therefore, the national income identity for an open economy is

$$Y + M = C + I + G + X \tag{6.3}$$

Rearranging, we get

$$Y = C + I + G + X - \mathrm{M} \tag{6.4}$$

or

$$Y = C + I + G + NX \tag{6.5}$$

where, NX is **net exports** (exports – imports). A positive NX (with exports greater than imports) implies a trade surplus and a negative NX (with imports exceeding exports) implies a trade deficit.

To examine the roles of imports and exports in determining equilibrium income in an open economy, we follow the same procedure as we did for the closed economy case – we take investment and government spending as autonomous. In addition, we need to specify the determinants of imports and exports. The demand for imports depends on domestic income (Y) and the real exchange rate (R). Higher income leads to higher imports. Recall that the real exchange rate is defined as the relative price of foreign goods in terms of domestic goods. A higher R makes foreign goods relatively more expensive, thereby leading to a decrease in the quantity of imports. Thus, imports depend positively on Y and negatively on R. The export of one country is, by definition, the import of another. Thus, our exports would constitute foreign imports. It would depend on foreign income, Y_f, and on R. A rise in Y_f will increase foreign demand for our goods, thus leading to higher exports. An increase in R, which makes domestic goods cheaper, will increase our exports. Exports depend positively on foreign income and the real exchange rate. Thus, exports and imports depend on domestic income, foreign income and the real exchange rate. We assume price levels and the nominal exchange rate to be constant, hence R will be fixed. From the point of view of our country, foreign income, and therefore exports, are considered exogenous ($X = \bar{X}$).

The demand for imports is thus assumed to depend on income and have an autonomous component

$M = \bar{M} + mY$, where $\bar{M} > 0$ is the autonomous component, $0 < m < 1$. (6.6)

Here m is the **marginal propensity to import**, the fraction of an extra rupee of income spent on imports, a concept analogous to the marginal propensity to consume.

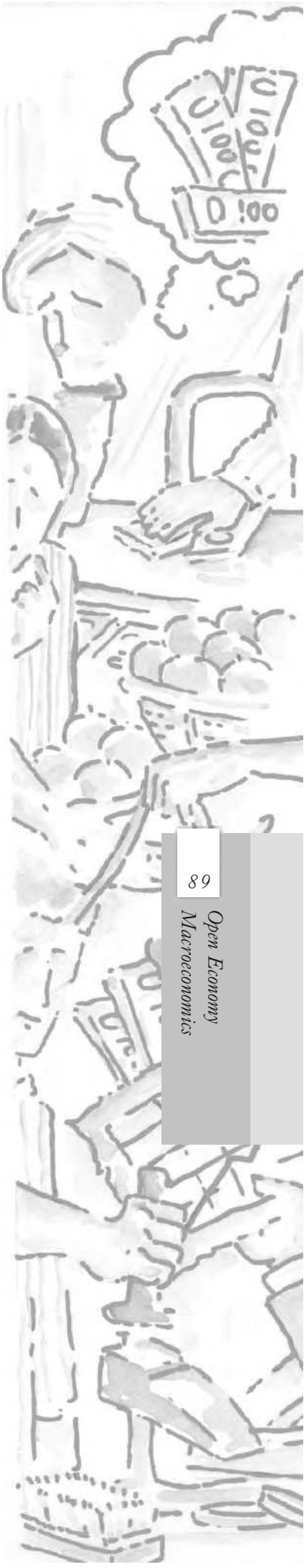
The equilibrium income would be

$$Y = \bar{C} + c(Y - T) + \bar{I} + \bar{G} + \bar{X} - \bar{M} - mY \tag{6.7}$$

Taking all the autonomous components together as $\bar{A}$, we get

$$Y = \bar{A} + cY - mY \tag{6.8}$$

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or, $$(1 - c + m)Y = \bar{A} \quad (6.9)$$

or, $$Y^* = \frac{1}{1 - c + m}\bar{A} \quad (6.10)$$

In order to examine the effects of allowing for foreign trade in the income-expenditure framework, we need to compare equation (6.10) with the equivalent expression for the equilibrium income in a closed economy model. In both equations, equilibrium income is expressed as a product of two terms, the autonomous expenditure multiplier and the level of autonomous expenditures. We consider how each of these change in the open economy context.

Since m, the marginal propensity to import, is greater than zero, we get a smaller multiplier in an open economy. It is given by

$$\text{The open economy multiplier} = \frac{\Delta Y}{\Delta \bar{A}} = \frac{1}{1 - c + m} \quad (6.11)$$

EXAMPLE 6.2

If $c = 0.8$ and $m = 0.3$, we would have the open and closed economy multiplier respectively as

$$\frac{1}{1 - c} = \frac{1}{1 - 0.8} = \frac{1}{0.2} = 5 \quad (6.12)$$

and

$$\frac{1}{1 - c + m} = \frac{1}{1 - 0.8 + 0.3} = \frac{1}{0.5} = 2 \quad (6.13)$$

If domestic autonomous demand increases by 100, in a closed economy output increases by 500 whereas it increases by only 200 in an open economy.

The fall in the value of the autonomous expenditure multiplier with the opening up of the economy can be explained with reference to our previous discussion of the multiplier process (Chapter 4). A change in autonomous expenditures, for instance a change in government spending, will have a direct effect on income and an induced effect on consumption with a further effect on income. With an mpc greater than zero, a proportion of the induced effect on consumption will be a demand for foreign, not domestic goods. Therefore, the induced effect on demand for domestic goods, and hence on domestic income, will be smaller. The increase in imports per unit of income constitutes an additional leakage from the circular flow of domestic income at each round of the multiplier process and reduces the value of the autonomous expenditure multiplier.

The second term in equation (6.10) shows that, in addition to the elements for a closed economy, autonomous expenditure for an open economy includes the level of exports and the autonomous component of imports. Thus, the changes in their levels are additional shocks that will change equilibrium income. From equation (6.10) we can compute the multiplier effects of changes in $\bar{X}$ and $\bar{M}$.

$$\frac{\Delta Y^*}{\Delta \bar{X}} = \frac{1}{1 - c + m} \quad (6.14)$$

$$\frac{\Delta Y^*}{\Delta \bar{M}} = \frac{-1}{1 - c + m} \quad (6.15)$$

An increase in demand for our exports is an increase in aggregate demand for domestically produced output and will increase demand just as would an

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increase in government spending or an autonomous increase in investment. In contrast, an autonomous rise in import demand is seen to cause a fall in demand for domestic output and causes equilibrium income to decline.

6.3.2 Equilibrium Output and the Trade Balance

We shall provide a diagrammatic explanation of the above mechanisms and, in addition, their impact on the trade balance. Net exports, ($NX = X - M$), as we saw earlier, depend on Y, Y_f and R. A rise in Y raises import spending and leads to trade deficit (if initially we had trade balance, $NX = 0$). A rise in Y_f, other things being equal, raises our exports, creates a trade surplus and raises aggregate income. A real depreciation would raise exports and reduce imports, thus increasing our net exports.

In the upper panel of Fig. 6.4, the line AD plots domestic demand, $C+I+G$, as a function of income (the familiar closed economy relation of Chapter 5). Under our standard assumptions, its slope is positive but less than one. To get the demand for domestic goods, we first subtract imports obtaining the line AA. The distance between AD and AA is equal to the value of imports, M. Because the quantity of imports increases with income, the distance between the two lines increases with income. AA is flatter than AD because as income increases, some of the additional domestic demand falls on foreign goods. Thus, with an increase in income, the domestic demand for domestic goods increases less than total domestic demand. Second, we add exports and get the line DD, which is above AA. The distance between DD and AA is equal to exports and remains constant because exports do not depend on domestic income (the two lines are parallel). Now, the open economy aggregate demand curve, DD, is flatter than the closed economy one (because AA is flatter than AD).

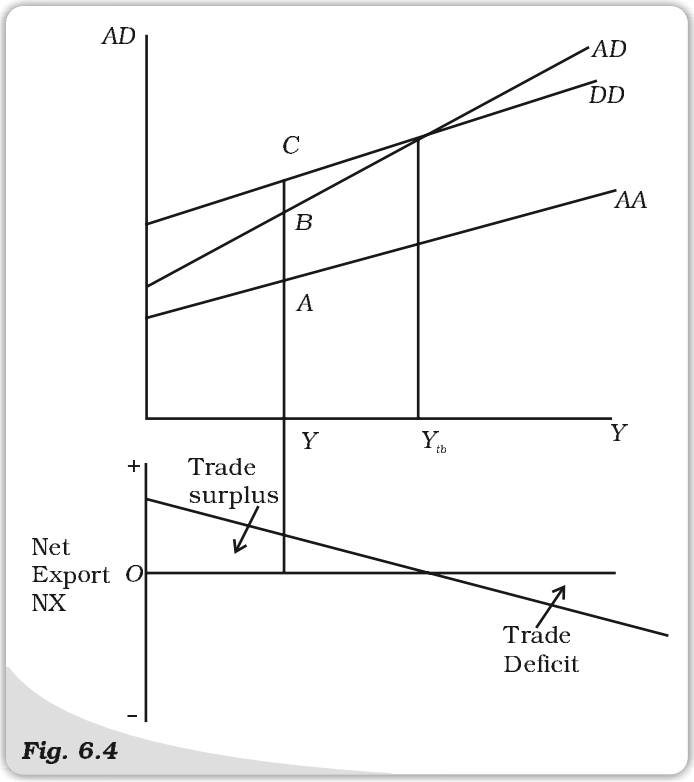


Fig. 6.4

Aggregate Demand in an Open Economy and the net Export Schedule

In lower panel of Fig. 6.4, we examine the behaviour of net exports, NX, as a function of income. For example, at income level Y, exports are given by the distance AC and imports by the distance AB, so that net exports are given by the distance BC.

Net exports are a decreasing function of domestic income. As income increases, imports increase and exports are unaffected leading to lower net exports. At Y_{tb} ('tb' for trade balance), the level of income at which the value of

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imports is just equal to exports, net exports are equal to zero. Levels of income above Y_{tb} lead to higher imports, and thus a trade deficit. Levels of income below Y_{tb} lead to lower imports, and thus to a trade surplus.

The goods market is in equilibrium when the supply of domestic output is equal to the demand for domestic output, at point *E* in Fig.6.5 at the intersection of the line *DD* with the 45-degree line. There is no reason for the equilibrium level of output, Y^*, to be the same as the level of output at which trade is balanced, Y_{tb}. In Fig. 6.5, equilibrium output is associated with a trade deficit equal to the distance *BC*.

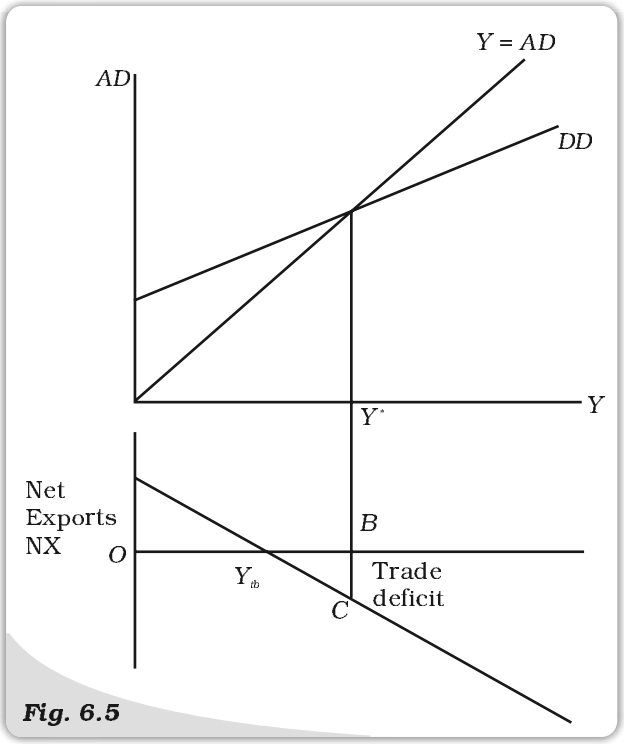


Fig. 6.5

Equilibrium Income and Net Exports

To examine the effects of an increase in autonomous expenditure (say, *G*), we assume a situation when, at the equilibrium level of income, *Y*, trade is balanced, so that *Y* and Y_{tb} are the same. If the government increases spending, as shown in Fig. 6.6, the aggregate demand line moves up from *DD* to *DD′* , and equilibrium moves up from *E* to *E′* and income increases from *Y* to *Y′* . The *NX* schedule as a function of output does not shift as *G* does not enter the *X* or *M* relation directly. The increase in output is clearly larger than the increase in *G*, there is a multiplier effect. This is similar to the closed economy case, only that the multiplier is smaller. The *DD* curve is flatter than the closed economy *AD* curve.

However, the increase in output from *Y* to *Y′* leads to a trade deficit equal to *BC*. The trade deficit and the smaller multiplier both arise from the same cause – an increase in demand now falls not only on

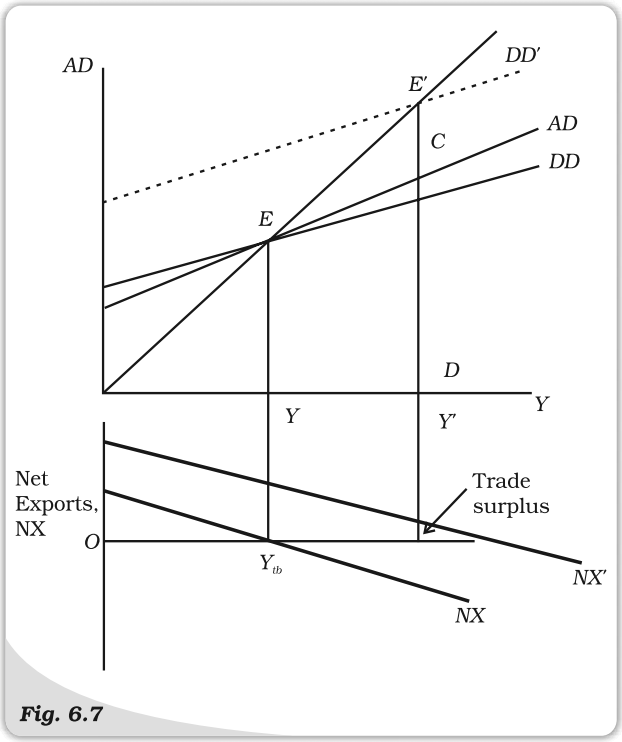


Fig. 6.7

Effect of Higher Government Spending

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domestic goods but also on foreign goods. This, as explained earlier, leads to a smaller multiplier. And because some of the increase falls on imports and exports remain unchanged, the result is a trade deficit.

These two implications are important. The more open the economy, the smaller the effect on income and the larger the adverse effect on the trade balance. For example, suppose a country has a ratio of imports to GDP of around 70 per cent. This implies that when demand increases, roughly 70 per cent of this increased demand goes to higher imports and only 30 per cent to an increase in demand for domestic goods. An increase in *G* is thus likely to result in a large increase in the country's trade deficit and a small increase in output and income, making domestic demand expansion an unattractive policy for the country.

***Interdependent Incomes – Increase in Foreign Demand*:** We have so far assumed that foreign income, prices and exchange rate remain unchanged. First, we consider an increase in foreign income, Y_f, keeping prices and the exchange rate fixed. The initial demand for domestic goods is given by DD in Fig. 6.7. The equilibrium is at point *E*, with output level *Y*. We assume that initially trade is balanced so that net exports associated with *Y* are equal to zero.

As was explained in Fig. 6.4., the line *AD* is steeper than *DD*, the difference is equal to net exports so that if trade is balanced at *E*, *DD* intersects *AD* at *E*. The direct effect of an increase in Y_f is to increase exports. For a given level of domestic income, this increases demand for domestic goods so that *DD* shifts up to *DD′* . As exports increase at a given level of income the net exports line also increases to *NX′* . The new equilibrium is at point *E′* , with net output level *Y′* . The increase in Y_f leads to an increase in domestic income through the multiplier.

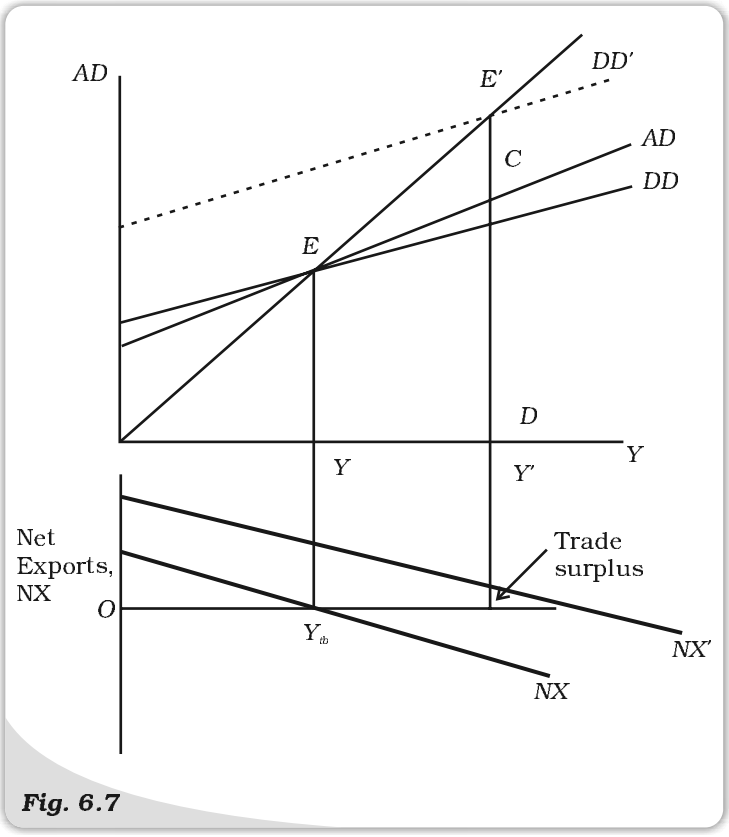


Fig. 6.7

The Effects of Higher Foreign Demand

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What happens to the trade balance? If the increase in Y leads to a large increase in imports, the trade balance could deteriorate. But it does not. At the new level of income, domestic demand is given by DE'. Net exports are thus given by CE' – which, because AD is necessarily below DD', is necessarily positive. Thus, while imports increase, they do not offset the increase in exports, and there is a trade surplus. Coversely, a recession abroad would reduce domestic exports and cause a trade deficit. Thus, booms and recessions in one country tend to be transmitted to other countries through international trade in goods and services.

***Change in Prices*:** Next we consider the effects of changes in prices, assuming the exchange rate to be fixed. If prices of domestic products fall, while say foreign prices remain constant, domestic exports will rise, adding to aggregate demand, and hence will raise our output and income. Analogously, a rise in prices of a country's exports will decrease that country's net exports and output and income. Similarly, a price increase abroad will make foreign products more expensive and hence again raise net exports and domestic output and income. Price decreases abroad have the opposite effects.

***Exchange Rate Changes*:** Changes in nominal exchange rates would change the real exchange rate and hence international relative prices. A depreciation of the rupee will raise the cost of buying foreign goods and make domestic goods less costly. This will raise net exports and therefore increase aggregate demand. Conversely, a currency appreciation would reduce net exports and, therefore, decrease aggregate demand. However, we must note that international trade patterns take time to respond to changes in exchange rates. A considerable period of time may elapse before any improvement in net exports is apparent.

6.4 Trade Deficits, Savings and Investment

The question arises – are trade deficits a cause for alarm? We note that an essential difference between a closed economy and an open economy is that while in a closed economy saving and investment must always be equal, in an open economy, they can differ. From equation (6.5) we get

$$Y - C - G = I + NX \tag{6.16}$$

or

$$S = I + NX \tag{6.17}$$

We distinguish between private saving, S^p, (that part of disposable income that is saved rather than consumed — $Y - T - C$) and government saving, S^g, (government's 'income', its net tax revenue minus its 'consumption', government purchases, $T - G$). The two together add up to national saving

$$S = Y - C - G = (Y - T - C) + (T - G) = S^p + S^g \tag{6.18}$$

Thus, from (6.16) and (6.17), we get

$$S = S^p + S^g = I + NX$$

or

$$NX = (S^p - I) + S^g = (S^p - I) + (T - G) \tag{6.19}$$

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When a country runs a trade deficit[5], it is important to look at the right side of equation (6.18) to see whether there has been a decrease in saving, increase in investment, or an increase in the budget deficit. There is reason to worry about a country's long-run prospects if the trade deficit reflects smaller saving or a larger budget deficit (when the economy has both trade deficit and budget deficit, it is said to be facing twin deficits). The deficit could reflect higher private or government consumption. In such cases, the country's capital stock will not rise rapidly enough to yield enough growth (called the 'growth dividend') it needs to repay its debt. There is less cause to worry if the trade deficit reflects a rise in investment, which will build the capital stock more quickly and increase future output. However, we must note that since private saving, investment and the trade deficit are jointly determined, other factors too must be taken into account.

[5]Here,to simplify the analysis, we take trade balance to be synonymous with the current account balance, ignoring invisibles and transfer payments. As Table 6.1 shows, invisibles can help bridge the trade deficit in an important way.

Summary

1. Openness in product and financial markets allows a choice between domestic and foreign goods and between domestic and foreign assets.
2. The BoP records a country's transactions with the rest of the world.
3. The current account balance is the sum of the balance of merchandise trade, services and net transfers received from the rest of the world. The capital account balance is equal to capital flows from the rest of the world, minus capital flows to the rest of the world.
4. A current account deficit is financed by net capital flows from the rest of the world, thus by a capital account surplus.
5. The nominal exchange rate is the price of one unit of foreign currency in terms of domestic currency.
6. The real exchange rate is the relative price of foreign goods in terms of domestic goods. It is equal to the nominal exchange rate times the foreign price level divided by the domestic price level. It measures the international competitiveness of a country in international trade. When the real exchange rate is equal to one, the two countries are said to be in purchasing power parity.
7. The epitome of the fixed exchange rate system was the gold standard in which each participant country committed itself to convert freely its currency into gold at a fixed price. The pegged exchange rate is a policy variable and may be changed by official action (devaluation).
8. Under clean floating, the exchange rate is market-determined without any central bank intervention. In case of managed floating, central banks intervene to reduce fluctuations in the exchange rate.
9. In an open economy, the demand for domestic goods is equal to the domestic demand for goods (consumption, investment and government spending) plus exports minus imports.
10. The open economy multiplier is smaller than that in a closed economy because a part of domestic demand falls on foreign goods. An increase in autonomous demand thus leads to a smaller increase in output compared to a closed economy. It also results in a deterioration of the trade balance.
11. An increase in foreign income leads to increased exports and increases domestic output. It also improves the trade balance.
12. Trade deficits need not be alarming if the country invests the borrowed funds yielding a rate of growth higher than the interest rate.

Key Concepts

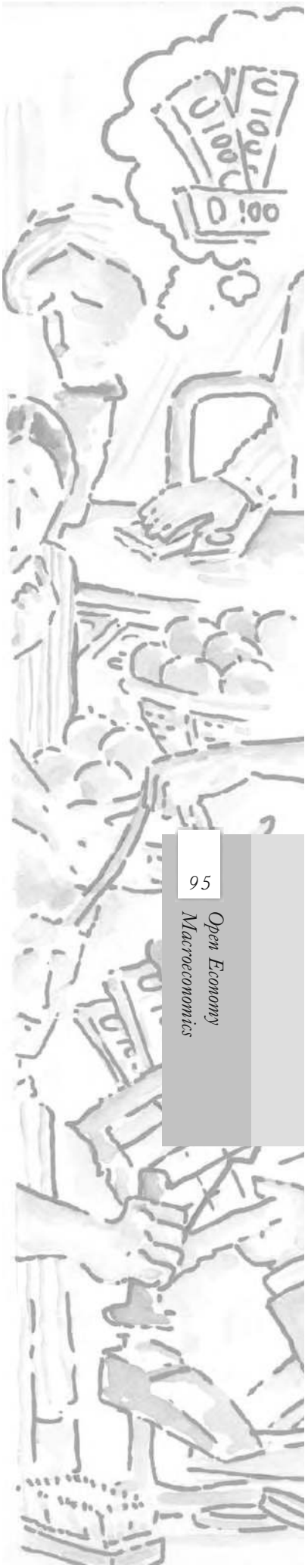
Open economy
Current account deficit
Autonomous and accommodating transactions
Purchasing power parity
Depreciation
Fixed exchange rate
Managed floating
Marginal propensity to import
Open economy multiplier
Balance of payments
Official reserve transactions
Nominal and real exchange rate
Flexible exchange rate
Interest rate differential
Devaluation
Demand for domestic goods
Net exports

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Box 6.1: Exchange Rate Management: The Indian Experience

India's exchange rate policy has evolved in line with international and domestic developments. Post-independence, in view of the prevailing Bretton Woods system, the Indian rupee was pegged to the pound sterling due to its historic links with Britain. A major development was the devaluation of the rupee by 36.5 per cent in June, 1966. With the breakdown of the Bretton Woods system, and also the declining share of UK in India's trade, the rupee was delinked from the pound sterling in September 1975. During the period between 1975 to 1992, the exchange rate of the rupee was officially determined by the Reserve Bank within a nominal band of plus or minus 5 per cent of the weighted basket of currencies of India's major trading partners. The Reserve Bank intervened on a day-to-day basis which resulted in wide changes in the size of reserves. The exchange rate regime of this period can be described as an adjustable nominal peg with a band.

The beginning of 1990s saw significant rise in oil prices and suspension of remittances from the Gulf region in the wake of the Gulf crisis. This, and other domestic and international developments, led to severe balance of payments problems in India. The drying up of access to commercial banks and short-term credit made financing the current account deficit difficult. India's foreign currency reserves fell rapidly from US $ 3.1 billion in August to US $ 975 million on July 12, 1991 (we may contrast this with the present; as of January 27, 2006, India's foreign exchange reserves stand at US $ 139.2 billion). Apart from measures like sending gold abroad, curtailing non-essential imports, approaching the IMF and multilateral and bilateral sources, introducing stabilisation and structural reforms, there was a two-step devaluation of 18–19 per cent of the rupee on July 1 and 3, 1991. In march 1992, the Liberalised Exchange Rate Management System (LERMS) involving dual exchange rates was introduced. Under this system, 40 per cent of exchange earnings had to be surrendered at an official rate determined by the Reserve Bank and 60 per cent was to be converted at the market-determined rates.The dual rates were converged into one from March 1, 1993; this was an important step towards current account convertibility, which was finally achieved in August 1994 by accepting Article VIII of the Articles of Agreement of the IMF. The exchange rate of the rupee thus became market determined, with the Reserve Bank ensuring orderly conditions in the foreign exchange market through its sales and purchases.



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Exercises

1. Differentiate between balance of trade and current account balance.
2. What are official reserve transactions? Explain their importance in the balance of payments.
3. Distinguish between the nominal exchange rate and the real exchange rate. If you were to decide whether to buy domestic goods or foreign goods, which rate would be more relevant? Explain.
4. Suppose it takes 1.25 yen to buy a rupee, and the price level in Japan is 3 and the price level in India is 1.2. Calculate the real exchange rate between India and Japan (the price of Japanese goods in terms of Indian goods). (**Hint:** First find out the nominal exchange rate as a price of yen in rupees).
5. Explain the automatic mechanism by which BoP equilibrium was achieved under the gold standard.
6. How is the exchange rate determined under a flexible exchange rate regime?
7. Differentiate between devaluation and depreciation.
8. Would the central bank need to intervene in a managed floating system? Explain why.
9. Are the concepts of demand for domestic goods and domestic demand for goods the same?
10. What is the marginal propensity to import when $M = 60 + 0.06Y$? What is the relationship between the marginal propensity to import and the aggregate demand function?
11. Why is the open economy autonomous expenditure multiplier smaller than the closed economy one?
12. Calculate the open economy multiplier with proportional taxes, $T = tY$, instead of lump-sum taxes as assumed in the text.
13. Suppose $C = 40 + 0.8Y_D$, $T = 50$, $I = 60$, $G = 40$, $X = 90$, $M = 50 + 0.05Y$ (a) Find equilibrium income. (b) Find the net export balance at equilibrium income (c) What happens to equilibrium income and the net export balance when the government purchases increase from 40 and 50?
14. In the above example, if exports change to $X = 100$, find the change in equilibrium income and the net export balance.
15. Explain why $G - T = (S^g - I) - (X - M)$.
16. If inflation is higher in country A than in Country B, and the exchange rate between the two countries is fixed, what is likely to happen to the trade balance between the two countries?
17. Should a current account deficit be a cause for alarm? Explain.
18. Suppose $C = 100 + 0.75Y_D$, $I = 500$, $G = 750$, taxes are 20 per cent of income, $X = 150$, $M = 100 + 0.2Y$. Calculate equilibrium income, the budget deficit or surplus and the trade deficit or surplus.
19. Discuss some of the exchange rate arrangements that countries have entered into to bring about stability in their external accounts.

Suggested Readings

1. Dornbusch, R. and S. Fischer, 1994. *Macroeconomics*, sixth edition, McGraw-Hill, Paris.
2. *Economic Survey*, Government of India, 2006-07.
3. Krugman, P.R. and M. Obstfeld, 2000. *International Economics, Theory and Policy*, fifth edition, Pearson Education.

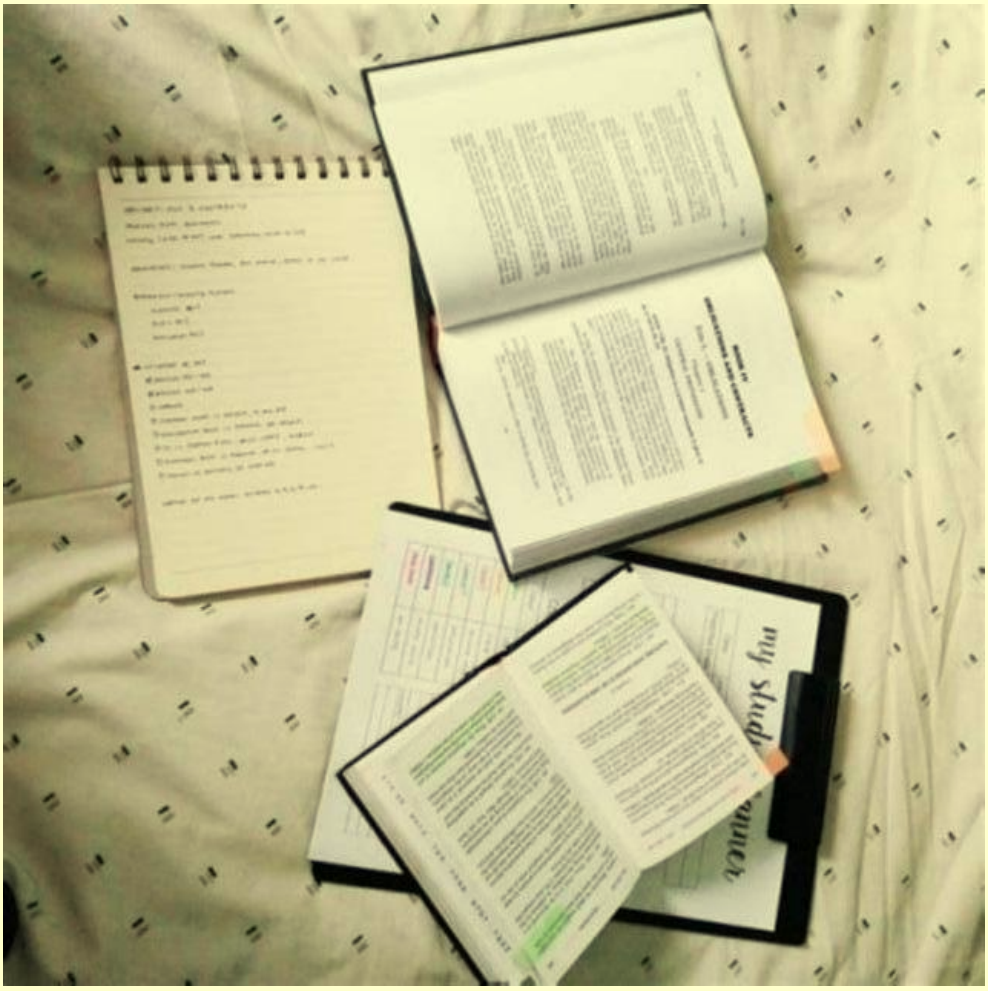
Table 6.1: Balance of Payments : Summary # (in US $ million)

	1990 -91	1989 -99	2000 -01	2001 -02	2002 -03	2003 -04
1. Exports	18,477	34,298	45,452	44,703	53,774	66,285
2. Imports	27,915	47,544	57,912	56,277	64,464	80,003
of which POL	6,028	6,399	15,650	14,000	17,640	20,569
3. Trade balance	–9,438	–13,246	–12,460	–11,574	–10,690	–13,718
4. Invisibles (net)	–242	9,208	9,794	14,974	17,035	27,801
Non-factor services	980	2,165	1,692	3,324	3,643	10,144
Income	–3,752	–3,544	–5,004	–4,206	–3,446	–4,505
Pvt. transfers	2,069	10,280	12,854	15,398	16,387	21,608
Official transfers	461	307	252	458	451	554
5. Current Account Balance	–9,680	–4,038	–2,666	3,400	6,345	14,083
6. External assistance (net)	2,204	799	410	1,117	–3,128	–2,858
7. Commercial borrowings (net)	2,254	4,367	4,303	–1,585	–1,692	–2,925
8. IMF (net)	1,214	–393	–26	0	0	0
9. NR deposits (net)	1,536	961	2,316	2,754	2,978	3,642
10. Rupee debt service	–1,192	–802	–617	–519	–474	–376
11. Foreign investment (net)	101	2,312	5,862	6,686	4,161	13,744
of which						
(i) FDI(net)	96	2,380	3,272	4,734	3,217	2,388
(ii) FIIs	0	–390	1,847	1,505	377	10,918
(iii) Euro equities & others	5	322	743	447	567	438
12. Other flows (net)+	2,284	623	–3,739	–96	8,795	6,111
13. Capital account total (net)	8,401	7,867	8,509	8,357	10,640	17,338
14. Reserve use (–increase)	1,279	–3,829	–5,842	–11,757	–16,985	–31,421

Source: *Economic Survey*, 2005-06.

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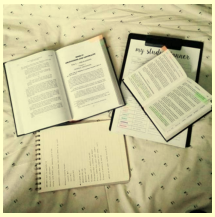




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Glossary

Adam Smith (1723 – 1790) Regarded as the father of modern Economics. Author of *Wealth of Nations*.

Aggregate monetary resources Broad money without time deposits of post office savings organisation (M3).

Automatic stabilisers Under certain spending and tax rules, expenditures that automatically increase or taxes that automatically decrease when economic conditions worsen, therefore, stabilising the economy automatically.

Autonomous change A change in the values of variables in a macroeconomic model caused by a factor exogenous to the model.

Autonomous expenditure multiplier The ratio of increase (or decrease) in aggregate output or income to an increase (or decrease) in autonomous spending.

Balance of payments A set of accounts that summarise a country's transactions with the rest of the world.

Balanced budget A budget in which taxes are equal to government spending.

Balanced budget multiplier The change in equilibrium output that results from a unit increase or decrease in both taxes and government spending.

Bank rate The rate of interest payable by commercial banks to RBI if they borrow money from the latter in case of a shortage of reserves.

Barter exchange Exchange of commodities without the mediation of money.

Base year The year whose prices are used to calculate the real GDP.

Bonds A paper bearing the promise of a stream of future monetary returns over a specified period of time. Issued by firms or governments for borrowing money from the public.

Broad money Narrow money + time deposits held by commercial banks and post office savings organisation.

Capital Factor of production which has itself been produced and which is not generally entirely consumed in the production process.

Capital gain/loss Increase or decrease in the value of wealth of a bondholder due to an appreciation or reduction in the price of her bonds in the bond market.

Capital goods Goods which are bought not for meeting immediate need of the consumer but for producing other goods.

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Capitalist country or economy A country in which most of the production is carried out by capitalist firms.

Capitalist firms These are firms with the following features (a) private ownership of means of production (b) production for the market (c) sale and purchase of labour at a price which is called the wage rate (d) continuous accumulation of capital.

Cash Reserve Ratio (CRR) The fraction of their deposits which the commercial banks are required to keep with RBI.

Circular flow of income The concept that the aggregate value of goods and services produced in an economy is going around in a circular way. Either as factor payments, or as expenditures on goods and services, or as the value of aggregate production.

Consumer durables Consumption goods which do not get exhausted immediately but last over a period of time are consumer durables.

Consumer Price Index (CPI) Percentage change in the weighted average price level. We take the prices of a given basket of consumption goods.

Consumption goods Goods which are consumed by the ultimate consumers or meet the immediate need of the consumer are called consumption goods. It may include services as well.

Corporate tax Taxes imposed on the income made by the corporations (or private sector firms).

Currency deposit ratio The ratio of money held by the public in currency to that held as deposits in commercial banks.

Deficit financing through central bank borrowing Financing of budget deficit by the government through borrowing money from the central bank. Leads to increase in money supply in an economy and may result in inflation.

Depreciation A decrease in the price of the domestic currency in terms of the foreign currency under floating exchange rates. It corresponds to an increase in the exchange rate.

Depreciation Wear and tear or depletion which capital stock undergoes over a period of time.

Devaluation The decrease in the price of domestic currency under pegged exchange rates through official action.

Double coincidence of wants A situation where two economic agents have complementary demand for each others' surplus production.

Economic agents or units Economic units or economic agents are those individuals or institutions which take economic decisions.

Effective demand principle If the supply of final goods is assumed to be infinitely elastic at constant price over a short period of time, aggregate output is determined solely by the value of aggregate demand. This is called effective demand principle.

Entrepreneurship The task of organising, coordinating and risk-taking during production.

Ex ante consumption The value of planned consumption.

Ex ante investment The value of planned investment.

Ex ante The planned value of a variable as opposed to its actual value.

Ex post The actual or realised value of a variable as opposed to its planned value.

Expenditure method of calculating national income Method of calculating the national income by measuring the aggregate value of final expenditure for the goods and services produced in an economy over a period of time.



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Exports Sale of goods and services by the domestic country to the rest of the world.

External sector It refers to the economic transaction of the domestic country with the rest of the world.

Externalities Those benefits or harms accruing to another person, firm or any other entity which occur because some person, firm or any other entity may be involved in an economic activity. If someone is causing benefits or good externality to another, the latter does not pay the former. If someone is inflicting harm or bad externality to another, the former does not compensate the latter.

Fiat money Money with no intrinsic value.

Final goods Those goods which do not undergo any further transformation in the production process.

Firms Economic units which carry out production of goods and services and employ factors of production.

Fiscal policy The policy of the government regarding the level of government spending and transfers and the tax structure.

Fixed exchange rate An exchange rate between the currencies of two or more countries that is fixed at some level and adjusted only infrequently.

Flexible/floating exchange rate An exchange rate determined by the forces of demand and supply in the foreign exchange market without central bank intervention.

Flows Variables which are defined over a period of time.

Foreign exchange Foreign currency, all currencies other than the domestic currency of a given country.

Foreign exchange reserves Foreign assets held by the central bank of the country.

Four factors of production Land, Labour, Capital and Entrepreneurship. Together these help in the production of goods and services.

GDP Deflator Ratio of nominal to real GDP.

Government expenditure multiplier The numerical coefficient showing the size of the increase in output resulting from each unit increase in government spending.

Government The state, which maintains law and order in the country, imposes taxes and fines, makes laws and promotes the economic wellbeing of the citizens.

Great Depression The time period of 1930s (started with the stock market crash in New York in 1929) which saw the output in the developed countries fall and unemployment rise by huge amounts.

Gross Domestic Product (GDP) Aggregate value of goods and services produced within the domestic territory of a country. It includes the replacement investment of the depreciation of capital stock.

Gross fiscal deficit The excess of total government expenditure over revenue receipts and capital receipts that do not create debt.

Gross investment Addition to capital stock which also includes replacement for the wear and tear which the capital stock undergoes.

Gross National Product (GNP) GDP + Net Factor Income from Abroad. In other words GNP includes the aggregate income made by all citizens of the country, whereas GDP includes incomes by foreigners within the domestic economy and excludes incomes earned by the citizens in a foreign economy.

Gross primary deficit The fiscal deficit minus interest payments.

High powered money Money injected by the monetary authority in the economy. Consists mainly of currency.

Households The families or individuals who supply factors of production to the firms and which buy the goods and services from the firms.

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Imports Purchase of goods and services by the domestic country to the rest of the world.

Income method of calculating national income Method of calculating national income by measuring the aggregate value of final factor payments made (= income) in an economy over a period of time.

Interest Payment for services which are provided by capital.

Intermediate goods Goods which are used up during the process of production of other goods.

Inventories The unsold goods, unused raw materials or semi-finished goods which a firm carries from a year to the next.

John Maynard Keynes (1883 – 1946) Arguably the founder of Macroeconomics as a separate discipline.

Labour Human physical effort used in production.

Land Natural resources used in production – either fixed or consumed.

Legal tender Money issued by the monetary authority or the government which cannot be refused by anyone.

Lender of last resort The function of the monetary authority of a country in which it provides guarantee of solvency to commercial banks in a situation of liquidity crisis or bank runs.

Liquidity trap A situation of very low rate of interest in the economy where every economic agent expects the interest rate to rise in future and consequently bond prices to fall, causing capital loss. Everybody holds her wealth in money and speculative demand for money is infinite.

Macroeconomic model Presenting the simplified version of the functioning of a macroeconomy through either analytical reasoning or mathematical, graphical representation.

Managed floating A system in which the central bank allows the exchange rate to be determined by market forces but intervene at times to influence the rate.

Marginal propensity to consume The ratio of additional consumption to additional income.

Medium of exchange The principal function of money for facilitating commodity exchanges.

Money multiplier The ratio of total money supply to the stock of high powered money in an economy.

Narrow money Currency notes, coins and demand deposits held by the public in commercial banks.

National disposable income Net National Product at market prices + Other Current Transfers from the rest of the World.

Net Domestic Product (NDP) Aggregate value of goods and services produced within the domestic territory of a country which does not include the depreciation of capital stock.

Net interest payments made by households Interest payment made by the households to the firms – interest payments received by the households.

Net investment Addition to capital stock; unlike gross investment, it does not include the replacement for the depletion of capital stock.

Net National Product (NNP) (at market price) GNP – depreciation.

NNP (at factor cost) or National Income (NI) NNP at market price – (Indirect taxes – Subsidies).

Nominal exchange rate The number of units of domestic currency one must give



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up to get an unit of foreign currency; the price of foreign currency in terms of domestic currency.

Nominal (GDP) GDP evaluated at current market prices.

Non-tax payments Payments made by households to the firms or the government as non-tax obligations such as fines.

Open market operation Purchase or sales of government securities by the central bank from the general public in the bond market in a bid to increase or decrease the money supply in the economy.

Paradox of thrift As people become more thrifty they end up saving less or same as before in aggregate.

Parametric shift Shift of a graph due to a change in the value of a parameter.

Personal Disposable Income (PDI) PI – Personal tax payments – Non-tax payments.

Personal Income (PI) NI – Undistributed profits – Net interest payments made by households – Corporate tax + Transfer payments to the households from the government and firms.

Personal tax payments Taxes which are imposed on individuals, such as income tax.

Planned change in inventories Change in the stock of inventories which has occurred in a planned way.

Present value (of a bond) That amount of money which, if kept today in an interest earning project, would generate the same income as the sum promised by a bond over its lifetime.

Private income Factor income from net domestic product accruing to the private sector + National debt interest + Net factor income from abroad + Current transfers from government + Other net transfers from the rest of the world.

Product method of calculating national income Method of calculating the national income by measuring the aggregate value of production taking place in an economy over a period of time.

Profit Payment for the services which are provided by entrepreneurship.

Public good Goods or services that are collectively consumed; it is not possible to exclude anyone from enjoying their benefits and one person's consumption does not reduce that available to others.

Purchasing power parity A theory of international exchange which holds that the price of similar goods in different countries is the same.

Real exchange rate The relative price of foreign goods in terms of domestic goods.

Real GDP GDP evaluated at a set of constant prices.

Rent Payment for services which are provided by land (natural resources).

Reserve deposit ratio The fraction of their total deposits which commercial banks keep as reserves.

Revaluation A decrease in the exchange rate in a pegged exchange rate system which makes the foreign currency cheaper in terms of the domestic currency.

Revenue deficit The excess of revenue expenditure over revenue receipts.

Ricardian equivalence The theory that consumers are forward looking and anticipate that government borrowing today will mean a tax increase in the future to repay the debt, and will adjust consumption accordingly so that it will have the same effect on the economy as a tax increase today.

Speculative demand Demand for money as a store of wealth.

Statutory Liquidity Ratio (SLR) The fraction of their total demand and time deposits which the commercial banks are required by RBI to invest in specified liquid assets.

Sterilisation Intervention by the monetary authority of a country in the money

market to keep the money supply stable against exogenous or sometimes external shocks such as an increase in foreign exchange inflow.

Stocks Those variables which are defined at a point of time.

Store of value Wealth can be stored in the form of money for future use. This function of money is referred to as store of value.

Transaction demand Demand for money for carrying out transactions.

Transfer payments to households from the government and firms Transfer payments are payments which are made without any counterpart of services received by the payer. For examples, gifts, scholarships, pensions.

Undistributed profits That part of profits earned by the private and government owned firms which are not distributed among the factors of production.

Unemployment rate This may be defined as the number of people who were unable to find a job (though they were looking for jobs), as a ratio of total number of people who were looking for jobs.

Unit of account The role of money as a yardstick for measuring and comparing values of different commodities.

Unplanned change in inventories Change in the stock of inventories which has occurred in an unexpected way.

Value added Net contribution made by a firm in the process of production. It is defined as, Value of production – Value of intermediate goods used.

Wage Payment for the services which are rendered by labour.

Wholesale Price Index (WPI) Percentage change in the weighted average price level. We take the prices of a given basket of goods which is traded in bulk.

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