INTRODUCTION TO MACROECONOMICS

[With Application to Bangladesh Economy]

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To

Our colleagues of General Economics Division (GED) and Support to Sustainable and Inclusive Planning (SSIP) project, UNDP

PREFACE

This textbook is an output of the 'Support to Sustainable and Inclusive Planning (SSIP)' project of the General Economics Division (GED), Planning Commission, GoB, funded by UNDP-Bangladesh. One of the objectives of this project is to expand the capacity of the public planners so that the planners have the basic understanding on how an economy works, particularly a developing economy like Bangladesh. With better understanding of the economy and the public policies, planners will be able to analyze the economic issues with greater rigor and confidence and this will be reflected in crafting national policy documents. With this broad goal in mind, the Senior Economist of the SSIP project Dr. Kazi Iqbal started teaching a course on the principles of macroeconomics to the officials from General Economics Division in 2014-15. Amin Bin Hasib provided excellent research support and helped add flesh to each chapter. A. Z. M. Saleh provided valuable editorial support. This textbook is the collation of the expanded version of the class notes prepared for the course taught at GED.

What makes this textbook unique is that it is written to understand the economy and macroeconomic policies of Bangladesh while maintaining the standard of the undergraduate level textbook on the principles of macroeconomics. Most of the examples and relevant issues are drawn from Bangladesh economy. Given the broad scope and importance of the issues, two chapters – chapter 4 and chapter 9 are fully dedicated to review the banking sector and fiscal policies of Bangladesh respectively, after explaining the relevant concepts and issues. A separate chapter (chapter 5) has been written on stock price bubble and burst with reference to 1996 and 2010-11 stock market debacles of Bangladesh. We believe that this issue should be included in the introductory text book of macroeconomics in Bangladesh and should become a standard common knowledge of the mass people. Once we become familiar with the process how a bubble generally forms and how it bursts, it will help us to spot the next one and avoid becoming an ignorant participant in it.

We know that all macroeconomic variables are linked through both accounting and behavioral relationships. We think introductory macroeconomics should offer the pedagogical tool to understand the accounting relationships among macro variables while appreciating the behavioral relationships among them. All major actors in the economy - households, businesses, government, commercial banks and central bank are connected through their balance sheets (accounting relationships) and action of one actor affects the balance sheet of the others. We think one should understand this accounting relationships first before exploring more complex behavioral relationships. In this light, we particularly focus on the balance sheets of the commercial banks and the central bank in explaining monetary economics. The linkages between these two balance sheets are central to the understanding of how monetary policy works. We highlight this point in the textbook in several occasions with examples from a commercial bank and the central bank of Bangladesh.

It is well understood that the use of textbooks designed to explain the issues and policies of the developed countries (e.g., USA, EU) in teaching introductory macroeconomics fails to motivate the students of a developing country like Bangladesh, largely because the students cannot connect what they read in textbook with what they observe around them or encounter in everyday life. As a result, the students learn only a few definitions, concepts and theories,

but don't know how to use them in explaining real world problems. We believe this textbook will help students appreciate that the tools learnt in economics are in fact useful in explaining real world issues and making policies.

Who are the right audience of this book? Typically, it is an introductory level macroeconomics book for the first year undergraduate students in economics. However, some of the chapters go beyond the introductory level without introducing any technical rigor. This book can also be used to teach in Masters of Development Studies type program where students have little background in economics. In fact, all public planners and development practitioners will find this book useful for their professional development.

The textbook has 13 chapters. We hope to include one more chapter on poverty and inequality in the next version. The discourse on the macroeconomic issues in a developing country cannot be complete without knowing their distributional implications. Despite having a plan to include the historical context of the Indian sub-continent of the issues such as national income accounting, banking, money, etc., we could not do it due to time constraint. We hope to include it in the next version as we think that it will motivate the students greatly. All the data and information used in the textbook are not up-to-date as the course at GED was taught in 2014-15 and also due to time constraint. We have a plan to create a databank which will contain all updated data used in this book and it will be made available online so that students can play around with this data. This is the first cut of the book which is yet to include exercises. We will teach this book for a couple of years before finalizing it. We believe that we will be able to meet the demand of the students only when this book is taught several times.

Your comments to enrich the content of the book will be highly appreciated.

General Economics Division (GED)
Bangladesh Planning Commission
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CHAPTER 1

What is macroeconomics all about?

All economic issues are broadly divided into two broad groups – microeconomics and macroeconomics. Microeconomics deals with the behavior of individual households and firms whereas macroeconomics helps us see the economy-wide broad picture. Let us take an example of price. When we analyze the movement of the price of a commodity, say rice, it becomes an issue of microeconomics. On the other hand, inflation, which is the change in an aggregate measure of price level, is a topic of macroeconomics. There are two types of macroeconomic variables - real and nominal. Real variables include real GDP, employment, capital stock, etc. while nominal variables are commodity price, money supply, interest, etc. It is important to understand that both microeconomics and macroeconomics dwell on policies and their impact on the well-being of the people. For example, In December, 2015 the Government of Bangladesh banned export of raw jute. This policy has profound implications for the production and price of raw jute. This is a microeconomic issue which focuses only on raw jute market. On the other hand, the central bank of Bangladesh, the Bangladesh Bank, has reduced the Repo rate by 50 basis points in the Monetary Policy Statement (MPS) for the period January – June, 2016. It was intended to help reduce the lending rate of banks and thus to stimulate the private investment and economic growth. This is an example of monetary policy which occupies a vast area of macroeconomics.

1.1 Two broad questions

Every discipline or sub-discipline is developed around some fundamental questions and macroeconomics is no different. In particular, macroeconomics seeks to provide answers to the following two sets of broad questions.

1. How an economy grows over time? Why some economies grow faster than others? How to foster growth?
2. Why an economy experiences ups and downs in economic activities and how to mitigate this fluctuation?

The first question essentially deals with the growth of an economy. Economic growth is a long term phenomena and hence is analyzed over a longer time horizon, from ten to twenty years, for example. This question seeks to explain how an economy grows over time, both theoretically and empirically and sheds light on the effective growth policy. It also addresses why some economies have grown or are still growing faster than others. That is, this branch of macroeconomics tends to explain why such vast differences in per capita exist and whether this gap will widen more in future. It also dwells on the implications of economic growth on poverty and distribution of income.

For example, the 7th Five Year Plan (FYP) for the period 2016-2020, prepared by General Economics Division of the Planning Commission addresses the first question – how the growth path of the economy can be maneuvered to a targeted path. The Plan sets the target

that the economy would achieve 8 percent growth rate in the final year of the 7th FYP, that is, in FY2020. The Plan then estimates the necessary investment required to achieve this target. The second question deals with why an economy goes through phases of fluctuations i.e. ups and downs in the movements of real GDP or output in the short run and the policy issues for minimizing these fluctuations as they can have adverse effects on the well-being of people. The idea is to stimulate the economy when the economic activity is in stagnation or downturn and slow down the economic activity when it is over heated. The policy interventions come from either in the form of fiscal policy or monetary policy or both. Keynesian fiscal policy or the Monetarist's fixed rule for money supply are the examples of different methods of minimizing the fluctuations. The theory of *business cycle* has been developed in order to understand the causes of fluctuations and means of addressing its negative impact.

Bangladesh Bank announces Monetary Policy Statement (MPS) in every six months which sets some targets of inflation, growth of money supply and credit. The prime objective is to stimulate economic activities while keeping inflation low. This is an example how the policy makers, especially the central bank, address the second question. Government also announces annual budget for its spending every year as well as various means (both tax and non-tax) of collecting revenue. As we will learn later in detail, an increase in government spending gives stimulus to the economy and so does the tax cut. These are also the instruments at government's disposal to minimize the fluctuation of the economy. However, it is also worth noting that fiscal policy, especially its public investment component has strong bearing on the growth potential of the economy. That is, fiscal policy addresses the first question as well.

1.2 Economic Growth: A Brief Overview

When we mention the term economic growth, we generally mean the growth rate of *real* output (i.e., real GDP). We are interested to measure the growth rate of physical quantity, not the growth rate of value (i.e., nominal GDP) which has a price component. Suppose an economy produces only one apple and the price of apple is Taka 10 each. So, the nominal GDP is Taka 10 and real GDP is one apple for the economy. If price doubles next year, nominal GDP will be Taka 20, but the real GDP remains the same. What matters is the change in physical quantity as far as economic growth is concern.

How an economy grows is one of the most fundamental questions that economists have been asking since the time of Adam Smith. At present we have better understanding of the drivers of growth of an economy and their historical origins. At the beginning we will introduce the concept of *production function* which is the key to understanding the basic mechanics of growth. Let us define a simple production function with three inputs - land, labor and capital. Output is produced by these three inputs with the help of some technology f(.):

$$\text{Output} = \text{Technology}.\ f\ (\text{Land, Labor, Capital})$$

where f(.) is a *function* i.e. an operation that transforms one or many variables into another. One can think of making orange juice out of orange. In this case the input is oranges; output is orange juice and the blender is the function (that carries out the transformation).

Similarly our production function shows us how output is produced in the economy. Since growth is the change in output, the production function shows how the change in land, labor

and capital lead to change in output. This is an aggregate production function for the economy – a hypothetical construction. We assume that this production function summarizes the entire production activities in the economy and thus it determines the total or aggregate level of output. The inputs to the production function: land, labor and capital are called the *Factors of Production*. Technology is not included in the production function as it is not a factor of production but rather its role is to enhance the efficiency of the production process. It has a *scale effect* and shifts the entire production function upwards when there are technological improvements that raise productivity.

In a land scarce developing country such as Bangladesh, there is hardly any scope for augmenting land. Therefore, in order to understand the factors behind the growth for a country like Bangladesh, more appropriate production function is the following:

Output = technology. f (human capital, physical capital)

Furthermore, the number of people is not a good proxy for factor input as it cannot capture the variations of skill level of the labor force. It treats skilled and unskilled labor equally as if they contribute to the production of output in the same way. Instead we use *human capital* as the factor of production which represents education, skill and even health and all these can be accumulated over time.

Before moving on, let's review the definition of physical capital. *Physical Capital* refers to such factor of production which is used to generate output but remains unchanged after the production process. An interesting analogy can be drawn to the role of catalysts in chemical reactions. Catalysts expedite chemical reactions but itself remains unchanged in the process. For example, fertilizers and pesticides are inputs in agricultural production but they are *not* considered as capital as they are used up in the process of production. On the other hand, say a tractor, which is also used in agricultural activities, but not used up in the process, is an example of capital good. Another relevant concept is *physical investment* which is defined as the change in physical capital stock. It is important to take note that physical investment is different from financial investment. An example of financial investment is stock and it is not a factor of production. We will elaborate this issue later in chapter 3.

Let's come back to the production function. If we define the production function in terms of technology, human and physical capital, we can see that an economy grows if it accumulates more physical and human capital as well as experience greater technological advancements. As physical and human capital grows, the economy grows and the rate of growth depends on the state of technology. Moreover, higher physical capital also enhances the productivity of human capital. A computer can increase the productivity of a worker many folds. When we talk about any growth strategies, for example, for the 7th Five Year Plan, we mean the strategies for increasing the physical and human capital as well as improving technology to attain certain level of economic growth.

Let us take an example of a simple economy to illustrate the points above. Consider the case of Robinson Crusoe, a man shipwrecked alone on a deserted island. Assume that initially he could catch only one fish per day and this took up all of his time of the day. But then he made a fishing net (a capital good) which allowed him to catch two fishes each day and with only

half of the time that it took him earlier. Therefore he now had more time available to spend in other activities including leisure. Less time working meant more free hours for Mr. Crusoe and subsequently his quality of life improved. So we can see how the effect of capital stock leads not only to higher productivity of labor but also fosters better quality of living standard by freeing up time previously occupied by production activities.

Now we will briefly present the evolution of the theories of economic growth, beginning with the Harrod (1939)-Domar (1946) model. This model emphasizes on the role of *savings* in economic growth. Savings is necessary not only for replacing the worn out capital in the economy but also for making new additions to the existing capital stock. This relationship between the capital stock and the growth of output is the main idea of the model and it shows that the more an economy is able to save and invest, the higher will be the growth rate of its GDP (output). This idea was central to the earlier Five Year Plan of India in 1960s. The policy makers and important policy documents such as 7th Five Year Plan of Bangladesh still uses the concept of capital-output ratio of this Harrod-Domar model to get an idea about the size of the physical investment required to achieve certain level of targeted growth.

Next comes the famous Solow growth model (1954) which is a cornerstone of the neoclassical theories of growth and it later earned Robert Solow the Noble prize in Economics. It is similar to Harrod-Domar but it also incorporates labor and technology into the model. The main features of this model are summarized below:

- Saving is important but it only affects the '*level*' of output, not the *growth rate* of output. This is a big departure from the Harrod-Domar model which considers saving as the source of growth. In neoclassical model argues that savings can raise the level of output in the economy but it cannot lead to continued growth of the output over time.
- Technological development is the key to growth as it leads to higher factor productivity and hence positive growth in output; thus technological improvements can explain the long-term growth of economies.
- Low income countries with low capital stock will catch up with the high income countries with high capital stock. The main idea that leads to convergence of countries is the law of diminishing returns of capital stock. Low income countries with lower capital stock have higher returns of capital than high income countries with higher capital stock.

The major shortcoming of the neoclassical growth theories is that it places *exogenous* technological improvements as the only source of growth and fails to explain the large differences in the growth rates of countries with similar technologies. The level of technology is determined outside the model and the model cannot explain how it evolves. To address these issues, the *endogenous* growth theories were put forwarded. These theories put greater emphasis on the role of Research and Development (R&D) activities and positive externalities from investments in human capital to determine the rate of return on capital investments. It assumes that investments in human capital generate positive external economies and enhance productivity. Thus the role of human capital, research and development and technology is seen to provide the 'micro-foundation' for economic growth. Additionally, the outcome of the model also suggests that there is no tendency for the growth rates of different countries to converge over time. We will learn later in chapter 12 that the property of diminishing return to (private) capital is counter balanced by the introduction of externalities which creates

increasing return to (social) capital. This is the fundamental property of endogenous growth theory which can generate perpetual long term growth.

Recent works on growth theory and empirics tend to find the historical causes of growth divergence and focus on the role played by *institutions* such as property rights, rule of law, etc. The neoclassical and endogenous growth theories shed light on the role of human and physical capital, technology, research and innovation in economic growth. But more fundamental question is why some countries have higher capital and improved technology than other countries. Economists like Daron Acemoglu (2001) argues that it is the earlier institution that makes the difference and the types of colonies have a huge impact on the type of institution a county ended up with. Europeans were more likely to set up extractive institutions where they did not want to settle and high mortality rates (e.g., due to malaria) explain their choice of settlement. In the places such as Africa tropical diseases such as malaria was widespread and so were the mortality rates of the European colonists. In these places, institutions which protect private property rights, ensure safety and security of life and property never emerged in the colonial era. These initial extractive institutions of several centuries ago determine the low level of institutions today and this creates the divergence in incomes. The logical flow of argument is following:

Settler mortality ➔ Settlement ➔ Early institutions ➔ Current institutions ➔ Current economic performance

1.3 Economic Fluctuations (Business Cycle) and Policies

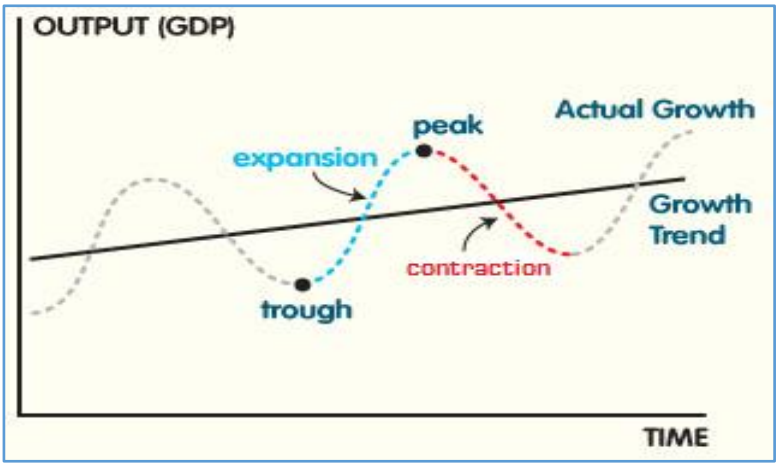
Every economy is dynamic in the sense that the level of output or the volume of economic activities vary over the course of time, even in shorter time horizon. Economic fluctuations are the rise and fall in the level of overall economic activities of an economy exhibiting *expansion* and *contraction* of the economy.

The economic model that describes these fluctuations experienced by an economy is the *Business Cycle*. Basically it is the ups and downs in the real gross domestic product (GDP) of an economy around its *long-term trend*. Thus business cycle is defined in terms of periods of relatively rapid economic progress (expansion), periods of relative stagnation or decline (recession) and the transitions in between. The use of the term 'cycle' may be a bit misleading in the sense that we usually define cycles as being the repetition of the same pattern over time and thus being predictable. But this is not the case with business cycle as so far they have proven to be difficult to predict. Typically, business cycles are characterized by four distinct phases: *Expansion, Peak, Contraction* and *Trough*. If we plot the real GDP data of an economy over the course of several years we can see that there are *peaks* and *troughs* – representing highs and lows in the level of economic activity. The Figure 1 below shows the typical fluctuations experienced by an economy over the course of time.

An *expansion* period is represented by the rising part of the real GDP plot that shows increasing economic activities (increasing employment, output, and upward pressure on prices). Next the economy reaches a *peak* which is the highest point of the business cycle and the economy is operating at its maximum attainable output with minimum unemployment (at or near full employment) and high price levels. After reaching the peak, the economy

enters into a period of *contraction* during which growth slows down, employment declines (unemployment increases) and the rising pressure on prices subsides. The economy then reaches the bottom - the *trough* – after which the economy starts to pick up again. These fluctuations occur around the *long-term growth trend* of the economy which is the average growth rate achieved over the cycles.

Fig 1: Business Cycles



Recession is defined as period when the output of the economy declines for several consecutive *quarters* (e.g., negative growth in two consecutive quarters in USA). It is marked by a significant decline in economic activities as reflected by falling indicators such as industrial production, employment, real income and trade volumes. Recessions are thus part of the contractionary phase of the business cycles on the downward sloped portion of the curve. They typically last from 6 to 18 months in duration. *Expansion* on the other hand refers to when the economy is experiencing growth and hence is on the upward sloped part of the business cycle curve. During expansion the economy becomes vibrant with all the indicators registering healthy signs.

The National Bureau of Economic Research (NBER) - an independent body - dates the business cycle in USA. But in Bangladesh we neither have such institutions nor the practice to keep track of quarterly performance of the economy, primarily because we don't have quarterly GDP data. This makes the tracking of the overall economic condition in the short term very difficult.

Another important issue that needs clarification is that *seasonality* is not the same as *business cycle*. The seasonal movements in variables occur usually within a year and the patterns repeat themselves after a set period of time, which makes them more or less predictable. For example, in our country the demand for non-food products is usually high around the time of the two Eid festivals. This makes real output to rise and follow more or less similar patterns during the course of a year and hence it displays seasonality. Agricultural production is another good example of seasonality as the production of agricultural output follows strict seasonal pattern. Therefore, analysis of business cycle requires that these seasonality is removed from the real GDP.

What causes the fluctuations? So far we have looked at the fluctuations in the real output over time that gives rise to the business cycles. But what actually causes these fluctuations?

The oldest model that explains the business cycles is the *Cobweb model*. The main idea behind the model is that there exist systematic mistakes in the formation of price expectations. This is especially applicable in the case of agricultural markets in which there is a lag between planting decision and harvesting and subject to whim of nature. The story goes like this: One year Mr. Farmer experienced a bumper production of rice and he believes that he will be able to earn a handsome amount from crop sales this year. But over production has led to reduction in rice price and his earnings are nowhere near what he had expected. He becomes very pessimistic about the price of rice and cut down his rice production in the following year and so do other farmers. This has resulted in shortage of rice production and price shoots up. And these cycles continue like cobweb.

In this case, Mr. Farmers' expectation about next year's price is based on this year's price. This is called *adaptive expectation* which is based on expectations from past experiences. But this sounds very irrational as people can't make the same mistake repeatedly – they will eventually learn from their mistakes. Economists rely on *'rational expectation'* which takes into account all available information – be it past, present and or future – in forming expectations. Thus rational expectations are the best possible expectations using all available information at hand. Expectation about the future is an important determinant of macroeconomic fluctuations. Today's expectation about the future not only impacts future outcome and today's outcome as well when people form expectations rationally. Developed countries routinely collect data on '*expected*' price of commodity and assets to better predict the future changes in prices. Bangladesh do not have any data on the expected price currently.

Next we turn to the two types of economic 'shocks' that leads to the creation of such fluctuations in the economy. *Shocks* are events that create significant changes within an economy and can have very large impacts. They can be predictable or unpredictable and affect supply and demand conditions of the economy.

Demand shocks are sudden events that can temporarily increase or decrease the demand for goods and services in the economy. For example, consumers'/investors' confidence may drop which will depress demand, force them to cut the spending and as a result output will contract. Demand shocks can be either positive or negative and their effects will also be on the price level of the economy. The demand shock may come from local or international consumers/investors as in the case of export demand. This is very applicable in the case of Bangladesh as the country greatly depends on export receipts and remittance for its sustained growth.

What are the most plausible demand shocks for Bangladesh? No matter how low the consumer confidence is, people will always buy the necessary goods. In a developing country where a large share of people lives under poverty, local demand shocks don't seem to work much. It may only work in the urban and semi urban areas where the middle class and rich people live and who spend a considerable amount of their income on luxury goods. After the terrorist attack in Gulshan in July 2016, the local economy in Gulshan and Banani areas in Dhaka were depressed because people didn't go out and spend in a fearful condition. Local culinary business in particular was hard hit by drastic drop of consumer's confidence of the overall situation.

Now let us take the example of political strikes that the country experienced in 2013. Did the people of Bangladesh spend less? Who were most affected? Investment demand is argued to be more affected than consumption demand due to political strikes. Political uncertainty is a dominant source of demand shocks in developing countries which hurt investors' confidence about future business prospects.

However, as mentioned earlier, lack of international demand also has the potential to affect the domestic economy substantially, especially the manufacturing sector in Bangladesh. In this globalized world, global shock is transmitted into the local economy through the greater integration of goods (international trade), capital (FDI, ODA) and labor (remittances) markets.

Supply shocks such as technological innovation, disaster, political uncertainty have the potential for affecting the supply of goods and services in the economy. For example, technological improvements will usually cause the supply of goods to rise and prices to fall while adverse impacts of disaster will lead to the reduction of supply of goods such as agricultural products.

Supply shocks seem to have more profound impact on output fluctuation in BD than demand shocks where economy is disaster prone and susceptible to political risks.

Other variables that also fluctuate with output are employment, inflation, import, export, trade deficit, budget deficit, remittances, exchange rate, stock prices, etc. Some of these variables are *leading variables* whereas some are *lagging variables*. Leading variables are those that signal future events, especially about the business. For example, bond yield rates are thought to be a good leading indicator of the stock market because bond traders anticipate and speculate trends in the economy. Therefore leading variables can be used to predict future patterns and trends. Other examples include stock prices, retail sales. On the other hand, a lagging variable follows the path of other variables. For example, the rate of unemployment is a common lagging variable which indicates how well the economy has been performing in the previous period.

Now let us turn again to our broad two questions we started with. The second question also involves the issue of abating the fluctuations – stimulating the economy when it is in downturn and cooling down when it is over heated. Here comes the roles of the government and the central bank in the form of fiscal and monetary policies respectively.

Monetary policy intends to impact the real output and price level in the economy by changing the money supply and interest rate in the short run. In our country the central bank, Bangladesh Bank, is in charge of conducting the various activities that constitute monetary policy. Broadly there are two types of monetary policies - expansionary and contractionary – for increasing and decreasing money supply, respectively.

When the economy is in slump, what would be the right monetary policy? First thing we need to do is to assess the causes of such slackness - whether the recession is driven by demand or supply shocks. This is the diagnosis stage. It is important to keep in mind that money supply can only stimulate the *aggregate demand* by lowering the interest rate or making more credit available to the businesses. Suppose the recession is demand driven, then, increases in money

supply (expansionary policy) will lower interest rate and stimulate investment demand. However, in practice, the process is not that straight forward as we describe here. The linkages between the part of money which is under central banks' control (monetary base), actual money supply in the economy, credit flow to the private sector and lending rates are not stable and highly unpredictable. This is reflected in Bangladesh Bank's failure to achieve the targets (e.g., growth of private sector credit) set in Monetary Policy Statement (MPS) in successive years.

Tools that monetary authority uses for conducting monetary policy are i) Open market operations (buying and selling of government securities), ii) Repo and Reverse Repo, and iii) Cash Reserve Ratio (CRR). In Bangladesh, a major task of monetary policy is to manage liquidity in the banking sector; that is, to change the composition of asset holding of the banks. For example, in the case of open market purchase, where central bank buys securities for liquidity from the banks, it increases liquidity and decreases the holding of government bonds by the banks.

Let us now turn our attention to fiscal policy. Fiscal policy entails all the public expenditure and revenue generating policies undertaken by the government of a country. Fiscal policy aims to improve the overall economic performance of the economy especially when it is going through economic slowdowns. Hence it is also termed as *fiscal stimulus* as it can help to stimulate the economy when it is slowing down. One fundamental difference between fiscal and monetary policy is that the former also impacts the growth (real) of the economy while the latter does not. There are two major tools of fiscal policy - G (Government Expenditures, including ADP) and T (Taxes). Fiscal Policy can also be expansionary or contractionary – with increases in G and reduction in T marking expansionary policy while the opposite is true for contractionary policies.

In this light, the annual budget can also be seen as a tool to stabilize the economy – to smoothen out the fluctuations. In the period of economic down turn, governments tend to spend more and lower the tax rate to boost the consumption spending in the economy. When the expenditure of the government exceeds the revenues generated, the government is said to run a *budget deficit* and the opposite is termed as a *budget surplus*. When the government is running a budget deficit, it needs to rely on additional financing. The primary sources of funds to finance deficits are to borrow from the commercial banks, from public (e.g., saving certificate) form the central bank and also from overseas (government, development partners, private banks).

CHAPTER 2

Measuring Standard of Living: National Income

How do we measure the prosperity of a nation? What is a good indicator of the standard of living of a country? How to compare two countries in terms of level of development? In order to answer these questions, we need an objective measure of prosperity of a country. Similar to household income, which is a good indicator of the well-being of the household, income of the whole country – the national income – is also a good metric of the country's economic welfare. The history of measuring national income dates back to the 17th century. William Petty first estimated the national income of England in 1665. Interestingly, the objective of measuring national income at first was in fact somewhat different – to prove mathematically that state could increase tax revenue by imposing more taxes. The national income he estimated was £40 million in UK. Later his estimates were refined and in 1696 George King introduced three separate ways of measuring national income – production, expenditure and income. We still follow these three approaches to estimate national income.

In 20th century, the issue of measuring national income resurfaced with the publication of 'The General Theory of Employment, Interest and Money" in 1936 by John Maynard Keynes who strongly advocated for having an accurate measurement of national income for planning purposes. He commissioned James Meade and Richard Stone to estimate the national income and later Richard Stone received the Nobel Prize in economics in 1984 for his work on national and international accounting.

In this chapter we first introduce a simple economy, the Robinson Cruse economy, to highlight the basic concept of national income and its components. Then we turn to more formal treatment of the methods of measuring national income and its related concepts and definitions. We also provide a brief overview of the accounting methods used in Bangladesh economy.

2.1 Robinson Crusoe Economy and Its National Income (Product)

We all know the story of Robison Crusoe, a sailor shipwrecked alone on a deserted island. He sets about collecting foods and making things that he needs using the few tools and materials that he was able to salvage from the shipwreck. The economy of Robinson is a one-person economy with his income being what he produces. It is not money, rather the coconuts he gathers, the fishes he catches, and the objects he makes make up the national income. Crusoe spends part of his time producing goods for immediate consumption such as fishes, coconuts and such. He also makes goods that enhance his productivity in the future such as making a crude knife and harpoon. At the same time, when he finds out that cannibals visit the island, he also builds a stockade to protect himself. We can classify the different types of goods Robinson Crusoe produces and add them by steps in meaningful way in order to get the measure of national income. Let us consider the following four cases.

Case 1: Only consumption goods

Initially Crusoe only knows how to catch fishes from the ocean. And as he eats the fishes for food, they are part of his consumption. As Crusoe does not know how to produce other goods, these fishes are the only goods in his economy. Therefore, with only consumption, national product for the economy is equal to the consumption goods. This is the simplest form of the Crusoe economy.

Case 2: Consumption and investment goods

Mr. Crusoe now learnt how to make crude harpoons from blades he salvaged from the shipwreck. With the aid of the harpoons, he can now catch more fishes each day. Although the harpoon wears out with use over time, Crusoe is able to use it several times before it becomes unusable and he has to make a new one. Thus the harpoons are a form of capital good that raises the productivity of Crusoe. The number of new harpoons he produces every year is the investment. Now with fishes and harpoons in the economy, we have both consumption and investment goods. Therefore, now the national product of the economy is the sum of the consumption and investment goods.

Case 3: Consumption, investment goods and public goods

When Crusoe finds out that cannibals visit his island, he begins to build stockades to defend himself and his dwelling. In an advanced economy, such goods (e.g., national defense) would be provided by the government. But being alone Crusoe himself has to provide such goods for himself. He is acting as if he is the government. Now we have a new good added into the Crusoe economy – defense, which is a form of public good. Therefore, with three types of goods in the economy, national product becomes the summation of consumption, investment and public goods.

Case 4: Consumption, investment, public, and export goods

One day Crusoe rescues Mr. Friday from his cannibal captors and brings him back to his dwelling. Mr. Friday is apparently an expert in collecting fresh coconuts from the trees but still hasn't quite figured out the art of catching fishes. On the other hand, Crusoe has nearly perfected his skill of catching fishes but cannot climb trees to collect the coconuts. But both immensely enjoy eating coconuts and fishes. To get around this problem they begin to trade coconuts for fishes. Assuming that Crusoe and Friday are separate economies, we now have that Crusoe exports fishes and imports coconuts from Friday. Therefore, there is now a new form of good in the Crusoe economy which is not produced but consumed in the economy. This is the key idea of the benefit of trade – an economy can consume beyond what it produces. With the addition of export, we now have national product of the Crusoe economy as the summation of consumption (fishes and coconuts), investment goods (harpoons), public goods (defensive stockade) and exports (fishes). However, we have to deduct import (coconut) as it is not produced but consumed in Robinson Crusoe economy. This is the most augmented form of the Crusoe economy. This gives rise to the famous national income identity:

National Income (product) = Consumption goods + Investment goods + Government goods + Export -Import

The Case 4 of the Robinson Crusoe economy also sheds light on how an economy can be analyzed by dividing it into four sectors - household sector, business sector, public sector and external sector.

2.2 National Income Accounting

Now let us turn to more formal treatment of the national income accounting issue. National income accounting is the technique used to measure the overall production (or income) of the economy. It is an accounting system that measures economic activity and its various components.
The fundamental identity of national income accounting is:

Total Production = Total Expenditure = Total Income

The above equality denotes that the total value of production of an economy is equal to the total expenditure by the economy on goods and services produced and is also equal to the income earned by the various factors of production involved in the production process. These three components are equal because there is a buyer and a seller for every good produced in the economy. For example, when you purchase a piece of cake for Tk. 20 from a local bakery, your expenditure of Tk. 20 is income of equal amount for the owner of the bakery. Now suppose the owner pays Tk. 15 to its employees as wage bills and keeps the rest as profit. That is, Tk. 20 is distributed between income of labor (Tk. 15) and income of capital (Tk. 5).

The national income accounting identity shows us that any of the three approaches—production, expenditure, or income—should give the same answer when computing the national income (GDP). We will discuss these three approaches in detail later on in this chapter. But before getting into details of these approaches, some concepts are needed to be clarified first.

2.3 Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is the broadest measure of economic activity. It includes the value of goods produced, such as bricks and books, and the value of services, such as haircut and healthcare received. The output of each of these is valued at its *market price*, and the values are added together to get GDP.

Formally, GDP is the total '**market value'** of all '**final goods and services' 'newly produced'** in a given '**time period** (usually a year)' within the '**boundaries of a country**'.

Each of the phrases in bold are the key words that are explained below:

Market Value: An economy produces several different goods and services with each having different prices. To calculate the value of output in the economy, we weigh each good and service by its market price and add them up. Since we cannot add apple with orange, we take the value (quantity multiplied by price) to compute GDP. That is, if the economy only produces apples and oranges, we have:
GDP = (price of apples × quantity of apples) + (price of oranges × quantity of oranges)

Thus GDP is a *monetary measure* of the output measured at *market price* which can be at current and constant prices. We will discuss the distinction between GDP at current price and GDP at constant price in detail later on in the chapter.

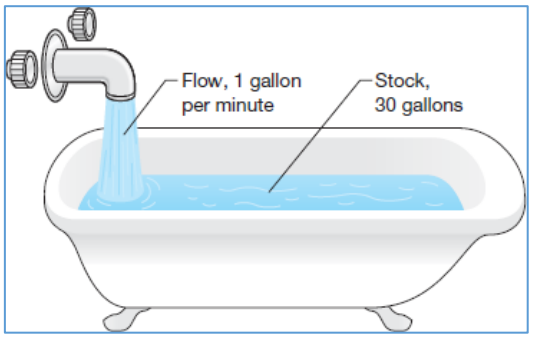
Final Goods and Services: Production of goods and services typically occurs in stages as some inputs are not readily available – they are produced also. Therefore, the production process requires some *intermediate goods and services* that are entirely used up in the stages of production to produce final goods and services which are the end goods in the production process.

In calculating GDP we only consider the final goods and services as inclusion of the intermediate goods would result in *double counting* because the cost of the intermediate goods and services used in producing the final good are already included in the price of the final good. That is, GDP should include only the market value of final goods and services.

Time Period: GDP is measured over a specific time period, usually a year or a quarter. Thus GDP for the year 2015 tells us the value of final goods and services produced over the course of one year of 2015. GDP is a *flow* variable which measures an amount in a period of time. On other hand, a *stock* variable is measured at a given point in time. The concept of stock and flow variables is discussed in detail in Box 1 below.

Box 1: Stock vs. Flow Variables

Stocks and flows are closely related: a stock is often an accumulation of flows over time. If the faucet has been running for half an hour with a flow of one gallon per minute and the tub was initially empty, then the stock of water in the tub will be thirty gallons in thirty minutes.



Another useful analogy to help distinguish between flows and stocks is by comparing the actions of a Still Camera (which records position at a point of time) with that of a Video Camera (which records position during a period of time). The most important flow variable we have discussed so far is the GDP which is the value of output produced per year or per quarter. Other flow variables include: investment, consumption, savings, government spending, import, export, expenditure, change in inventories (not just inventories), lending, borrowing, rent, profit, etc. On the other hand, stock variables include: Debt, capital stock, wealth, inventories (not change in inventories), opening stock, money supply (amount of money), population, etc. Some examples of related stock and flow variables are presented for comparison in the table below.

Table 1: Stock and Flow variables

Flow Variable	Stock Variable
Capital Investment	Capital Stock
Inventory Investment	Inventory Stock
Savings	Wealth
Borrowings	Debt

Newly Produced: Only goods and services newly produced in the current time period (typically one year) are included; it excludes those that were produced in the previous periods

like second hand goods. For example, if you buy a three-year old car from a used car dealer, there is no increase in production of automobiles - the cost of the used car is not included in GDP. The car was already counted in GDP when its original owner purchased it new. However, the value of the services provided by the car dealership that sold you the used car is included in current GDP. That is, something has to be produced new in the period of concern. Transfers (e.g., cash transfer to poor old people by the government) that do not involve the production of new goods and services are not part of GDP.

A common mistake we generally observe in newspaper when some measures of damages by natural disaster is quoted as the loss of GDP. Suppose an economy has a bridge which was built long time ago and the economy produces only crops. Heavy floods hit the economy and destroys both the bridge and all crops. It will be wrong if value of both the bridge and crops is added to measure the loss of GDP due to floods. Since the bridge was not built in the current year, its value will not be included in GDP but the services it provided throughout the whole year will be included.

Boundaries of a Country: GDP includes all goods and services produced within the boundaries of a country. Thus the value of output of Chinese-owned factories in Bangladesh is part of Bangladesh's GDP.

Now we detail out the issues of nominal and real GDP and its differences which were mentioned very briefly at the beginning of this chapter. These are concepts which are used not only for GDP but for other macroeconomic variables also. As we will learn, when we use the terms GDP or growth of GDP, we generally mean real GDP not the nominal one.

2.3.1 Nominal GDP

Nominal variables are measured at *current* market prices. Market prices allow us to sum up different goods and services to get a measure of nominal GDP. That is, conceptually speaking, if we want to calculate the nominal GDP of 2015, we have to multiply each product produced in 2015 with its price in 2015 to get nominal GDP of 2015. But nominal variables, including nominal GDP, have a huge disadvantage: they do not tell us what is happening to economic activity over time if prices are changing. If, for example, all prices of goods and services in the economy doubled, then nominal GDP would as well, but the actual quantity of goods produced, and hence economic activity, would be unchanged. An increase in nominal GDP could be due to rising quantity of goods and services or due to their rising prices, or both.

2.3.2 Real GDP

A measure of an economic variable in terms of physical quantities of goods and services is called a real variable. But when millions of goods and services are added up to get the GDP, it is next to impossible to express GDP in terms of physical quantity. Since the whole purpose is to isolate the effect of price change, a *base year price* is set at which all the goods and services are valued to get real GDP. Since the price is fixed at the base year, the changes of value captures only the changes in physical quantity. Currently, 2005-06 is used as the base year in Bangladesh. Therefore, in order to calculate real GDP of 2015, all the goods and services produced in 2015 are valued at 2005-06 prices. This is also called GDP at constant prices.

Numerical Example 1: Nominal vs. Real GDP

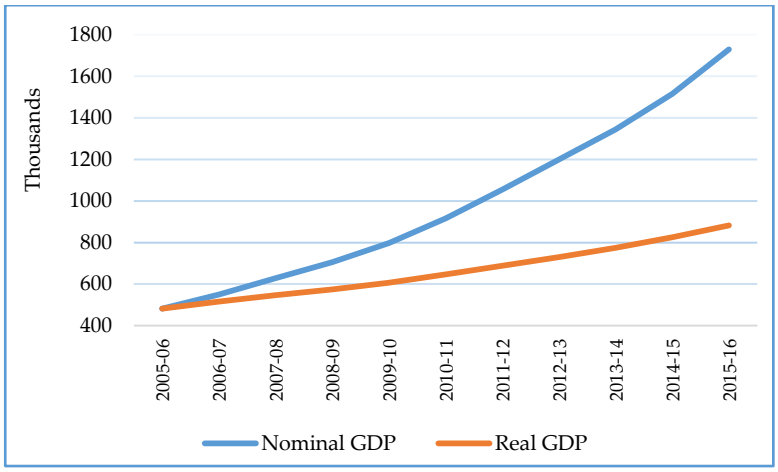
Year	Output	Current Price	Base year price (2005)	GDP at current price (nominal)	GDP at constant price (real)
2012	1 mango	Taka 10	Taka 4	Taka 10	Taka 4
2013	2 mangoes	Taka 5	Taka 4	Taka 10	Taka 8
2014	3 mangoes	Taka 8	Taka 4	Taka 24	Taka 12

Suppose a tiny economy produced only one good – mango. In 2012, the economy produced only one mango and the market price of a mango in 2012 was Taka 10. Therefore, the nominal GDP in 2012 was Taka 10. Suppose, the base year of the economy is 2005 and price of mango in 2005 was only Taka 4. Therefore, the real GDP or GDP at constant price in 2012 was Taka 4. Now, in 2013 the economy learnt how to increase its production and produced 2 mangoes. But the price of mango fell to Taka 5. Therefore, the nominal GDP remained constant (Taka 10) while the real GDP increased to Taka 8 in 2013. Which variable – nominal or real GDP captures the true change in economic activity? Nominal GDP cannot capture the fact that total production doubled (from one mango to two mangoes) in 2013 from the previous year, but the real GDP can. Similarly, when price increased to Taka 8 in 2014, nominal GDP shot up to Taka 24 and real GDP simply captured three-fold increase in output from 2012. Therefore, the idea of using a constant price is to take the price component out and make the measure only responsive to changes in the quantity of goods and services.

2.3.3 Nominal and real GDP of Bangladesh

Figure 1: Trends in Real and Nominal GDP (base year: 2005-06)

Source: Bangladesh Bank



The diagram above shows the trends in nominal and real GDP of Bangladesh. In 2015-16, GDP at current (nominal) and constant (real) market prices were 1729566 crore Taka and 883054 crore Taka, respectively. The two variables coincide in the year 2005-06, which is the base year in our calculation of real GDP. The two variables follow similar trends but as expected, real GDP has trailed behind the nominal value. This is due to the fact that the increase in the price level has offset the growth in the output of the country.

As only the yearly GDP data is available for Bangladesh economy we cannot observe the *seasonal fluctuations* that take place over the quarters of a year. Seasonality are patterns in time series (data collected over an interval of time) that repeat over known, fixed periods of time. For example, consumer expenditure in our country will generally be higher during the months of Eid and this pattern will be repeated each year and so depicts seasonality. In case

of Bangladesh we do not need to de-seasonalize the data, i.e. adjust it for seasonality, as it is in annual format. If we had quarterly data, we need to do two things before any analysis of short-run fluctuation (business cycle) – take out the seasonal part (de-seasonalization) and present the data in annual basis, that is, if the GDP grows at the same pace as in the quarter, what would be the GDP in a year? Simply put, we multiply the quarterly data with 4. This applies for other quarterly variables such as export, import, etc. We can use real and nominal GDP to learn something about the price level of the overall economy. In order to do so, we define a concept called GDP deflator.

2.3.4 GDP Deflator

It is the ratio of nominal GDP to real GDP or implicit price deflator of GDP. The name deflator comes from the fact that this measure deflates nominal GDP to obtain real GDP. Since nominal GDP and real GDP are same in the base year, The GDP deflator is 100 in the base year as

$$\text{GDP deflator} = (\text{Nominal GDP}/\text{Real GDP}) \times 100$$

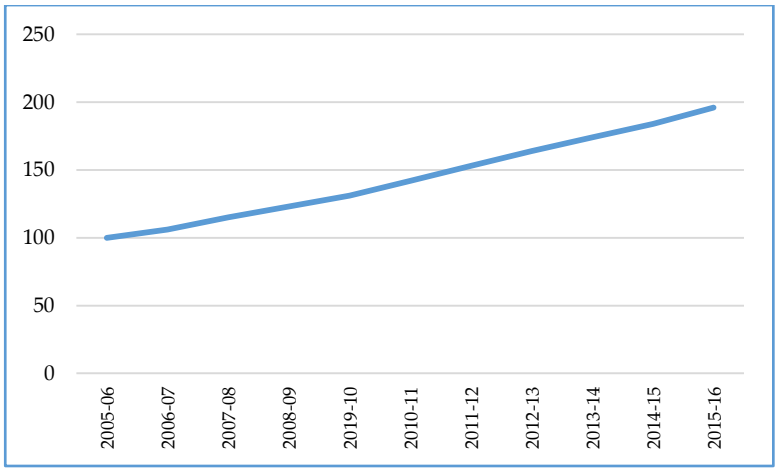
Change in GDP deflator is a measure of inflation. We don't use the GDP deflator to measure inflation in Bangladesh, instead we use Consumer Price Index based inflation. We will learn these issues in detail in Chapter 6.

Numerical Example 2: GDP deflator

Year	GDP at current price (nominal)	GDP at constant price (real)	GDP deflator	Inflation
2012	Taka 10	Taka 4	2.5	-
2013	Taka 10	Taka 8	1.25	(1.25 - 2.50)/2.5 ×100 = -50%
2014	Taka 24	Taka 12	2	(2 - 1.25)/1.25 × 100 = 60%

Figure 2: GDP deflator for Bangladesh (Base year for GDP: 2005-06)

Source: Bangladesh Bank



We use the numerical example of 1 to show the method of calculating GDP deflator and the changes in GDP deflator or inflation. Since we have only one good in the economy, the measurement of nominal and real GDP is very straightforward. One thing to bear in mind is that GDP deflator takes into account the prices of all goods and services in the economy unlike other measures of prices such as Consumer Price Index (CPI) or Producer Price Index (PPI). Figure 3 shows the trend of GDP deflator for Bangladesh for the period of 2005-06 to 2015-16. It is equal to 100 in 2005-06 (the base year) and has increased steadily over the period, almost

doubling itself ten years down the line in 2015-16. Thus it reflects the fact that inflation has been positive during the period under review. How does it compare with other measures of price? We will discuss this issue in Chapter 6.

A related concept is Net Domestic Product (NDP) which is defined as:

Net Domestic Product (NDP) = Gross Domestic Product (GDP) – Depreciation

NDP thus comes closer to measuring the net volume of goods and services produced in the country in a given period: It is the total value of production minus the value of the amount of capital used up in producing that output. Depreciation is the amount of capital stock that wears out in a year.

2.3.5 The Three Approaches of Measuring GDP

As mentioned earlier that the three approaches of measuring GDP provide the same results. These approaches are:

1) Product Approach or Value Added Approach
2) Expenditures Approach
3) Income Approach

2.3.5.1 Product or Value Added Approach

The product approach defines a nation's GDP as the market value of all final goods and services newly produced within a nation during a period of time. It appears that one can calculate GDP by simply counting the number of goods and services produced, multiply them with their prices and adding them up. But the problem is, in reality it is very difficult to distinguish between final product and intermediate product. Let us take an example of potato production. We know the amount of potato produced in a year. Can we just include the value of total potato output in GDP? The answer is no. Because, a share of potato will again be used in potato processing industries to produce potato flakes. Potato flakes is a kind of powder of potato used to produced chips, crackers, and other ready-make foods. Currently there are three large potato flakes industries in Bangladesh who supply the flakes to the producers of chips and crackers. Therefore, if we include the market values of potatoes, flakes, chips and crackers produced in the economy, we multiple-count potatoes and flakes because they are already included in the price of chips and crackers.

In order to avoid this multiple counting, we only consider the *value added* at each stage. Value added is the market value of the product sold by a firm, less the value of the products purchased and used by the firm (as inputs) to produce the final product. It is also important to note that new *capital goods* are included in GDP. Recall from the previous chapter that capital goods are *used in the production of other goods* and are not used up during the stages of production. They are included in GDP because they are not considered in calculating the value added in each stage. Moreover, *Inventory Investment* is also included in GDP. This inventory is the firms' holdings of raw materials, unfinished goods, and unsold finished goods which are produced in this period but not used up in the current period. Since this inventory is not included in calculating value addition, like capital goods, it has to be included in GDP.

There are also non-production transactions that we should not include in the GDP. These transactions take place without the production of new goods and services. These include public and private transfer payments, stock-market transactions and second-hand sales. In case of each, payments are *not* made for *newly produced* goods and services but rather for goods and services produced in previous periods. Thus such transactions are excluded from the GDP.

To clarify the value addition approach of GDP determination, consider the following simple example. Take the case of a loaf of bread. Bread is made from flour, which is in turn produced from wheat. Suppose that the wheat farmer sells a kilogram of wheat for Tk. 20 to the flour miller who uses the wheat to make flour and sell it for Tk. 30 to the baker. For simplicity, assume that the cost of inputs for the farmer is zero. Therefore, while the *value addition* by the flour producer is equal to the price at which he sells the flour minus the price he paid for his input (wheat) i.e. Tk. 30 – 20 = Tk. *10*, it is equal to Tk. *20* for the farmer. Next the baker uses the flour to bake a loaf of bread and sell it to the local grocery store for Tk. 50. The value addition in this stage is Tk. *20* (Tk. 50 – 30). Finally, the local grocer packages the loaf of bread and sells it to a customer for Tk. 60. Thus the final price of the bread is Tk. 60 and the value addition in the last stage is Tk. *10* (Tk. 60 – 50). The table below shows the value addition of the bread at different stages of production.

Table 2: Hypothetical value addition for a loaf of bread

Stage of Production	Product/ Intermediate Product	Selling Price of the Product (Tk.)	Value Addition (Tk.)
Farmer	Wheat	20	*20* (=20 - 0)
Flour Producer	Flour	30	*10* (=30 - 20)
Baker	Bread	50	*20* (=50 – 30)
Grocery Store	Packet of Bread	60	*10* (=60 – 50)
Total Value Addition			60

From the table we have that the total value addition for the bread is Tk. 60. Recall that is exactly *equal* to the final *selling price* of the bread. Therefore, the final price of a product that involves multiple stages of production reflects the value added at each stage. Thus we can use the individual value additions for a product to arrive at its final price while simultaneously avoiding the issue of 'multiple counting' (as the price of inputs are explicitly taken into account). Hence we can use the value added approach to determine the price of different commodities and then add them together to get the value of GDP. Bangladesh Bureau of Statistics (BBS) primarily uses this approach to measure the national income of the country.

2.3.5.2 Expenditure Approach

We now turn to our second technique for computing GDP. With the expenditure approach, GDP is the total spending on currently produced final goods and services in the economy. The expenditure approach allows us to get information on the different components of spending that add up to GDP. The national income accounts divide spending into four basic categories: *consumption expenditure*, *investment*, *government purchases*, and *net exports (export-import)*. We have already seen these components from the Robinson Crusoe economy. The national income accounts add up these four categories of spending to determine GDP in the *national income identity:*

Y = C + I + G + NX
Where,
Y = GDP = Total production (output)
C = Consumption expenditure
I = Investment expenditure
G = Government Purchases of goods and services
NX = Net Exports (Exports – Imports)

Whatever is produced in the economy is bought by the households (C), businesses (I), government (G) and rest of the world (NX). The idea is that the spending has to be on the domestically produced goods and services to measure the national income. That is why we deduct import from the national income identity. To illustrate this point, write the national income identity again:

Y = C + I + G + Ex – Im

Note that the C, I and G all include both domestic goods and imported goods. That is, by denoting domestic goods with superscript 'd' and imported goods by 'Im', we can write:

$C = C^d + C^{Im}$; $I = I^d + I^{Im}$; $G = G^d + G^{Im}$
Therefore, $Im = C^{Im} + I^{Im} + G^{Im}$

Since these imported goods are ***not*** produced within the boundary of the economy, we deduct them from the total spending in the economy.

For Bangladesh in 2015-16 (in Billion Taka), we have:

GDP = 12144 (C) + 3767.5 (I) + 2333.3 (G) + 1675.4 (Ex) – 1990.5 (Im) = 17929.7

The above expression tells us that the GDP for Bangladesh in the fiscal year of 2015-16 was Tk. 17929.7 billion which is arrived at by adding up the different expenditure components. The lion's share (70.2%) of the GDP was from private consumption expenditure while investment made up about 21.8%. The share of government expenditure (including govt. consumption and investment) was 13.5% and net exports (exports minus imports) were negative in the tune of -1.8% of GDP.

2.3.5.3 Income Approach

The third way of measuring GDP, the income approach, involves adding up all the incomes received by households and firms in the economy, including profits and tax revenue to the government. The income approach defines GDP in terms of the income derived or created from producing all final goods and services. Following this approach, we have:
Net Domestic Income/Product at *factor cost* =

Wages, Salaries, and Supplementary labor Income +
Profits of Corporations and Govt. Enterprises before taxes +
Interest and Investment Income +

Net Income from Farms and Unincorporated Businesses +
Taxes less subsidies on factors of production

Therefore, Net Domestic Income at factor prices is the summation of various incomes earned by all the factors of production in the economy from both domestic and foreign sources.

Now we define,
Net Domestic Income at *market prices* = Net Domestic Income at factor cost +
Indirect taxes less subsidies

We need to add indirect taxes less of subsidies to Net Domestic Income at factor prices to get Net Domestic Income at market prices because these needs to be added to net income of businesses to yield their total income. The difference between factor prices and market (final) prices (used in the expenditure calculation) is the total taxes and subsidies that the government has levied or paid on that production.

Finally, we can illustrate the relationship between expenditure and income methods:
Gross Domestic Product (GDP) at *market prices* = Net Domestic Income at market prices + Capital Consumption Allowances (depreciation) + Statistical Discrepancy

In obtaining the net income of businesses, depreciation was subtracted out, so in order to compute gross income, we have to add it back and get GDP. The term *Statistical Discrepancy* is used to account for the fact that due to errors in figures and missing information, the production-based measure of GDP and the income-based measure of GDP may not always be equal.

Bangladesh National Accounts Statistics

In Bangladesh, the Bangladesh Bureau of Statistics (BBS) is entrusted with the duty of compiling and disseminating GDP data of the country. The BBS follows the UN recommended guidelines of the System of National Accounts (SNA) 1953, 1968, 1993 and 2008 in computing the national income figures of the country.

Due to a lack of required information on the income of the various factors of production, the BBS cannot compile GDP using the Income approach and instead relies on the Production and Expenditure methods.

- **Production method**: In this approach, the economy is divided into 15 industry sectors following the International Standard Industrial Classification (ISIC), rev. 3. Therefore, the entire economy of the country is represented by these 15 sectors. In this method, the Gross Value Added (GVA) of each of the sectors is summed together to arrive at the value of GDP. GVA of each sector is equal to the total value of output of the sector minus the value of intermediate consumption of the sector (i.e. the cost of production inputs). Sector-wise deflator is used for estimating sectoral GVA at constant price. For example, producer price index for manufacturing production is used for manufacturing sector. The GDP figure BBS publishes is derived using production method.

- **Expenditure method:** While BBS publishes the estimates of GDP using production method, it uses expenditure method primarily to estimate the expenditure components of GDP such as investment (I), public expenditure (G), Export (Ex) and Import (Im). The required data on exports and imports are taken from the Balance of Payments (BOP) of the country, which is reported by the Bangladesh Bank. Public expenditure comes from Annual budget. Investment has two parts – Gross Fixed Capital Formation (GFCF) and changes in inventories. The public part of GFCF is estimated from Annual Development Programme (ADP) and the private part of it comes from import data and survey of firms. While Household Income and Expenditure Survey (HIES) of BBS helps to get an idea of the private consumption expenditure (C), in practice, the consumption expenditure is derived residually.

2.3.6 Components of GDP revisited

Let us now examine in detail each of the components of the national income derived using expenditure method.

2.3.6.1 Consumption Expenditure (C)

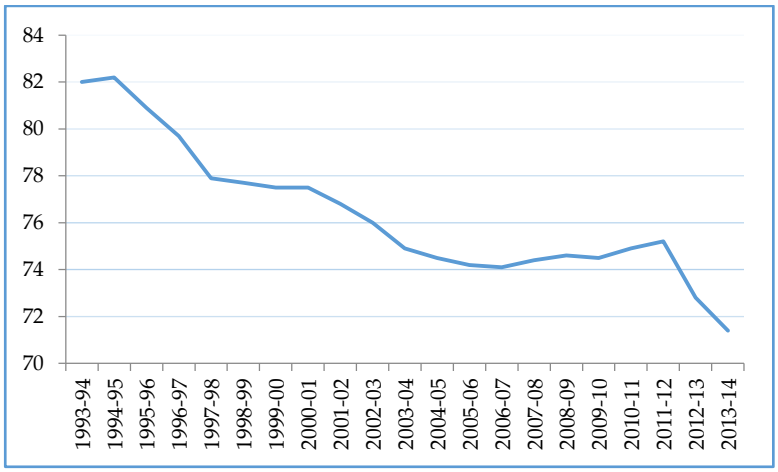
Consumption expenditure is the total spending for currently produced consumer goods and services. It can be broken down into three basic categories:

i. Consumer durables are goods purchased by consumers that last a long time (are durable), such as automobiles, electronic goods, and appliances.
ii. Nondurable goods are short-lived consumer goods such as food, housing services (but not purchases of houses, which are part of investment), fuel, and clothing.
iii. Services are purchased by consumers; examples include haircuts, education, medical care, air travel, and financial services.

The figure below plots the trend in the share of private consumption in GDP (C/Y) over time for Bangladesh. It can be seen that the share of consumption has more or less steadily declined over the period of time under review. The share was 82% in 1993-94 but has steadily declined to around 70% of total GDP in the mid-2010s.

Figure 3: Share of private consumption in GDP (C/Y) for Bangladesh (%)

Source: Bangladesh Bank



2.3.6.2 Gross Investment (I)

Investment is spending on currently produced *capital* goods that are used to produce goods and services over a period of time. Investment has to do with the creation of new physical capital assets – assets that create income. The transfer (sale) of claims of existing capital goods does not create new capital. Thus the purchase of stocks or bonds, purchases that do not necessarily involve newly produced goods and services are not included in investment. Investment (I) includes:

- All final purchases of machinery, equipment, and tools by businesses
- All construction (residential construction as well as the construction of new factories, warehouses, and stores)
- Houses and apartments are capital goods for households because they produce a service (a roof over our heads) over an extended period of time.
- Increases in inventories (unsold goods) are considered to be investment because they are unconsumed output.

2.3.6.3 Depreciation

In real life capital goods like machinery wear out over time from use. Depreciation is the decline in the value of capital goods from wear and tear due to usage and from capital being scrapped because it has become obsolete. By subtracting depreciation from the Gross Investment, we have:

Net investment = Gross Investment - Depreciation

More formally, capital consumption allowance or depreciation is the amount of capital that is used up (consumed) in the process of producing the GDP. Therefore, subtracting the value of depreciation from gross investment gives us the net investment which is the actual addition to the stock of existing capital.

Box 2: Financial Investment vs. Physical Investment

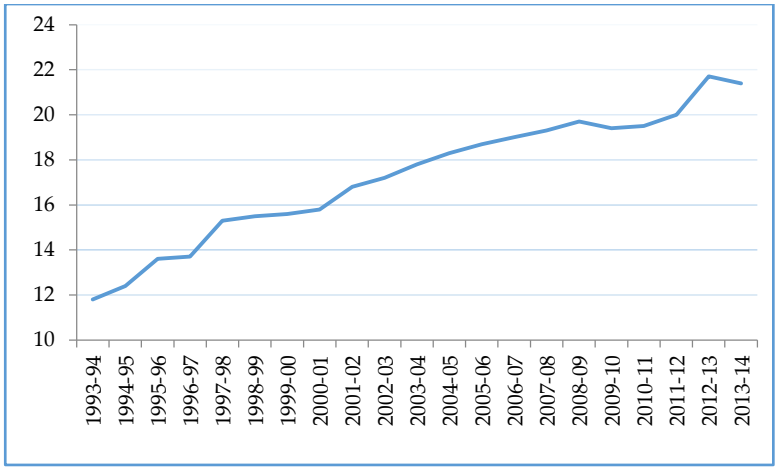
A mistake we commonly make is to confuse the concept of *financial capital* with that of *physical capital*. When economists talk about investment, they refer to the change in physical capital stock which is used to produce output, but itself remains unchanged after production. Physical capital is tangible and examples include factories, machinery, tools, vehicles and computers among other things that are used in the production of new output. Thus, say if a printing press purchases an additional printing machine for its workshop, then it has undertaken an investment in physical capital.

On the other hand, *financial capital* refers to the indirect or less tangible form of investment that include securities like stocks and bonds issued by businesses for the purpose of raising capital for business. Thus, when we say that we need some amount of 'capital' to start a business, we are referring to the *financial investment* requirements for starting up the business. So now we can see the distinction between the two: investments in physical capital increases capital stock for businesses while financial investment allows businesses to raise money for their operations.

The following example will clarify the point. Suppose that the printing press issues bonds and raises Tk. 1 lac as its capital. This will be a financial investment for those who have purchased the bonds. Now if the press uses Tk. 10,000 from the (financial) capital it raised through bond to buy a new machinery, it will certainly be a physical investment for the press as the new machine will add to its existing capital stock.

Figure 4: Share of private investment in GDP (I/Y) (%)

Source: Bangladesh Bank



We can divide the total investment in the economy into those undertaken by the private and the public sector. Private investment is made up of all the investments undertaken by businesses in the country. The figure above plots the trend in the share of private investment in GDP (I/Y) over time. The share of private investment has increased continuously over time, almost doubling itself in the span of 20 years. It was just about 12% of GDP in 1993-94 but had increased to around 22% of GDP by 2013-14. Thus the growth in private investment for the country has clearly followed an upward trend.

2.3.6.4 Government Expenditure (G)

If you recall, you will notice that we have distinguished both consumption and investment between their *private* and *public* components. Now it will be clear why we made this distinction.

While all governments need to undertake investments to enhance productivity and improve the standard of living of its people, it also has to make consumption expenditures. Government consumption are the expenditures for goods and services that the government consumes in providing public services to the people. Therefore, when we refer to government expenditure (G), we are including both investment and consumption of the government. That is:

Govt. expenditure (G) = govt. consumption + govt. investment

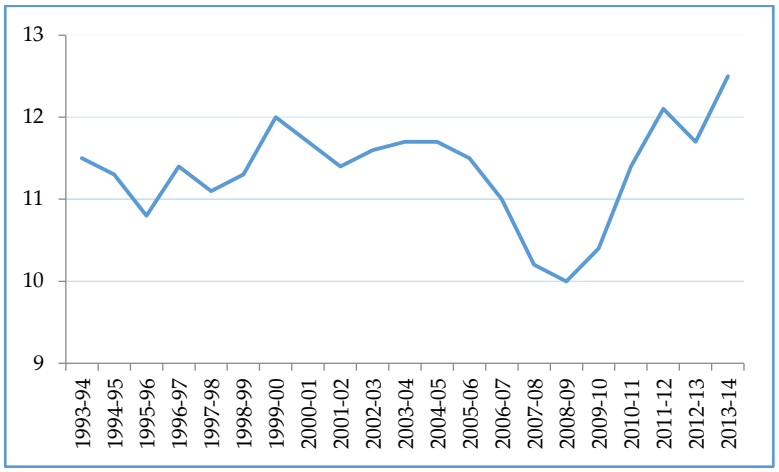
Government consumption includes all government expenditures on final goods, and all direct purchases of resources, including labor. It does *not* include government transfer payments like unemployment benefits, old age benefits and expenditures on social safety net programs when it is used to calculate GDP. Because they are not payments in exchange for currently produced goods and services, they are not included in government purchases, G, or GDP. Interest payments on government debt are also not made in exchange for goods and services and so they are not included in 'G' as well.

On the other hand, govt. investment includes all forms of investment undertaken by the public sector of the country. These include govt. projects and programs aimed at the development of the country. Therefore, investments related to infrastructure, healthcare, education, energy, transportation and other public services are all part of public investment. In Bangladesh, the

development works of the govt. are all brought together under the umbrella of the Annual Development Programme (ADP).

Figure 5: Share of government expenditure in GDP (G/Y) (%)

Source: Bangladesh Bank



The figure above shows the trend in the share of govt. expenditure (G) in GDP over time. In the span of 20 years, G as a percentage of GDP has experienced some fluctuations but has always remained in the range of 10-12% of GDP. In more recent times, it has been exhibiting a slightly upwards trend, accounting for 13.5% of GDP in 2015-16.

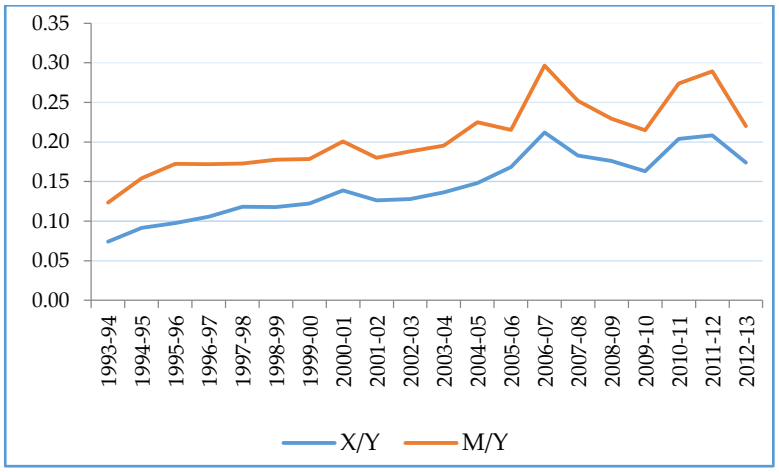
2.3.6.5 Net Exports (NX)

Net exports are exports minus imports: that is, the value of currently produced goods and services exported, or sold to other countries, minus the value of goods and services imported, or purchased from abroad. Net Exports are also referred to as the Trade Balance.

Net Exports (NX) = Exports (X) – Imports (M)

Figure 6: Share of Export and Import in GDP (Ex/Y, Im/Y) (%)

Source: Bangladesh Bank

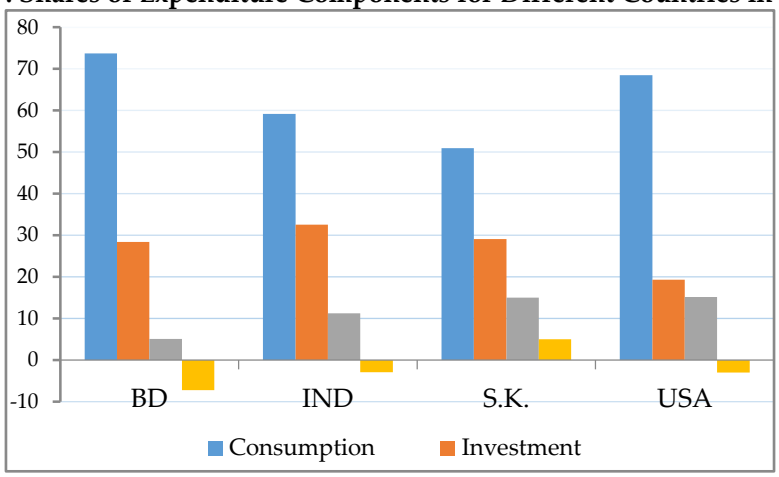


The diagram above shows the trends in export and import for the period of FY94 to FY14. Imports always exceeded exports during the period making net exports negative. The two variables move closely together and thus exhibit similar patterns. Why do export and import move together? The export of Bangladesh heavily depends on the import of capital goods and other raw materials. That is, increase in import, especially, the capital goods, is a good *leading indicator* for export in Bangladesh. This also implies that most of the import is productive

import. For example, in 2014-15, only about 11% of total imports were for consumption purposes.

Box 3: A comparison of Expenditure Components of GDP of different countries

Fig 7: Shares of Expenditure Components for Different Countries in 2013



Source: World Bank

The figure above shows the shares of national expenditure components in 2013 for four different countries. A developing country (Bangladesh), an emerging economy (India) a new industrialized country (South Korea) and an old developed country (USA). How do the components of GDP differ across these four countries?

First compare Bangladesh with India. Share of private consumption is about 15 percentage points lower and share of investment is about 3 percentage points higher in India than Bangladesh. It indicates that the economy of India consumes less but invests more than that of Bangladesh. However public spending is also much higher in India than Bangladesh. Interestingly, in Korea, private consumption is about 50 percent whereas investment is similar to that of BD. The case of USA stands out – shares of both consumption and investment are lower than that of BD, with larger size of the government. Except for South Korea, all four countries experienced trade deficit in 2013.

Initially, a developing country (BD) consumes more of its GDP and thus have smaller shares for investment and govt. expenditure. As the economy becomes more industrialized (India), the share of consumption goes down, while both investment and govt. spending's are found to increase. With continued industrialization (South Korea), the share of govt. expenditure further increases while investment share is seen to decrease slightly. However, it is important to bear in mind that the size of government (G) also depends on the economic philosophy of the ruling party. For example, the Republican party in USA advocates for smaller government, as opposed to the Democrats. Net exports, which are negative for developing countries (BD and India), are seen to become positive for South Korea. For older industrialized economies (USA), we find that the share of consumption in GDP has increased again along with a larger share of govt. expenditure. But at the same time, the share of investment has declined further (with negative net exports).

In conclusion, we can summarize the following observations:

- Share of consumption in GDP initially declines with the level of industrialization. But once fully industrialized, the share of consumption increases again.

- Developing countries have low levels of investment but it increases with further industrialization. After attaining a high level of industrialization, the share of investment falls.
- Developing countries initially import more than they export but with further industrialization, exports tend to dominate.
- Size of the government heavily depends on the economic philosophy of the ruling party in developed countries.

2.3.7 Other National Accounts

2.3.7.1 The Gross National Product (GNP)

The Gross National Product (GNP) is the market value of all the goods and services produced in one year by the factors of production owned by the citizens of the country Unlike Gross Domestic Product (GDP), which defines production based on the geographical location of production, GNP underscores the ownership. Therefore, GNP includes GDP, plus any income earned by residents from overseas investments and employments (remittance), minus income earned within the domestic economy by overseas residents. Thus:

Gross National Product (GNP) = Gross Domestic Product (GDP) + Net Income from Non-residents

Example: Consider the following two examples which parallel each other.
First, take the case of a Korean RMG firm that is operating in BD with its own factory in Dhaka. The output produced by the firm is *within the boundaries* of BD and hence it will be part of the *GDP* of BD. When the firm sends part of its profits back to Korea, the value of the profit will be part of the *GNP* of Korea (as the firm is owned by Koreans) but will not be included in the Korean *GDP* (as the firm is located outside Korea).

Second, now consider the case of a Bangladeshi agro-processing firm (e.g. Pran) operating in India. While the output of the firm will be part of the GDP of India (as it is located in India), the profits sent back to BD by the firm will be included in the GNP of BD (as the firm is owned by Bangladeshis) but it will also be *subtracted* from the GNP of India (as the firm is not owned by Indians).

Both examples thus illustrate how GNP is arrived at by adding GDP to *net inflow* of income from abroad.

2.3.7.2 Private Disposable Income

The amount of money that households have available for spending and saving after **income taxes** have been accounted for. As it is the actual amount of income that households finally have to spend on goods and services (and for savings), it is a crucial determinant of consumption expenditure. Thus it is often monitored as one of the many key economic indicators used in advanced economies.

Private Disposable Income = Personal Income – Income Taxes

2.3.8 Shortcomings of GDP

The concept of GDP, in practice, is used not only as a measure of how much is being produced but also as a measure of the welfare of the residents of a country. The general consensus is that an increase in GDP of a country means that its people are better off. But this may not always be the case as GDP data are far from being perfect measures of economic welfare. This sub-section examines some shortcomings of GDP in measurement issues and capturing welfare.

2.3.8.1 Measurement Issues

a) **Nonmarket Goods and Services**: Not all goods and services produced in the economy are sold in markets that provide us with their market prices. Goods and services produced but not exchanged for money are known as 'nonmarket production'. Some of these nonmarket goods and services are left out of measures of GDP by necessity as it would be too difficult and or costly to value them. For example, many household services that are produced within a family or by friends - cleaning, cooking, child care - could be included if it were easy to measure them.

b) **Underground Economy**: Nonmarket goods and services produced in the underground economy are also not counted in GDP. In the underground economy, goods and services produced are hidden from the government, either because they are illegal (drugs, gambling, smuggling) or because the person producing the goods and services is avoiding paying taxes on the income he or she receives. Similarly, barter i.e. exchange of goods for other goods also takes place outside of recorded marketplaces. Money that is generated through both illegal and unreported legal activities in the underground economy is referred to as 'black money'. The underground economy is also known as the black market, shadow economy or parallel economy.

   Values of underground transactions in certain economics can be quite large. According to a 2011 study by the Ministry of Finance (MoF), the size of the underground economy of BD was estimated to be only 7% of nominal GDP in 1973. But since then it has grown enormously and in 2010 it was estimated to a whopping 62.75% of GDP. Therefore, almost two third of all transactions in the country were carried out outside of official records. This certainly has negative consequences, especially for the fiscal health of the economy, as tax evasion and tax avoidance greatly reduces govt. revenues. At the same time, a 2015 report by the Global Financial Integrity estimated that Bangladesh had an annual illegal financial outflow of about 1.5 billion USD. Unregulated capital flight also adversely affects the economy.

c) **Imputed Values for Nonmarket Goods and Services**: Many other nonmarket goods and services lacking a market price are counted in GDP by determining an imputed value, an estimate of what the price of the good or service would be if it were traded in a market. For example, for a person who owns his/her own house, the imputed value of his/her house rent is the rental price of comparable housing in the market. Similarly, government services aren't directly priced by the market as well. The standard practice is to value these services at the cost of providing them. The salaries of the government

staff are used to measure the value of services of the government sector. The drawback of such accounting method is that if a government increases the salaries of its staff, the value of the service sector increases and it raises the GDP and thus GDP growth. Therefore, GDP will be mis-measured to the extent that a Taka spent by the government produces output valued by the public at more or less than a Taka.

d) **Changes in quality and the inclusion of new goods:** Higher quality and/or new products often replace older products. GDP, being a quantitative measure, does not capture the value of improvements in product quality. Thus it is difficult to account correctly for improvements in the quality of goods when calculating GDP. Take the example of computers, whose quality has improved dramatically while their price has fallen sharply. Although some adjustments are made for the improvements in quality, but the task is not easy, especially when new products and new models are being invented.

e) **Leisure/Human Costs:** GDP does not take into account leisure time, nor is consideration given to how hard people work to produce output. Also, jobs are now safer and less physically strenuous than they were in the past. Because GDP does not take these factors into account, changes in real income could be understated.

2.3.8.2 Shortcomings in Well-Being Measurement

1) **GDP and the Environment**: GDP calculation also do not subtract anything for environmental pollution and degradation. Pollution and damage to the environment can occur in producing the goods and services of the economy. But these are actual costs to the society and their exclusion means that the true costs of producing the goods and services are not reflected in GDP statistics. Therefore, GDP is most likely to overestimate the true value of production of the economy. As an example, one study of Indonesia claims that properly accounting for environmental degradation would reduce the measured growth rate of the economy by 3 percent. But, although no subtractions to GDP are made for their harmful effects.

2) **Composition and Distribution of Output**: GDP does not tell us what mix of goods and services benefit or harm society because it assigns equal weight to products of the same price. For example, the value of a book and a gun will be equal in GDP if their prices are similar. Therefore, clearly some goods and services are enriching while others are potentially detrimental to society. It does not tell us how much of the output goes into welfare measures for the public. At the same time, we do not know what proportion of the income goes into the hands of the different income classes. For example, consider two countries with identical GDP per capita (per person). But it may be that in one country the upper class receives most of the income while in the other the distribution of income is more equal among its people, making the latter country better off. Thus not only the quantity of output but its composition and distribution are vital for the society as well.

3) **Non-material Sources of Well-being**: Just as a household's income does not measure its total happiness, a nation's GDP does not measure its total well-being. There are

many things that could make a society better off without necessarily raising GDP, e.g. crime reduction, peaceful international relations, greater civility among the people, less drug and alcohol abuse, etc. GDP as a measure of national income only values goods and services but fails to encapsulate these non-material sources of wellbeing for the people.

Box 4: Gross National Happiness

Given the short comings of GDP to reflect the non-material sources of wellbeing of people, the 'Gross National Happiness' measure was devised to gauge the collective happiness of a nation. It was coined in 1972 by Jigme Singye Wangchuck, the then King of Bhutan to represent a commitment to build an economy that would better suit Bhutan's cultural and spiritual values instead of just focusing on the material development embodied in GDP. The concept has now evolved into a socioeconomic development framework.

The primary concept of GNH is that sustainable development should take a holistic approach towards notions of progress and give equal importance to *non-economic* aspects of wellbeing. The philosophy of GNH is based on the following four pillars:

- Good governance
- Sustainable socio-economic development
- Cultural preservation
- Environmental conservation

The four pillars are further classified into nine domains in order to create widespread understanding of GNH and to better reflect the holistic range of GNH values. The nine domains are: *psychological wellbeing, health, education, time use, cultural diversity and resilience, good governance, community vitality, ecological diversity and resilience,* and *living standards*.

Each of the domains represent the components of 'wellbeing' of the people and the term wellbeing here refers to the fulfilling conditions of a 'good life' as per the values and principals of the GNH measure.

<u>The GNH Index</u>
The Gross National Happiness Index is a single number index constructed from 33 indicators categorized under the nine abovementioned domains. These indicators aim towards emphasizing the various aspects of wellbeing and the different ways of meeting these underlying human needs. The GNH Index varies from 0 to 1, with a higher number indicating greater levels of happiness. The 2010 GNH Index was 0.743 which reflects that 74.3% of the people of Bhutan reported being happy. A related concept is that of the Gross National Wellness (GNW) Index, developed in 2005 by the International Institute of Management in USA. This index is based on the following seven dimensions: economic, environmental, physical, mental, work, social and political.

Some Important Identities

Box 5: Difference between identities and equations

An identity is true for all values of x. An equation is true for only certain values of x.

An example of an identity is

$\sin^2 x + \cos^2 x = 1$

This is true for all values of x.

An example of an equation is

$x^2 - 16 = 0$

The only values of x that make this true are 4 and -4.

2.4 Relationship between Saving and Investment

2.4.1 Simple Economy

The amount of output produced in an economy equals the amount of output sold. But what happens to unsold output? Recall from before that the accumulation of inventories by businesses is regarded as investment by the firms or more specifically as inventory investment. And thus all output can be seen as either being consumed or invested. Therefore, in a simple economy without government or international trade, we have:

$$\mathbf{Y = C + I}$$

i.e. output sold can be expressed in terms of consumption and investment spending.

Next we look at the relationship between income, consumption and *saving*. Part of income is used for consumption while the rest is saved. Using **S** to denote *private sector saving*, we have:

$$\mathbf{Y = C + S}$$

That is, income can either be allocated to consumption or saving.
Combing the above two identities, we have:

$$\mathbf{C + I = Y = C + S}$$

The left hand side of the identity shows the components of demand while the right hand side shows the allocation of income. Subtracting **C** from each part of the identity, we have:

$$I = Y - C = S$$

From which we have:

$$\mathbf{S=I}$$

Thus in a simple economy *investment is identically equal to saving*. This relationship can be extended in several ways.

2.4.2 Economy with Government and International Trade

Let us now reintroduce the government and external sector in our economy.
Recall the **national income identity** is:

$$Y = C + I + G + NX$$

Turning to the relationship between output and **disposable income** (**YD**) we have:

$$YD = Y + TR - TA$$

where,
TA - Total Taxes

TR - Transfers to the private sector (including interest payments on public debt)

We have now incorporated in our model the fact that part of income is spent on taxes (TA) and that the private sector receives net transfers (TR) in addition to the national income. Thus disposable income is equal to income plus transfers less taxes.

Disposable income (YD), in turn, is allocated to consumption and saving:

$$YD = C + S$$

Rearranging the above identity, we have:

$$Y = YD - TR + TA$$

Substituting for Y:

$$YD - TR + TA = C + I + G + NX$$

Using the definition of YD, we have:

$$C + S - TR + TA = C + I + G + NX$$

Cancelling out C on both side and rearranging, we get:

$$\mathbf{S = I + (G + TR - TA) + NX}$$

(G + TR) is the total government expenditure which consists of government purchases and government transfer payments while TA is the total amount of taxes received by the government. Therefore, the term in parentheses is the excess of government spending over its receipts or the **budget deficit** (budget surplus is defined in the opposite manner). And as usual, NX shows the net export of goods and services.

The above identity shows that **private saving** is used to **lending** to *businesses*, to *government* to finance budget deficit and also to the *foreigners* who are buying more goods from us than we are buying from them.

Rearranging again, we have:

$$S - I = (G + TR - TA) + NX$$

In this form, the above identity tells us that the excess of **saving over investment** (S – I) in the private sector is equal to the **government budget deficit** (BD) plus the **trade surplus**. Therefore, these three important macroeconomic variables are clearly linked with each other. There is another way to look at the saving-investment relationship from the sectoral point of view.

We know,

$$Y = C + I + G + (EX - IM)$$

And as national income for the economy is the sum of private disposable income (YD), retained earnings or undistributed profits (UP) of businesses (to finance new investment) and total taxes (TA), we have:

$$Y = YD + UP + TA$$

Equating the above two identities:

$$YD + UP + TA = C + I + G + (EX - IM)$$

Rearranging,

$$(YD - C) + UP + (TA - G) + (IM - EX) = I$$

Using ROW to denote the Rest Of the World, in words the above identity is:
Private saving + business sector saving + government saving + ROW saving = Net Investment
The sum of savings by the private sector, business sector, government and ROW is the net investment in an economy with government and international trade.

2.4.3 Twin Deficit

Economists call the phenomenon of a simultaneous *trade deficit* and *government budget deficit* as **twin deficits**.

As private sector saving is equal to households saving plus business sector saving, using S_P to denote private sector saving and defined as $S_P = (YD - C) + UP$, we have:

$$S_P + (TA - G) + (IM - EX) = I$$

Rearranging and adding government transfer payments (TR),

$$(S_P - I) + (IM - EX) = (G + TR - TA)$$

This is a popular way of writing the twin-deficit identity since it explicitly indicates two deficits. If the right-hand-side expression $(G + TR - TA) > 0$, then the country has a government budget deficit. If $S_P - I = 0$, then $IM - EX > 0$, that is, *budget deficit implies trade deficit*.

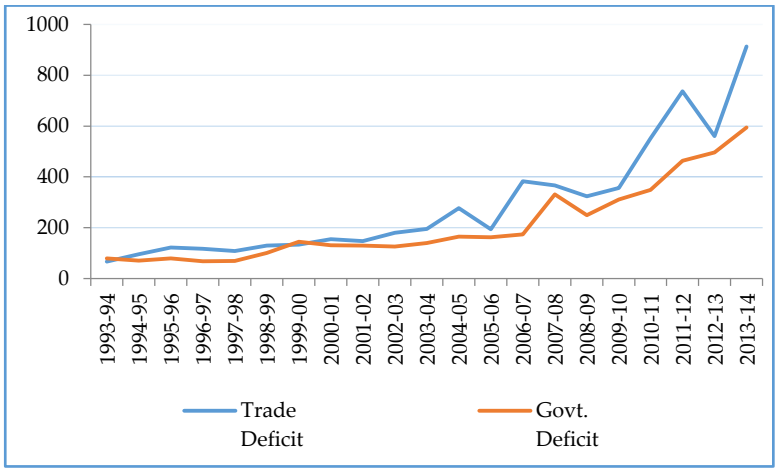
What is the intuition behind it? For example, if in an economy's savings is equal to investment and its government is running a budget deficit (surplus), it translates into a trade deficit (surplus) of equal amount for the economy. Any sector of the economy, spending more than its income, has to borrow from somewhere to pay for the excess expenditure. Given that the entire saving in an economy is used in investment, now if the government wants to spend more that it earns, the only source from which it can borrow is the external sector. With the economy borrowing more from ROW then lending out to it (imports exceeding exports), the budget deficit of the government turns into a trade deficit of equal amount.

Is there any *causal* relationship between these two deficits? That is, does one cause the other? If government purchase (G) increases and it includes a large share of imported goods, then imports (IM) also increase. This causal relationship makes more sense in the case of **capital mobility**. Capital mobility refers to the flow of capital in and out of a country. The flow chart below illustrates the mechanism by which government budget deficit leads to trade deficit for an economy.

Budget deficit ➔ govt. borrowing increases ➔ interest rate increases ➔ domestic asset becomes attractive ➔ foreigners buy more domestic asset ➔ demand for domestic currency goes up ➔ domestic currency appreciates ➔ export decreases and import increases ➔ trade deficit increases.

Figure 8: Twin Deficit 1993-94 to 2013-14

Source: Bangladesh Economic Review



Analytical Problems 1: One's expenditure is someone's income

Something is fundamentally flawed in the following report. Explain what it is in the light of what we have learnt in chapter 2.

The Daily Star

Thursday, May 12, 2011

GDP's 2.05pc lost to domestic violence, says CARE study
Staff Correspondent

Domestic violence costs 2.05 percent loss of Bangladesh's Gross Domestic Product (GDP) worth around Tk 15 crore annually, revealed a study of CARE Bangladesh yesterday.

The amount is equal to the sum spent by the government in the health and nutrition sector, said the study conducted on 483 such women victims from January to June last year in 24 villages of Dinajpur, Tangail and Sunamganj.

CARE Bangladesh, supported by USAID, organised the study's dissemination at a seminar titled "Domestic Violence Against Women: How much it costs to the Bangladesh society" at Journalism Training and Research Initiative (Jatri) conference room in the city.

The study's objective was to capture direct costs incurred by victims and perpetrator from an incidence of domestic violence, said speakers at the seminar.

They said the social impact of domestic violence is grave as it creates social instability, insecurity and gender disparity. But the economic impact is also immense, which remains unseen most of the time, they added.

It found that direct cost of violence is Tk 8,105 crore per annum including medical costs of the victim and perpetrators' family, filing cases and attending court.

Income loss of perpetrators and victims due to such violence costs Tk 5,978 crore per annum, including the time perpetrators evade police and serve jail.

Analytical Problem 2: Accounting vs. Behavioral Relationship

Explain the mistake in the following policy document:

Wilbur Ross and Peter Navarro played instrumental role in crafting important policy papers on trade for the US President Donald Trump during his election campaign. A policy paper says.

"When net exports are negative," Ross and Navarro write, "that is, when a country runs a trade deficit by importing more than it exports, this subtracts from growth."

They believe that, therefore, they can boost GDP and thus growth by curtailing imports. Trump proposes eliminating America's $500 billion trade deficit through a combination of increased exports and reduced imports. Again assuming labor is 44 percent of GDP, eliminating the deficit would result in $220 billion of additional wages. This additional wage income would be taxed at an effective rate of 28 percent (including trust taxes), yielding additional tax revenues of $61.6 billion.

CHAPTER 3

Saving and Investment: Role of Financial Institutions and Instruments

In the last chapter we leant from the national income identity that in a simple economy the amount of total saving by the households is equal to the amount of investment by the firms. This is true, when total amount produced is allocated between consumption and investment. But the real world is more complex than that. All the savings of the households may not be transformed into investment. In a developing country like Bangladesh, a large share of savers remains outside the formal financial market. Limited financial products, lack of financial literacy, and inefficiency in the financial market may impede bringing savers and borrowers together. That is why an efficient financial market plays the crucial role in transforming household saving into investment, and thus determines overall economic growth. The identity that equates saving to investment assumes that financial market functions perfectly well.

Consider for example that Mr. Shimul is an inventor who has invented a faster and smarter computer prototype which will completely change the way we work by making us much more productive. But unfortunately for Mr. Shimul, he lacks the amount of capital required to set up a factory and take his innovation into mass production. At the same time, Mr. Moin is a retired official who has accumulated a large amount of personal savings over the years but has not put them into any investment ventures. Now Mr. Shimul and Mr. Moin happened to meet and soon discover that they are in a position which is mutually beneficial to each other. Mr. Moin could lend his savings to Mr. Shimul, who could then use it to finance the construction of his factory and go into production. With his business underway, Mr. Shimul could then pay back Mr. Moin his original amount in addition to an *interest* for the use of the funds. In this way, not only will the individuals be better off, but the society at large will also benefit from the availability of more productive computers and hence higher output in the future.

The role of financial markets (e.g., bond and stock markets) and financial intermediaries (banks, leasing firms, etc.) is to link people like Mr. Shimul with Mr. Moin by moving funds from those who have a surplus (in our example Mr. Moin) to those who have a shortage of funds (Mr. Shimul).

How household savings are turned into investment by the business sector? From business's point of view, what are the options they have in terms of financing their investment? There are four options available for businesses, particularly in a developing country like Bangladesh:

1. Bank/Non-bank financial institutions (*Financial Intermediaries*)
2. Bond market (*Debt financing*)
3. Capital market (*Equity financing*)
4. Undistributed Profits/Retained Earnings

The first three options transform household savings into investment. Saving of the firms can also be transformed into investment using these three options. Undistributed profits or the retained earnings are the income of the business sector that is left after distributing dividends to all its share-holders. In this case, the earnings from business are invested back in the business. Thus saving by the business sector is transformed into investment.

A bank is an example of a financial intermediary. They bring the borrowers and savers together. In other cases, businesses borrow directly from the market through the bond and capital market. In this chapter we will discuss the first three financing options. The financing options can be divided, as noted above, into two categories: i) *direct finance* in which the borrowers borrow funds directly from lenders in financial markets by selling them *securities* (also called *financial instruments*), and *indirect finance* in which the borrowers get funds from the lenders via the intermediation of financial institutions like banks and leasing company. Direct financing is also of two types – *debt financing* and *equity financing*. In case of debt financing, the firm borrows from the public or other firms by issuing debt instruments such as bonds. Equity financing, on the other hand, offers equity partnership such as stock. We discuss these financial options in detail below.

3.1 Commercial Banks

3.1.1 What is a bank?

Banks are a type of financial intermediary that operate between the lender (savers) and the borrower (spenders) and helps to transfer funds from savers to borrowers. Banks, like any other financial intermediary, achieves this by borrowing funds from the lender (savers) and then using these funds to make loans to the borrower (spenders). Thus banks collect deposit from the households and others (the savers), pay them a fee for using their money (deposit interest rate), and lend it to the business sector (the borrowers) at a higher interest rate (lending rate) than the deposit interest rate. The difference in interest paid to the savers (depositors) and the interest charged to the borrowers is the bank's income.

3.1.2 Why does a bank exist?

Why can't a borrower directly contact the savers, bypassing the banks? It would lower the cost of borrowing since banks can't take the interest margin any more. There are several reasons why the functions of a bank in intermediation are more efficient than the borrowers directly contacting the lenders.

Transaction Costs - the time and money spent in carrying out financial transactions. Costs of finding the right savers and borrowers can be very high. Economists call it 'information cost'. Banks specialize in gathering information about borrowers and minimize this cost. For example, if Mr. Moin (the retiree) wants to lend his money to Mr. Shimul (the inventor) he will need to consult a lawyer to draw up the exact terms and conditions of the loan contract that will specify exactly how much interest Mr. Shimul will pay. Drawing up such a contract will not only take time but will also be expensive even to the point that it may not be worthwhile for Mr. Moin to lend out the money to Mr. Shimul.

Financial institutions can substantially reduce transaction costs because they have developed an expertise in lowering such costs. Since they deal with thousands of clients, this large number allows them to take advantage of *economies of scale*, which is the reduction in costs per Taka of transactions as the size of the transactions increases. As a result of low transaction costs, financial institutions can also provide their customers with *liquidity services* that make it easier for customers to conduct transaction through for example *checking* and *savings* accounts.

Risk Sharing – we already saw how banks can reduce transaction costs. This allows them to have several advantages, one of which is the reduction of *risk* that the investors/depositors have to face. This is achieved through a process of *risk sharing*: banks use the funds collected from their depositors to make out loans and earn a higher interest on the loans (than that paid out on deposits). We all know of the general notion that a risky investment pays a higher return (remember no risk, no gain!). And so while loans earn a high interest, they are rather risky and depositors would be reluctant to take on such risk. Therefore, banks provide depositors with a safer asset (deposits) but also pay them a lower interest. In this way, banks *share* the *risk of investment* with their depositors.

At the same time, the *spread* in the interest rate (*lending rate minus deposit rate*) not only allows the banks to earn a profit but also leads to the process of *asset transformation*. This is the mechanism via which banks use assets of one form (money deposited by clients) to make another type of asset (loans made out to borrowers). Put in another way, this also implies that banks convert risky assets (loans) into safer assets (deposits) for the investors.

Diversification - Financial institutions also help their customers to *diversify* their holdings of various assets in order to lower the extent of risk to which they are exposed. We all know the age old adage 'Do not put all your eggs in one basket' and this is main idea behind diversifying assets. *Diversification* refers to investing in a portfolio (collection) of assets. Banks invest savers' money in multiple instruments and thus minimize the risk.
Therefore, we can see that financial institutions like banks have several advantages and provide services to their clients that make them an essential part of the financial market of any economy. Their crucial role is in channeling loanable funds from the lenders-savers to people with productive investment opportunities.

3.1.3 How does a bank work?

As mentioned earlier, banks have the function of collecting deposits from their customers and using them to make loans to others like individuals and businesses. But to understand how exactly a bank works we need to look at the bank's *balance sheet*. The balance sheet shows the list of *assets* and *liabilities* of the bank and it has the property that it balances, i.e.

Total Assets = Total Liabilities + Capital

That is, the total value of assets owned by the bank is equal to its total liabilities and the value of the bank capital. Additionally, the balance sheet also shows the ***sources*** of funds for the bank (liabilities) and the ***uses*** to which they are put into (assets). Now suppose Mr. Naquib, who is a very rich business man, wants to start a bank. In order to do so, he needs to put some money as capital (paid-up capital), required by the law of the country. This capital will allow

him to collect depositor's money, which is generally a few multiples of the size of capital, and lend it to the borrowers. Therefore, depositor's money is banks' liabilities and credit to the borrowers is banks' asset. However, there are other forms of assets that a bank holds. The table below shows the balance sheet of a hypothetical bank to illustrate the various items that make up the assets and liabilities of a bank.

Table 1: Hypothetical balance sheet of a bank

Asset	Liability
• Required Reserve (CRR) • Loans • Investment in Govt. Bond • Investment in Stock • Physical investment • Excess Reserve	• Deposit • Capital

3.1.3.1 Liability

We start with the liabilities side first as this shows where the bank gets its funds from. A bank acquires funds by issuing (selling) liabilities and hence these are also referred to as the sources of funds. Liabilities include:

Deposits: These are funds that are deposited by customers in their bank accounts. They include deposits made in current account and savings account. Checkable deposits are those on which checks can be drawn and thus they are payable on demand i.e. the bank is obligated to pay the depositor immediately when he/she wants to make a withdrawal. Similarly, if a person receives a check written on an account of the bank and presents it to the bank, the bank has to pay out the funds immediately (or credit them to the person's account). They are usually the primary source of bank funds.

Therefore, deposits are an asset for the depositor as it is part of his/her wealth while it is a liability for the banks as they are obligated to pay out whenever the depositor wants to make withdrawal. Current Accounts are the cheaper source of funds for the banks as the depositors are willing to forgo some interest in order to have access to liquid asset while Savings Accounts have to pay interest.

Bank Capital: The other item on the liability side of the bank balance sheet is capital - the bank's net worth, which is equal to the difference between the total assets and liabilities of the bank. A bank forms its capital by selling its stocks to the share-holders and from retained earnings. The most important function of bank capital is that it acts as a cushion against a reduction in the value of the bank's assets which may lead to insolvency of the bank i.e. not being able to pay the depositors. To see why this is so, recall that:

$$Capital/Net\ worth = Assets - Liabilities$$

The assets are what generate income for the bank while liabilities are the bank's sources of funds. What remains after subtracting all liabilities from assets is the value of the bank capital. Now if for some reason, say due to a large volume of default loans (loans are assets for banks),

assets fall short of liabilities. The bank will now be in trouble as the claims on assets are greater than the value of assets. The bank will then be unable to pay back the depositors. One way the bank can get itself out of the trouble is if it has adequate levels of capital. The bank can then use the capital to pay for its liabilities and reestablish equality in its balance sheet. In this way, capital acts as a safety reserve for such instances when the bank experiences reduction in its asset value.

3.1.3.2 Assets

After having raised the required capital and collected deposits, the bank now has to generate income to cover the cost of fund from the depositors and to make profits. Therefore, bank assets are usually referred to as the *uses of funds* and the interests earned on them is the revenue for banks. A typical bank's assets include:

Reserves: All banks have to hold some of the funds that they have acquired as deposits in an account with the central bank of the country, Bangladesh Bank. Reserves are these deposits with the central bank plus currency that is physically held by banks in their own vaults (also known as *vault cash*, as it is stored in the bank vaults). Although reserves do not pay any interests to the bank, they have to be held by banks. First some reserves, called *required reserve*, are held due to the *reserve requirement*, the requirement of commercial banks by the central bank of the country that for every Taka in deposit at the bank, a certain fraction must be kept in reserves. This fraction is called the cash reserve ratio or CRR. Additional reserves, called *excess reserves*, also have to be held by the banks as these are the most liquid of bank assets and can be used to pay customers whenever they make withdrawals.

Loans: Banks usually make profits by issuing loans to individuals, businesses and others. Although loans are a liability for the individuals or businesses receiving it, it is an income generating asset for the banks. Loans are typically less liquid than other assets as they cannot be turned into cash until the maturity of the loan. Additionally, the risk of default is also higher on loans. But the lack of liquidity and higher risk of default also means that banks will earn their highest returns on loans compared to other assets.

Investments in Securities: The bank's holdings of various types of securities are a very important source of income for the banks. Securities can be of different types. *Government Bonds* are treasury debt securities issued by the Bangladesh Government and they are liquid as they can easily be traded and converted into cash with little transaction costs. *Stocks* are the other important securities held by the banks and consist of shares of publicly traded companies in the stock exchanges of the country. Compared to government bonds, stocks are more risky securities as there is the possibility that the issuer of the stock may not be able to pay dividend or the price of stock may fall well below its worth.

Physical Investments: The other type of assets of the bank includes its physical capital such as the building of the bank, furniture, computers, equipment used, etc. These are assets for the bank as they can be sold in the case of bankruptcy when the bank will have to liquidate its assets to pay off its debtors and equity owners.

Box 1: A Brief History of Banks - The Medici Family

It was no accident that the first modern banking industry flourished in Renaissance Italy, especially in Florence and Venice. These cities were the commercial hubs of Europe in middle ages and also became the center of arts and culture. These thriving cities where the places where people with high political and commercial power used to live. Medici family, who ran Florence for about 400 years, was one of them. Modern banking system owes to this family for their contribution to rapid expansion of branches throughout the Europe under a central holding company, giving rise to a modern international banking system. The Medici Bank was established in 1397 by Giovanni di Bicci de' Medici. Though the Medici family was not great innovators in banking system, they took full advantage of the techniques newly developed in Italy such as double-entry book-keeping, bills of exchange and book transfers.

The Kings were the major clients of the Medici Bank, though the sovereign risk was high. Lending to the royalties was also seen as means of getting other businesses. Medici bank collapsed in 1494 due to depression, internal strife and French aggression.
Source: *Those Medici*, The Economist, December 23, 1999

3.1.4 The Fable of the Goldsmith: Fractional Reserve Banking

Now let us delve into an interesting story about the fabled goldsmith. The story goes like this. There was once a goldsmith in Old England who owned a very strong vault which was used for the safekeeping of valuables. And many people of the town used the opportunity to safeguard their valuables by keeping them in the goldsmith's vault. So they brought their gold and silver coins to the goldsmith, who in return gave out receipts or notes for the stored amount. In this way the goldsmith gathered gold and silver deposits worth £ 200. At this point, the amount of gold and silver stored with the goldsmith (the reserve) equaled the claim by the depositors against this reserve, i.e. both were equal to £ 200.

The goldsmith soon noticed that the depositors would only occasionally return their notes for redemption, usually being satisfied with just holding them. After some time, the notes given out by the goldsmith began to circulate in the town as a form of currency when people realized that the notes were actually claims on assets that could be converted back to coins just by returning them to the goldsmith. Now the goldsmith was rather intelligent and soon figured out that he could write up more notes that look just like the original ones and lend them out (as the notes were not accepted as money). Say for example, someone wanted to borrow £ 20 from the goldsmith. The borrower would then sign a contract for the loan amount, promising to pay back the principal plus interest, and the goldsmith would give him notes that represent a claim of £ 20.

Having received a loan of £ 20, the borrower would then spend the notes to make purchases and the new notes would circulate in the community along with the old ones. But notice that, now the total value of notes in circulation was £ 220, which is £ 20 more than the value of the deposits with the goldsmith (£ 200). Therefore, the goldsmith was able to create £ 20 worth of additional money using the same £ 200 of reserve.

With his confidence now boosted, the goldsmith had no reason for stopping with just one loan. After a while, he had eventually made out loans to several people worth a total of £ 400

by issuing additional new notes of the same value (i.e. £ 400). The goldsmith's balance sheet then looked like this:

Table 2: Balance sheet of the Goldsmith

Asset	Liability
• Reserves £ 200 • Loans £ 400	• Notes £ 600
Total £ 400	Total £ 400

The balance sheet shows the assets and liabilities of the goldsmith after he issued the loans worth £ 400. While his reserve is still equal to £ 200, the goldsmith has been successful in creating £ 400 that did not exist before, simply by making out loans!

3.1.4.1 Fractional Reserve Banking

The purpose of the story above is to explain the concept of *fractional reserve banking*, a system in which the value of the reserves held by the banks is just a *fraction* of the total amount of their outstanding notes. Recall that the notes that were initially in circulation totaled £ 200 that is equal to the reserves. But due to the loans made out by the goldsmith, an additional £ 400 worth of notes were added to the circulation making the total volume of outstanding notes £ 600. In this way our story above illustrates fractional reserve banking: the size of the goldsmith's reserve is just a fraction, *one third* to be exact, of the total volume of notes in circulation.

Now if you observe carefully, you will notice that there are two things that can make this form of banking unstable. The first is that the borrowers can default on their loans or not make timely repayments. In this case, the liabilities of the goldsmith bank would exceed his assets and he would be unable to pay back the depositors. The second point is that even if the borrowers made timely repayments, the system will still fail if *more than* ***one third*** of the note holders come to the bank at once to redeem their notes. To see why this is so, recall that the reserves of the goldsmith bank is only £200 while its outstanding loans are £400. If all of the note holders (with a total value of £600) come to the bank at once and claim payment, the bank can only pay the amount equal to its reserve (£200). Thus £400 worth of notes cannot be paid and the bank would have failed! This situation is referred to as a **run on the bank**.

3.1.4.2 Bank Balance Sheet Analysis

Now let us go through the items of the balance sheet of an actual bank to study their holding of different assets as well as their liabilities in various forms.

Sample Balance Sheet of a Commercial Bank

Balance Sheet of AB Bank (on 31 December 2015)

Assets

	31.12.2015
Property and Assets	**Taka**
Cash	**17,034,569,843**
In hand (including foreign currencies)	1,205,441,602

Balance with Bangladesh Bank and its agent bank(s) (including foreign currencies)	15,829,128,241
Balance with other banks and financial institutions	**4,752,701,128**
In Bangladesh	2,196,851,448
Outside Bangladesh	2,555,849,680
Money at call and on short notice	**4,566,844,263**
Investments	**34,054,553,461**
Government	27,900,211,389
Others	6,154,342,072
Loans, advances and lease/investments	**216,364,880,127**
Loans, cash credits, overdrafts, etc./Investments	214,291,708,326
Bills purchased and discounted	2,073,171,801
Fixed assets including premises, furniture and fixtures	**4,819,543,816**
Other assets	**5,345,737,331**
Non-banking assets	**-**
Total Assets	**286,938,829,969**

The table above shows the assets portion of the balance sheet of AB Bank, one of the private commercial banks operating in Bangladesh. The items that make up the assets of the bank can be divided according to the general classifications we made earlier:

All figures reported are for December 31, 2015

i. **Reserves** of the bank – which includes *Cash, Balance with other banks and financial institutions*, and *Money at call and on short notice*. For AB Bank the reserves totaled Tk. 26,354,115,234.

ii. **Investments** in *Government bonds* as well as *Stocks* which is mentioned as 'Others' under investment totaling Tk. 34,054,553,461.

iii. **Loans, Advances and Lease/Investments** – Loans and advances made by the bank in the tune of Tk. 216,364,880,127.

iv. **Fixed assets** including premises, furniture and fixtures – This portion makes up the part of the physical investments of the bank with a total of Tk. 4,819,543,816.

v. **Other assets** – Other assets of the banks that totaled Tk. 5,345,737,331.

The total value of the assets of AB Bank on December 31, 2015 stood at Tk. 286,938,829,969. Next we turn to the liabilities and capital portion of the bank balance sheet.

Liabilities and Capital

	31.12.2015
Liabilities	**Taka**
Borrowings from other banks, financial institutions and agents	**24,098,598,784**
AB Bank Subordinated Bond	**6,500,000,000**

Deposits and other accounts	**213,671,723,838**
Current account and other accounts	20,050,332,586
Bills payable	3,699,973,387
Savings bank deposits	22,573,067,458
Fixed deposits	111,741,032,463
Other deposits	55,607,317,944
Other liabilities	**19,094,756,031**
Total Liabilities	**263,365,078,652**
Capital/Shareholders' Equity	
Equity attributable to equity holders of the parent company	**23,575,987,130**
Paid-up capital	5,990,165,460
Statutory reserve	6,111,203,545
Other reserve	4,039,376,532
Retained earnings	7,435,241,593
Minority interest	(2,235,814)
Total Equity	**23,573,751,317**
Total Liabilities and Shareholders' Equity	**286,938,829,969**

The items that make up the liability and capital section of the bank's balance sheet can be similarly classified as follows:

- **Borrowings** from other banks, financial institutions and agents – borrowing made by the bank which totals to Tk. 24,098,598,784.

- AB Bank Subordinated **Bond** – borrowings made from the public and institutions through the issuance of bonds, the total of which is Tk. 6,500,000,000.

- **Deposits and other accounts** – Deposits made in the bank (which include Current, Savings, Fixed Deposits and Bills payable), which totals Tk. 213,671,723,838.

- **Other liabilities** –other liabilities of the bank that totaled Tk. 19,094,756,031.

- **Capital/Shareholders Equity** – Bank *capital* which includes capital collected from *paid-up capital*, *retained earnings* of the bank, and the *reserves* that the bank has to maintain. This totaled Tk. 23,573,751,317.

The total liabilities and capital of AB Bank on December 31, 2015 stood at Tk. 286,938,829,969, exactly equal to the total value of its assets, an *accounting identity*.

The table below presents the **distribution** of the different components of assets and liabilities of AB Bank on December 31, 2015.

Table 3: Distribution of assets and liabilities of AB Bank Ltd. on Dec. 31, 2015 (%)

Asset		Liabilities	
Reserves	9.2	Borrowings	8.4
Investments	11.9	Bonds	2.3
Loans and advances	75.4	Deposits	74.5
Fixed/physical	1.7	Others	6.7
Others	1.9	Capital/Shareholders equity	8.2
Total	100%	Total	100%

First let us look at the assets side. Loans and advances made up about three fourth of the total assets of AB Bank on the given date. Investments were the second highest component (11.9%) followed by reserves which accounted for 9.2% of all assets. Other assets and fixed/physical assets collectively made up 3.5%.

On the liabilities side, we find that deposits took up the lion's share, accounting for 74.5% of all the liabilities of AB Bank on that date. Bank borrowings were 8.4% while capital or shareholders' equity was 8.2%. Bonds only contributed to 2.3% of liabilities while the *others* category accounted for the rest.

Therefore, we find that the main asset for AB Bank was loans and advances while its primary source for funds was *bank deposits*.

3.2 Structure of the Banking Sector in Bangladesh

After gaining independence in 1971, the banking sector of Bangladesh started its journey with 6 Nationalized Commercial Banks, 2 State Owned Specialized Banks and 3 Foreign Banks. In the 80's the banking sector experienced significant expansion with the entry of private banks in the market. The banks currently operating in the country are primarily of two types: Scheduled Banks (commercial) and Non-scheduled Banks (specialized banks with special and definite objectives).

There are currently only **4** non-scheduled banks in the country while there are **56** scheduled banks with the following composition:

- **State Owned Commercial Banks (SCBs) – 6** (fully or majorly owned by the government)
- **Specialized Banks (SBs) – 2** (established for specific objectives like agricultural or industrial development; fully or majorly owned by the government)
- **Private Commercial Banks (PCBs) – 39** (majorly owned by private entities). The PCBs can be further categorized into:
    - *Conventional PCBs* **– *31*** (interest based banking)
    - *Islamic Shariah based PCBs – 8* (Islamic Shariah based principles i.e. Profit-Loss sharing (PLS) mode based banking)
- **Foreign Commercial Banks (FCBs) – 9** (banks incorporated abroad)

3.2.1 The banking sector of Bangladesh

If all the banks in Bangladesh were to merge on December 31, 2013, the balance sheet of this amalgamated 'megabank bank' would look like the following:

Table 4: Banking Sector Aggregate Balance Sheet on December 31, 2013
In Billion Taka

Asset		%	Liabilities		%
Reserves	976.4	*12.2*	Borrowings	221.6	*2.8*
Investments	1571.2	*19.6*	Bills payable	68.9	*0.9*
Loans and advances	4720.1	*59.0*	Deposits	6294.3	*78.7*
Fixed/physical	198.2	*2.5*	Others	737.2	*9.2*
Others	532.5	*6.7*	Capital/shareholders' equity	678.3	*8.5*
Total	8000.2	*100*	Total	8000.2	*100*

Source: BB Financial Stability Report, June 2014

On the above date, the total asset of the banking system of the country stood at Tk. 8 trillion, while loans and advances were worth 4.72 trillion, accounting for 59% of all banking sector assets. Deposits of 6.29 trillion were the largest form of liability for the banks, making up 78.7% of total liabilities.

3.2.1.1 Securities Market

Securities are usually divided into debts and equities. When the security is a debt it represents money that is borrowed and has to be repaid. It has terms that define the amount borrowed, interest payable and the date of maturity/renewal. Government and corporate bonds are thus examples of debt securities. On the other hand, equities represent ownership held by the shareholders in a corporation. Thus stocks are an example of equities. In contrast with debt holders who only receive interest payments along with the repayment of their principal amount, holders of equity are able to make profits from *capital gains* (increases in the price of assets). The entity that issues the security is known as the *issuer*. Securities generally represent an investment or a means by which companies and other commercial enterprises can raise new capital for use and the market where these securities are traded is known as securities market.

Stock Market
What is a Stock/Share?
As mentioned above, stocks/shares fall under the category of equity securities. In the case of publicly traded firms (public limited companies), the ownership is split into many pieces (much like the pieces of a pie) and each piece is called a 'share' or 'stock'. Each shareholder is the owner of the firm and the owner's 'liability' is proportional to the size of his/her relative shareholding. Stocks/shares entitle their holders to some control over the company that has issued them as well as the rights to capital gains and profits made by the company. It is similar to owning a tree – each year you will get fruit (dividend) from it and the tree itself has value when sold for wood (price of the share/stock). The equity holders have voting rights which enable them to have control over the company. But in the case of bankruptcy, the shareholders will only receive the residuals after all the obligations of the creditors have been met with.

The value (price) of shares is determined by supply and demand in the secondary market. Value of the firm changes with the price of share as it reflects how the market values the business prospects of the firm. Therefore, the stock market acts as an important indicator of economic activities.

Benefits of holding a stock:

a) Ownership: has one vote to elect the director
b) Dividend (share of profits earned by the company)
c) Can sell the share in the secondary market (capital gain)
d) Limited liabilities

It is important to shed more light on the limited liability issue. The fact that there is a floor of what one can lose provides a huge incentive for the investors to investment in stock market. Suppose you start a new company, offload it's share and you own a certain amount of share of your company. Now, if the company fails, you will only lose the amount of money equal to the share of your ownership of the company. The law of limited liability will protect you from any punitive actions such as imprisonment. This is a remarkable innovation – it allows entrepreneurs and innovators to take risk and start a new business again. By upholding the idea that businesses and innovations are risky and they are prone to failing, the law of limited liabilities is argued to earn "a place of honor with Watt, Stephenson and other pioneers of the industrial revolution".

Box 2: The Key to Industrial Capitalism: Limited Liability

The Economist, December 23, 1999

"…. Shares were first issued in the 16th century, by Europe's new joint-stock companies, led by the Muscovy Company, set up in London in 1553 to trade with Russia. (Bonds, from the French government, made their debut in 1555.) Equity's popularity waxed and waned over the next 300 years or so, soaring with the South Sea and Mississippi bubbles, then slumping, after both burst in 1720. But share-owning was mainly a gamble for the wealthy few, though by the early 19th century in London, Amsterdam and New York trading had moved from the coffee houses into specialised exchanges. Yet the key to the future was already there. In 1811, from America, came the first limited-liability law.

…. The concept of limited liability, whereby the shareholders are not liable, in the last resort, for the debts of their company, can be traced back to the Romans. But it was rarely used, most often being granted only as a special favour to friends by those in power. Then in 1811 New York state brought in a general limited-liability law for manufacturing companies. Its popularity, and the flight of capital to states with limited liability from those without, led most American states to follow suit. In 1854, Britain, the world's leading economic power, did so too.

…. Before limited liability, shareholders risked going bust, even into a debtors' prison maybe, if their company did. Few would buy shares in a firm unless they knew its managers well and could monitor their activities, especially their borrowing, closely. Now, quite passive investors could afford to risk capital—but only what they chose—with entrepreneurs. This unlocked vast sums previously put in safe investments; it also freed new companies from the burden of fixed-interest debt. The way was open to finance the mounting capital needs of the new railways and factories that were to transform the world……"

Primary and secondary markets

There are two types of markets for securities – one is for the new securities and the other is for the older ones. The market for new securities is called the primary market while the market for old securities is called the secondary market.

Primary Market

In the primary market securities are issued for the first time**.** New securities are initially brought into the market through the primary market by the process of Initial Public Offering (IPO) by the issuers. Investment Banks and other financial institutions act as the 'underwriters' to market the new securities. But the securities may also be offered privately to a restricted and qualified group which is known as a *private placement*. Underwriters of the securities may also have the additional duty to purchase any share that remains unsold after the initial public offering.

Most of the businesses in the country rely mostly on borrowing from financial intermediaries and the total amount of fund raised from the market is very low compared to financing from banks. In recent times, even though the market witnessed increased activity, the contribution of the capital market in channeling funds for industrial development has remained low. This is reflected in the table below.

Table 5: Capital market and Bank financing in the country

Year	Number of IPOs	Total Fund raised from Capital Market (billion Taka)	Fund raised by Loans & Advances (billion Taka)
2010	4	2.46	483.95
2011	5	2.41	638.41
2012	10	7.74	646.48
2013	14	8.38	388.71

For example, in 2013, 14 companies raised only Tk. 8.38 billion through the capital market while in the same year, bank loans and advances amounted to Tk. 388.71 billion. This clearly shows that the capital market is lagging behind in supplying funds to businesses.

Secondary Market

This is the market for 'used' securities where stock holders can sell their stocks to other buyers. After the IPO, the securities are traded in the secondary market where they are simply transferred as assets from one investor to another. In this market, shareholders can sell their securities to other investors for profit. Why can't you sell your stock on your own – you find a buyer who is willing to buy your stock and sell it like your old cellular phone? It is not possible because, a stock is an ownership of a company and when a share is traded, ownership is also changed. This change of ownership involves legal issues and therefore, a formal exchange house is required. Securities are listed in *stock exchanges* where the issuers can seek listings of the securities and attract investors by providing a liquid and regulated market to trade in. In Bangladesh, the two stock exchanges are Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE).

The journey of stock in Bangladesh began on April 28, 1954 as the East Pakistan Stock Exchange Association Ltd. Trading in this market started in 1956 with a total paid up capital of Tk. 4 billion and 196 securities listed on the market. On June 23 1962, the exchange was renamed to Dhaka Stock Exchange (DSE) Limited and started its operations on May 14, 1964. From 1971 to 1976, trading on the DSE was suspended due to the liberation war and socialist orientation of the post-war economy. Trading resumed in 1976 with a total of 9 listed companies having a total paid up capital of Tk. 137.52 million. The market saw considerable developments during the 1990s and expanded further.

In its early days, the DSE was a physical stock exchange and trading took place under an *open out-cry system* in which verbal bids and offers as well as hand signals were used to convey trading information. To enable smoother and efficient operation of the market, DSE installed automated trading system on 10 August, 1998. Similar to other markets, DSE constructs its own price indices to show the movement in share prices over time. Currently the DSE reports the following indices: **DSEX**, **DSES** and **DS30**. The second stock exchange in the country is the Chittagong Stock Exchange (CSE) which formally opened on November 4, 1995. This was the first automated stock exchange of the country, automated on June 2, 1998. The indices reported by the CSE are: **CSE All Share Price Index (CASPI)**, **CSE 30** and **CSCX**.

The Bangladesh Securities and Exchange Commission (BSEC) is the regulator of the stock market (hence the capital market at large) and regulates organizations like the two stock exchanges - DSE and CSE, Central Depository Bangladesh Limited (CDBL), stock brokers, merchant banks and asset management companies.

The secondary market of the country

Table 6: Overview of the secondary market on September 29, 2016

	Dhaka Stock Exchange (DSE)	Chittagong Stock Exchange (CSE)
Total Number of Instruments	559	299
Total Number of Mutual Funds	35	35
Total Number of Debentures	8	0
Total Number of Treasury Bonds	221	0
Total Number of Corporate Bonds	2	2

Source: DSE and CSE

The table above shows the number of different instruments traded in the secondary market of the country on September 29, 2016. DSE had a total of 559 listed companies while 299 companies were listed on the CSE. Both stock exchanges had 35 listed **mutual funds**. *Mutual funds* involve the pooling of investments from many investors and then using the funds to acquire a *diversified* portfolio holding. They are therefore a form of collective investment scheme. Mutual funds are managed by a *fund manager* who invests the fund's capital in order to produce capital gains and income for the fund's investors. The advantage of mutual funds is that they allow small investors access to a professionally managed, diversified portfolio of stocks, bonds and other securities.

Debentures are debt instruments that are issued by corporations and governments for the purpose of raising capital from the market. They are quite similar to bonds in function. There

were only 8 listed debentures on the DSE while CSE had none. **Treasury bonds** refer to the bonds that are issued by the Bangladesh Bank (the central bank) for raising money from the public. In 2016, there were a total of 221 treasury bonds listed on DSE but none on the CSE.

Corporate bonds are the bonds that are issued by corporations in order to raise money from the market. At present, there are only 2 corporate bonds in the country, which are the *IBBL Mudaraba Perpetual Bond* and the *Sub 25% Convertible Bonds of BRAC Bank Ltd*. We will discuss more about bonds and debentures towards the end of this chapter.

Some terminology related to the Stock Market:

- **Number of shares outstanding** refers to a company's total number of shares held by all its investors/shareholders. It is composed of the shares in the hands of *sponsors* (which includes directors and other employees of the company), *institutional investors* (like the Investment Corporation of Bangladesh (ICB)), *government* (govt. holding of company shares) and the *public*. ***Public*** here refers to the holders of ordinary shares in the market i.e. this is the number of shares in the hands of general investors.

Total Number of Share Outstanding = Sponsor Holding + Govt. Holding + Institutional Holding + Public Holding

- **Market Capitalization:** also referred to as '*Market Cap*' is the total money value of the shares outstanding in the market. This is the value that is obtained by multiplying the price of each share of the companies by the number of issued securities. Therefore, total capitalization is given by:

Share price of each security × number of shares outstanding in the market.

When applied to a single company, market capitalization can be used by investors to determine the size of the company.

- **Earnings per Share (EPS):** EPS is an indicator of the profitability of the company as it shows how much profits are serviced to the share owners. It is calculated as total profits of a company divided by the number of shares:

EPS = Profits/Number of Share

The larger the size of the EPS for a given stock, the larger is its return from dividends payment.

- **Price-Earnings Ratio (P/E ratio)**: A ratio that is used to value a company by measuring the current share price relative to its per-share earnings or EPS. The P/E ratio is calculated as:

P/E = Price of per share/Earnings per share (*EPS*)

Essentially, what the P/E ratio tells us is the amount of taka an investor can expect to invest in a company in order to receive one taka of that company's earnings. For example, a company with a value of P/E of 20 means that an investor is willing to pay Tk. 20 for Tk. 1 worth of

earnings of the company. Both the EPS and P/E are important indicators of the performance of the stock.

- **Net Asset Value (NAV)** is the value of a business's *assets* minus its *liabilities*. Therefore, it represents the value of the total ***equity*** of a company (after subtracting liabilities from assets, the portion that remains is the shareholder's equity).

NAV = Total Assets - Total Liabilities

- **NAV per share (NAVPS)** is the total Net Asset Value divided by the number of Shares Outstanding. NAV per share thus reflects the per share value of the shareholder's equity.

NAVPS = Total Net Asset Value/ No. of Shares Outstanding

- **Return from a stock** is the total return from holding and selling a given piece of stock. It is determined by the following formula:

$$\textbf{\textit{Stock Return}} = \frac{price_t - price_{t-1} + dividend}{price_{t-1}} \times 100$$

$$= \frac{price_t - price_{t-1}}{price_{t-1}} \times 100 + \frac{dividend}{price_{t-1}} \times 100$$

The first part of the stock return equation captures the change in stock price from one period to the next. This is referred to as the **capital gain**. On the other hand, the second part shows the income earnings from **dividend** payment by the company.

Stock Indices

A *stock index* or *stock market index* is a measurement of the value of a section of the whole stock market. It is based on the prices of selected stocks and is typically a weighted average. The main purpose of stock index is to help describe the market and aid in the comparison of returns on specific investments.

Given the fact that there are hundreds of stocks traded in an exchange, it would be very difficult to keep track of all of them. To get around this problem, a small but representative section of the market is chosen for constructing the indexes. Investors can then use the indexes to keep track of the market's performance.

DSE Indexes

The DSE currently calculates the following indices:

1. **DSE Broad Index** (**DSEX**)
2. **DSE 30 Index** (**DS30**)

DSEX is the broad index of the exchange (or the benchmark index) which reflects around **97%** of the total equity market capitalization. The **DS30** index is constructed with **30** leading

companies and can be termed as the *investible index* of the exchange. DS30 reflects about **51%** of total market capitalization.

In choosing the stocks for the indexes, DSE takes into account the following criteria:

- **Market Capitalization** – A minimum of Tk. 500 million for the stocks in DS30 and above Tk. 100 million for the DSEX stocks.
- **Liquidity** – Stocks in DS30 must have a minimum 3-month ***average daily value traded*** (ADVT) of Tk. 5 million while DSEX stocks must have a minimum 6-month ADVT of Tk. 1 million as of the rebalancing reference date.
- **Financial viability** – DS30 stocks must have *positive* **net income** over the latest 12-month period, while such financial viability restrictions are not applicable for DSEX stocks.

All indices are computed using a given ***base***. The base for DSE 30 Index (DS30) is **1000** while that for the DSE Broad Index (DSEX) is **2951.91**. Before DSEX, the general index of the market was the **DSE General Index**, but which has now been discontinued. To link the two indices and maintain continuity, the value of the DSE General Index on January 17, 2008 has been used as the base of the new DSEX index.

Note that neither of the above indices includes ***mutual funds***, ***debentures*** and ***bonds***.

DSE Index calculation:

DSE uses the following methodology in constructing the indexes. The ***Index Calculation Algorithm*** is:

$$Current\ Index = \frac{Yesterday's\ Closing\ Price\ \times Current\ M.Cap.}{Openning\ M.Cap.}$$

$$Closing\ Index = \frac{Yesterday's\ Closing\ Index\ \times Closing\ M.Cap}{Opening\ M.Cap}$$

Market Capitalization (M. Cap) is given by:

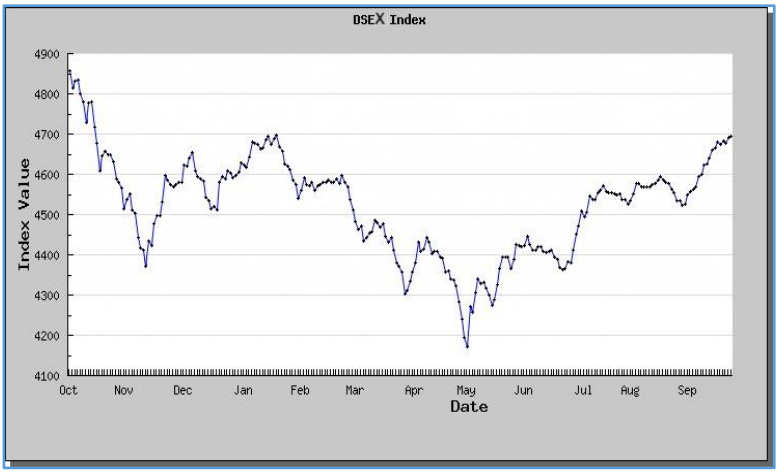
- Current M. Cap = ∑ (Last Traded Price × Total nos. of indexed shares)
- Closing M. Cap = ∑ (Closing Price × Total nos. of indexed shares)

Recent trend in the DSEX Index

The figure below shows the movements in the DSEX index over a period of a year. It can be seen that the index has gone through substantial fluctuations while generally trending downwards in the months from October 2015 to May 2016. Since May, the index has generally exhibited an upward trend with some minor dips.

Figure 1: DSEX Index - Last 1 Year from 30-09-2015 to 29-09-2016

Source: DSE website



Trends in stock prices and market capitalization

Trend in DSE General Index

The stock market of the country has so far experienced two major crashes, the first one being in 1996 and the second one taking place more recently in 2010-11. Both the crashes are evident in the plot of the DSE General Index over time shown below.

Dating back to before 1995, the DSE General Index was below 1000 points but reached a peak of around 3000 points by 1996. But then the market saw its first crash with the index falling back to around 1000 points by the year 2000. It began to pick up steam once again from 2004 onwards and the latter half of 2000 saw the index exceed the 4000-point mark. The bullish run of the market continued but it was the year 2010 that really saw the index skyrocket. The index more than doubled in this short span of time and by the end of the year had climbed to an unprecedented level of around 8500 points. The market was riding on a bubble and shortly after the index had hit its highest mark, the market collapsed once again. The index took a nosedive and fell continuously throughout 2011, and by the beginning of 2012 had fallen below 4000 points. In subsequent years, the index has remained low (hovering between 4000 and 5000 points) with the market showing signs of slow recovery amid the fluctuating general index.

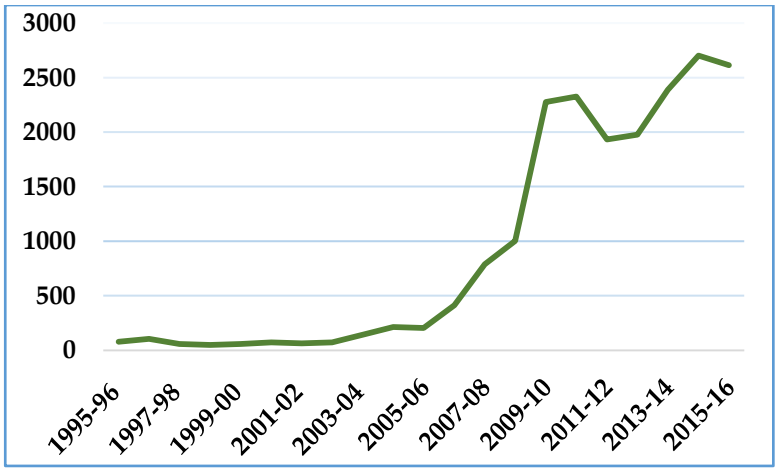
Fig 2: DSE General Index

Trend in total Market Capitalization

The figure below shows the trend in total market capitalization of the country over the period of 1995-96 to 2015-16. Total market capitalization has followed patterns almost similar to that depicted by the general share price index during the period under consideration. Until FY 07, total market capitalization had remained below Tk. 500 billion but began to increase from that point of time onwards. The steepest increase was observed in FY 10 when the total capitalization more than doubled (from 1000 to 2276) within the span of a 1-year period. It continued increasing the next year, albeit at a much lower rate, but in FY 12 it dropped below the Tk. 2000 billion level. This is in line with the market crash during the period; when the price of shares declined, so did their total market valuation. But it registered a positive growth in the next fiscal of 2013 and since then has been on a more or less upward trend.

Fig 3: Total Market Capitalization (in billion Taka)

Source: Bangladesh Bank



Bond Market

What is a bond?

As discussed earlier, bonds are a type of debt security. It is a debt instrument in which a saver loans money to a borrower, usually government or corporate. The funds are borrowed for a defined period of time and the interest rate can be either variable or fixed. Government and firms borrow directly from people and institutions through issuing bonds to raise money and finance different investments.

When companies or other entities need to raise money in order to finance new investments, or to maintain ongoing operations or to refinance existing debts, they may issue bonds directly to the savers instead of taking out loans from banks. The issuer issues a bond that contractually states the *interest rate* (coupon) that will be paid and the *date of maturity* at which the principal amount has to be returned by the borrower. Owners of the bonds are thus *creditors* of the issuing entity. The principal amount is the *face value* of the bond while the interest payments are *coupons*. The issuing price of the bond is usually set *at par* i.e. at a given *face value* - the nominal or the Taka value of a security that is stated by the issuer. *Coupon rate*, also known as ***coupon*** is the rate of interest stated on a bond when it is issued. The coupon is typically paid semiannually.

The key features of a bond are summarized below:

- It is a contract between the issuer of the bond (the borrower) and the buyer of the bond (the lender).
- Pays the **face value** of the bond on *maturity* and **interest** in the form of periodic "coupons".
- At maturity, a bond ceases to exist.
- A bond is described by its issuer, coupon, and maturity date.
- Bond prices are quoted for face value, and determined in market by supply and demand.

How is the coupon determined?

As mentioned earlier, the coupon is the rate of interest that the bond pays to its holders. But how is this interest rate determined? At the time of issuance, the **coupon** on a new bond is set so that the bond will sell '***at par***'. This simply means that:

- On the *date of issuance* of the bond, the **market value** of the bond is **equal** to its **face value**.

That is, the bond issuer cannot set the coupon rate at its will. They will need to look at the rate of interest paid by similar bond issuers and then determine their own rate based on the going market rate. If the company is less reputable than the established ones, they will need to pay a higher coupon rate. Similarly, if the investors feel that the company is trustworthy to pay back their money, they may require a lower coupon rate. Similarly, the longer the time to maturity of the bond, the higher will the interest payment needed for the longer time to encashment.

Suppose that there is a new bond with a face value of Tk. 100. Now, what must the coupon be in order for the bond to sell at par i.e. Tk. 100? Quite naturally, it must pay a coupon at least as high that paid by existing bonds with similar features. Therefore, the coupon must be equal to the going market interest rate.

Treasury bonds pay the least because the government does not fail to pay. Why? The government always has the option to issue more bonds to refinance the old ones and even has the ability to simply print additional money to pay off its debt. Therefore, government bonds are considered to be the safest.

Yield on Treasuries is usually used as the *benchmark rate* that provides a standard against which the performance of other bonds can be gauged. For the comparison of bonds to be more appropriate and useful, the benchmark and the bond being measured against it should have a comparable liquidity, size of issuance and coupon rate.

The Yield to Maturity

To understand the concept of Yield to Maturity, we need to look at bonds from the point of view of an investor (who buys the bonds). An investor will try to invest in that bond which maximizes his/her return from the purchase of the bond. Suppose that there are two bonds which will both mature in one-year time. How would you choose which one to invest in? At first, it may seem that *the one with the higher coupon will provide the higher return*, but take into

account that its price will also be higher. How would then one evaluate the return from the bonds?

The answer lies in using the Yield to Maturity (YTM). Yield to Maturity (YTM) or just 'yield' for a bond is the percentage by which a bondholder's money grows from the date of purchase of the bond to the date of maturity, expressed as a yearly rate. In simpler terms, YTM is the amount a bondholder will earn ***a year from*** now for ***each*** of his/her Taka invested today.

YTM or yield is given by the following expression:

$$\boldsymbol{Yield} = \frac{(face\ value\ +\ coupon)\ -\ price}{price} \times\ 100$$

Yield is thus equal to the amount of money received upon the maturity of the bond (the summation of its face value and coupon) ***minus*** the purchasing price of the bond, expressed as a percentage of the purchase price. The face value and coupon is the return from holding the bond while the price is the cost of the bond. Subtracting the price gives us the net return from the bond. Expressing this return as a percentage of the initial investment (purchase price), thus gives us the *yield*.

The Coupon for a New Bond

Now let us use what we have learnt so far to determine the coupon rate for a newly issued bond. Suppose that the govt. wants to issue a new 1-year bond with a face value of Tk. 100. We already saw that the bond must be sold at par i.e. at Tk. 100. What then is the required coupon rate for the bond?

First, the bond has to provide a yield that is at least equal to the yield of existing 1 year bonds otherwise no one will want to buy the bond. Using our formula for yield and plugging in Tk. 100 for the price of the bond, we have:

$$\boldsymbol{Yield} = \frac{Tk.100 + coupon - Tk.100}{Tk.100} \times 100\%$$

$$= \frac{coupon}{Tk.100} \times 100\%$$

Say that the market yield on existing 1 year bonds is 5%. Using this information and rearranging, we get:

$$\boldsymbol{Coupon} = \frac{Yield}{100\%} \times Tk.100$$

$$= \frac{5\%}{100\%} \times Tk.100$$

$$= \text{Tk. } 5$$

Therefore, we now arrive at the following conclusion:

The new bond will sell at par only if its *coupon rate is set equal to the yield* of comparable bonds in the market (those that will also mature in one years' time). A coupon that is lower than the YTM will fail to attract any investor.

Bond prices move inversely with Interest Rates

How is the bond price determined? Suppose you come up with a financial product (bond) which gives Taka 5 to its buyers each year (coupon) for the next 5 years and at the end of the maturity (after 5 years), buyers will get its face value (Taka 100). How much price would you charge today? How would you *discover* its price? One easy way to learn about its price is by auctioning off your product. When there are a large number of potential buyers in the auction, they would price your bond very close to what the market would price. Once we know the price of the bond, we can calculate the yield of the bond.

Consider the example of a fixed rate coupon one-year bond that is issued at Tk. 100 par value and with an annual coupon rate of 5%; thus it will generate Tk. 5 of income for its holder on maturity. But what about the return to an investor who sells the bond before the maturity date? Additionally, assume that at the time of issue of the bond, the yield rate on one-year bonds in the market was 5%. As the bonds coupon is also 5%, it is similar to the yield. Now if the one-year yield in the market increases to say, 6%, what happens then?

Naturally, now investors would not want to hold the bond as it only pays 5% coupon while the market yield is higher at 6%. In order to compensate for the lower coupon, the price of the bond would now also need to be lower. We can show this using the YTM equation.

The yield expression is:

$$Yield = \frac{(\text{face value } + \text{ coupon}) - \text{price}}{price} \times 100$$

Rearranging, we get:

$$\boldsymbol{Price} = \frac{Face\ Value + Coupon}{1 + \frac{yield}{100\%}}$$

Therefore, we can see that when the yield *increases*, the price of the bond *decreases* (the larger the *yield*, the greater is the denominator which leads to a lower value *price*). The opposite is also true: when yield decreases, the bond price increases. The inverse relationship between bond prices and yield rates is an important one and it stems from the fact that coupon payments from existing bonds are fixed. When the yield in the market is higher (lower), these fixed coupons worth less (more) and so the bond price is what changes to restore equilibrium in the market.

Returning to our problem at hand, and using the face value of Tk. 100, coupon of Tk. 5 and yield of 6%, we have:

$$Price = \frac{Tk.100 + 5}{1 + \frac{6\%}{100\%}}$$

$$= \text{Tk. } 99$$

Thus the price of the bond with Tk. 100 face value is now Tk. 99 following the increase in the yield rate.

Also note that at this reduced price, the return from the bond now equals the coupon of Tk. 5 plus Tk. 1 that will be received when the bond matures and pays face value of Tk. 100 (as the price is now Tk. 99). Therefore, the total return for an investor purchasing the bond at Tk. 99 is Tk. 6, or a return of 6%, which equals the market yield available on other bonds of the same maturity.

Thus given a fixed coupon, the price of the bond in the market adjusts itself to compensate for the changes in the yield rate of similar bonds.

Return from holding Bonds

Recall that in the case of stocks, we showed that the total return from holding the stock can be divided into *capital gains* and *dividend earnings*. Similarly, we can now show that the return from bonds can also be disaggregated into two components. The YTM equation can be written as:

$$Yield = \frac{(face\ value - price)}{price} \times 100\% + \frac{coupon}{price} \times 100\%$$

The first part of the equation shows the yield from the change in the price of the bond from now to maturity. Therefore, it is the *rate of capital gain*. On the other hand, the second part shows yield from the coupon payment. In our example above, the reduction in the price of the bond by Tk. 1 led to a price appreciation of 1% on maturity. Adding to this the 5% coupon rate, we get the total yield of 6%.

Rate of return, yield to maturity and interest rate: Are they the same?

So far in our discussion on bonds, we saw the coupon rate, which is the interest rate paid by the bond issuer to the holder of the bond and the yield to maturity or yield, which shows how much an investor can expect to earn from purchasing a bond. Clearly, the two are not the same. If we were to use one of them as a measure of the *rate of return* from the bond, which would it be?

In general, how well a person does from the holding of a security over a given period of time is accurately reflected by the *rate of return*. For any security, the rate of return is defined as the summation of the payments made to the owner (coupon or dividend) and the change in the price of the security (capital gain or price appreciation), expressed as a fraction of its purchase price. Hence the return on a bond held from time *t* to time *t*+1 can be written as:

$$\boldsymbol{R} = \frac{C + P_{t+1} - P_t}{P_t}$$

Where, R = return from holding the bond from time t to time t+1
P_t = price of the bond at time t
P_{t+1} = price of the bond at time t+1
C = coupon payment

The *rate of return* from the bond thus includes both the return from *coupon payment* as well as the capital gain due to the increase in the price of the bond (between the dates of purchase and sale). Thus the coupon rate, which is also the *interest rate* on the bond, will not reflect the *rate of return* from the bond when the bond price changes over time. Therefore, the yield is the true measure of the bond's rate of return as it incorporates both coupon payment and price changes.

We conclude this section by reiterating these findings:

- When yield rate rise, bond prices fall.
- When yield rate falls, bond prices rise.
- Coupon and face value are fixed, only the market price can change!
- Yield adjusts through changes in price to restore equilibrium in market.

How bonds are different from stocks?

- ***Ownership*** – Bond is a debt instrument and thus has no ownership claims while Stock is an equity that forms part of the ownership of the company
- ***Maturity*** – Bonds have a maturity date on which the principal amount is returned while Stocks are perpetual as the claims to ownership can be transferred
- ***Risk*** – Bonds have lower risks compared to Stocks. When a company goes bankrupt, the claims of the creditors (those who have loaned money to the company) are paid first while the Stock owners are residual claimants as they own part of the company as represented by their share ownership. Thus stockholders are subject to liabilities while bond holders are not.
- ***Income*** – Bonds have interest payments while Stocks earn dividends and have capital gains.

Bond Market in Bangladesh

Government bonds almost entirely make up the bond market of the country as currently there are only 2 *corporate* bonds listed on the DSE and CSE. Bangladesh Government Treasury Bonds (BGTBs) are with maturities of 2, 5, 10, 15 and 20 years. The BGTBs are issued through auctions and are tradable in the secondary market.

The Bangladesh bond market is the smallest in South Asia in terms of its relative size to GDP. It is still very underdeveloped and hence its role is limited. Additionally, the corporate bond market is very small with only 2 corporate bonds listed in DSE in 2015. Several impediments that hamper the development of the market have to be addressed which includes:

- There is lack of both issuers and investors – the dependence is on bank credits instead
- Liquidity of listed securities is insignificant – small number of investors with buy-and-hold attitude and inferior quality of the instruments
- High costs – Interest rates are traditionally high which both reduces supply and lowers demand due to investor uncertainty
- High Transaction costs – Payment of several govt. fees in bond issuance
- Poor confidence of investors on the issuers, market, legal and regulatory framework.

Yield Curve

The yield curve is a graph that plots the yield rate, at a given point in time, for bonds of *equal* credit quality but with *different* dates to maturity. The yield curve is used as a benchmark for

other debts in the market such as bank lending rates. It also helps to predict changes in economic output and growth.

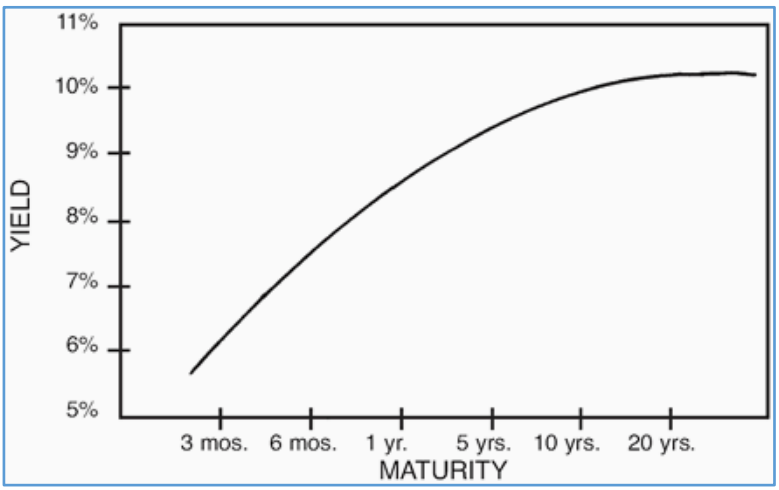
Shape of the yield curve

The shape of the yield curve is an indicator of future interest rate changes and hence of the level of economic activities. Yield curves usually take three main shapes: normal, inverted and flat or humped.

A normal shaped yield curve depicts the scenario in which bonds with longer maturity have a higher yield compared to shorter term bonds. This is due to the fact that there are greater risks associated with a longer holding period. Thus the yield curve will slope upwards depicting longer term bonds with increasing yields. A typical yield curve thus looks like the following:

Fig 4: A typical 'normal' yield curve

Source:



Notice how the yield increases with the longer maturity period of the bonds. What does it imply? When interest rates are rising in the market, investors will wait before purchasing long term bonds as their price will decline further in the future due to rising yields over time (recall bond price and yield are negatively related). Thus the demand for short term bonds will be temporarily high in the market, driving their prices up while lowering their yields. Furthermore, note that when investors expect interest rate to be higher in the future, they show greater confidence on the economy and so it is an indicator of positive growth outlook. On the other hand, when the yield on short term bonds is greater than that of longer term bonds, the shape of the yield curve gets 'inverted'. This is referred to as the inverted yield curve. But when might this type of yield be observed? This is usually a sign of upcoming recession: investors expect that longer term bonds will be worth less in the future compared to shorter term ones. Therefore, investors' expectation that the economy will perform poorly in the future (compared to the present) leads to lower confidence which is reflected in the shape of the yield curve.

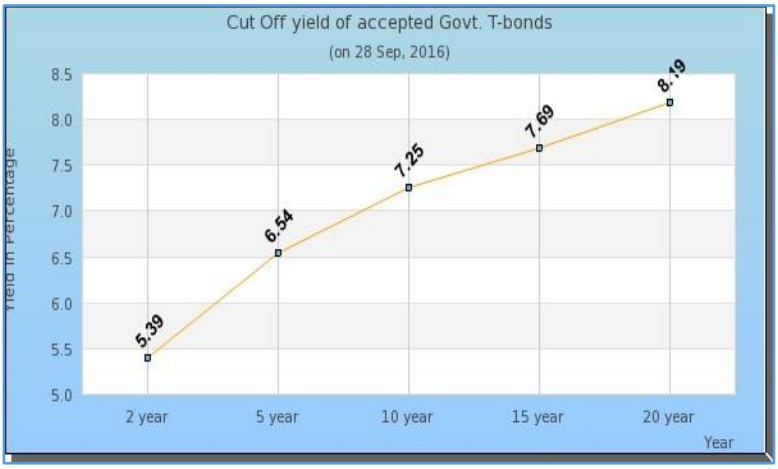
The other common shape of yield curves is *flat* or *humped* in which long and short term yields are very much similar to each other. They may develop from either normal or inverted curves, depending on changing economic conditions. When the economy is in transition from prosperous times to recessions, the normal shaped curve will slowly flatten out. On the other

hand, when the economy is in recovery from recession, the inverted curve will then turn into a flat one. Flat yield curves thus indicate an economy in transition.

The slope of the yield curve is important as the slope shows the extent of difference among short and long term interest rates. Figure 5 below shows a typical yield curve for the govt. treasury bonds in the country. The first thing we observe is that the curve is upward sloped. 2-year T-bonds have a yield of 5.39% while the longest duration 20-year bonds have a yield of 8.19%. From our just preceding discussion, we can say that this 'normal' shaped yield curve depicts a scenario in which investors expect positive future growth for the economy.

Figure 5: Yield Curve for government T-bonds (as on 28 September 2016)

Source: Bangladesh Bank



In the early stages of development, financial intermediaries (e.g. banks) and retained earnings of the businesses (self-finance) are the major sources of capital for the firms. As the economy grows, share of firms using direct financing from securities markets increase. It is important to note that the direct financing requires following a great deal of standard accounting practice by the firms. Once listed with the security exchange, financial practices of the firms are very closely monitored. This is one of the main reasons why a firm in developing country relies less on direct financing for raising capital. Most of the firms of the developing countries do not conform to this practice and also lack transparency. As a result, the firms rely more on banks where informality is allowed and 'personal relationship' can be used as collateral.

Furthermore, financial literacy of the general public is also very low in developing countries. Most of the people are hardly aware of the intricacy of the bonds and stocks. If a firm, which is not very well-known in the country, offers bonds, the people can hardly assess the profitability of the company and make an informed investment decision. Therefore, lack of adequate financial literacy and trust on the firms may also hamper the growth of the bond and capital market in a developing country like Bangladesh. However, as the country is growing fast, aspiring to reach a higher middle income country soon, the demand for direct financing will be growing and the financial market needs to be prepared for it.

CHAPTER 4

Structure and Performance of the Banking Sector

In developing countries, banking sector is the dominant player in the financial market as other markets such as equity and bond markets take time to mature. The banking sector is regarded as the life line of the economy in a developing country and thus any crisis in the banking sector has the potential to destabilize the entire economy. Given the sound external sector balance, sometimes it is argued that if there is any major macroeconomic crisis occurs in Bangladesh, it might come from the banking sector. Therefore, it is imperative to have some basic understanding of the banking sector of Bangladesh and potential sources of risks in this sector.

The phenomenal growth of the economy over the last two decades or so has been fueled by the banking sector alone, in the absence of well-developed capital market and other sources of corporate finance and with low injection of foreign equity into the economy. One of the driving forces of the growth of the real economy – the RMG sector – is largely bank-dependent.

The banking sector of the country has a long history which went through ownership and structural changes in several phases since the independence of Bangladesh in 1971. Initially this sector was nationalized as the country moved away from the market economy and embraced the ideology of planned economy. As the policies undertaken at the time focused on helping industrialization and agricultural development, the major functions of the state-owned banks were to channel funds from savers to the priority sectors of the economy at subsidized rates.

The first wave of reforms came in the form of privatization of 3 Nationalized Commercial Banks (NCBs) and granting license to 4 Private Commercial Banks (PCBs) in early 1980s. However, the reforms were not very effective due to the continued domination of the NCBs, leading to another spell of loan defaulting. Thus another set of reforms followed during 1991-2000 which saw increased participation of private and foreign banks in the sector. Several market friendly measures were adopted to make the sector more competitive. A third phase of reforms came in the early 2000s with improved banking regulation and supervision, strengthening of the Bangladesh Bank and increased participation from the private sector. During this time, BASEL norms (a set of recommendations for regulations in the banking sector) were also implemented. Although this has led to improved discipline in the sector, the State owned Commercial Banks (SCBs) are still suffering from weak governance and bad assets.

As mentioned in the previous chapter, there are currently 4 types of bank operating in the country: SCBs, SBs, PCBs and FCBs (Islamic Banks are included in PCBs).

Table 1 below shows the present structure of the banking system of the country. Today a total of 55 different banks with 8427 branches are providing banking services across the country compared to the 17 banks with 4067 branches in 1980. In fact till 2012 there were 47 banks in

total when 8 new ones started operating in 2013. From the composition of the bank branches it can be seen that while there are more urban branches than rural in the total, the majority of the rural branches are of the SCBs and DFIs/SBs (as they form part of the government's initiative to provide access to finance in the rural regions). As of December 2012, of the total 3339 branches of the PCBs, 1270 were in rural regions with the rest in urban while the 9 FCBs had no rural branches. The number of branches increased rapidly over the period implying the greater need for the services that banks provide (Table 1). Expansion has occurred more in the urban regions compared to the rural as the number of urban branches increased from 2460 to 3600 during the period while similar figures for rural regions are 3659 in 2000 to 4827 in 2013. Thus over time, banking operations have increased more in urban areas than rural.

Table 1: Banking System Structure (as of June 2013)

Type of Bank	Number of Banks	Total no. of Branches	Number of Branches (*as of December 2012*)		
			Rural	***Urban***	Total
SCBs	4	3499	2225	1253	3478
SBs	4	1476	1265	175	1440
PCBs	38	3386	1270	2069	3339
FCBs	9	66	0	65	65
Total	55	8427	4760	3562	8322

***Source**: Annual Report 2013, Bangladesh Bank*

Table 2: Number of Bank Branches

Indicators	2000	2005	2006	2010	2011	2012	2013
Number of Banks (as at end June)	49	48	48	48	47	47	55
Number of Branches	6119	6402	6562	7658	7961	8322	8427
Rural	3659	3764	3834	4393	4551	4760	4827
Urban	2460	2693	2728	3265	3410	3562	3600

***Source**: Annual Report, Bangladesh Bank. (Various years)*

4.1 Structural changes of the Banking sector over time

The structure of the banking sector has changed substantially over the last decade or so and the major changes can be summarized in terms of:

- Share of Private vs. Public banks
- Sectoral Composition of credit
- Term structure of credit (Short vs. Long term)

We will now treat each one of them in detail.

4.1.1 Private vs. Public Banks

The table below shows the pattern over time in the share of ***loans and advances*** made by the different categories of banks. The market share of the SCBs has declined steadily over time along with the SBs and this has been captured by the PCBs who saw their share rise during the period. In 2000, SCBs accounted for about 49% of the market share while SBs share was about 17%, which meant that almost two-third of the total credit in the country was disbursed

by the public banks. Private Banks, consisting of the PCBs and FCBs, therefore only had a share of about 34%.

But in the subsequent years there was a reversal of roles: the share of the public banks went down while that of the PCBs went up. Looking at the shares of the banks in different years, we can see that PCBs overtook SCBs share in 2004 while in 2005 PCBs overtook the combined share of SCBs and SBs. This is the period when significant structural shift took place in the banking sector as the private banks share over took that of the public ones. The growth of loans and advances by the PCBs during the period was 1380% compared to the 550% growth of total loans and advances in the country. More recently PCBs alone have accounted for almost two-thirds of the total market, establishing them as the dominant player in the loan market.

The SBs were primarily created for providing targeted sectoral credit in the economy but their pace of growth has fallen short of the growth in total credit, resulting in their share declining continuously. On the other hand, the FCBs share in total credit is seen to always remain small (fluctuating within 5 to 8 percent) but experienced significant increase in absolute value (almost by a multiple of six) during this period.
In 2012 the respective market shares of PCBs, SCBs, SBs and FCBs were about 67%, 21%, 7% and 6%.

Table 3: Total loans and advances (Billion Taka) & Market Share (%) by type of bank

Year	SCB	Market Share (%)	SBs	Market Share (%)	FCB	Market Share (%)	PCB	Market Share (%)
2000	288.05	48.53	101.44	17.09	31.02	5.22	173.11	29.16
2001	315.84	45.92	106.14	15.43	37.37	5.43	228.42	33.21
2002	339.08	44.17	108.4	14.12	41.7	5.43	278.55	36.28
2003	358.49	42.31	100.98	11.92	54.4	6.42	333.47	39.35
2004	376.62	39.59	105.42	11.08	66.29	6.97	402.98	42.36
2005	402.46	36.02	106.37	9.52	78.2	7.00	530.29	47.46
2006	417.6	32.33	119.98	9.29	89.09	6.90	664.98	51.48
2007	422.18	28.80	128.66	8.78	114.05	7.78	800.85	54.64
2008	431.41	23.76	141.55	7.80	147.64	8.13	1,094.92	60.31
2009	475.72	22.76	153.15	7.33	145.65	6.97	1,315.96	62.95
2010	558.12	21.68	179.29	6.96	154.91	6.02	1,682.11	65.34
2011	710.34	22.11	222.78	6.93	190.95	5.94	2,088.79	65.01
2012	813.14	21.07	259.68	6.73	217.73	5.64	2,568.79	66.56

***Source**: Bangladesh Bank*

The question that naturally comes to mind is what caused the share of bank loans to change so dramatically during the period. Some factors can be identified in answer to this question.

- *Overall structural change of the economy* – In the first half of 2000, the economy itself went through a major structural change as the share of agriculture declined sharply while that of manufacturing and services rose on the back of a booming RMG sector. This private sector led growth created substantial demand for credit which was met by the private banks.

- *Entry of the third generation banks* – The third generation banks entered the market in the late 1990s and contributed extensively in meeting the increased credit demand. Additionally, with the entry of new banks, the existing first and second generation private banks also expanded their services.
- *Inefficiency of public banks* – Public banks, similar to other public institutions of the country, are riddled with several issues that make them very inefficient in their operations. Thus, while the private banks were able to address the increased credit demand, the public ones remained inactive and lost their market share.

All these factors contributed towards the declining share of the public banks (and the accompanied rise in the share of the private ones) which brought forth the structural shift in the banking sector of the country.

4.1.2 Sectoral Composition of Credit

The sectoral composition of credit (loans and advances) is just as important as the total volume of credit in evaluating the financial condition of the economy. Credit employed in productive avenues, such as enterprises, is likely to have a greater growth impact than credit used for personal purposes such as household consumption.

Figure 3 below shows the share of credit received by the different sectors of the economy from the banking system on June 30, 2012. The largest share of bank credit went to finance trade (39%) while the industrial sector, with a share of 21%, was the second highest recipient of credit. 13% and 8% credit shares went to finance working capital and construction, respectively. Interestingly the agricultural sector, which accounts for almost 20% of total GDP, only received a share of 5%.

The following diagram (Figure 4) shows the trend in the composition of credit shares over the period of 2000-12. While the share of credit going to industry and agriculture has gone down; trade, working capital and construction each saw increased share of credit. Between 2000 and 2012, agricultural credit fell drastically from 15% to 5% while the industrial sector similarly experienced a decline in credit (from 26% of total credit in 2000 to hover around 20% from 2005 onwards). Both working capital and construction had their shares increase by about 1.5 times during the period while the share of credit used in trade financing increased from 29% in 2000 to 39% in 2012.

The discussion above captures the change in the composition of credit received by the different sectors of the economy. Increasing shares of sectors like *working capital*, *trade*, *construction* and others (which include *transportation*), indicates that the economy has been on the path of becoming more industrialized. At the same time, increased levels of commercial activities are reflected in the booming manufacturing and trade sectors. But at the same time, the declining share of *industrial* credit also reveals that the extent of industrialization has been limited to manufacturing (which has lower capital requirements and shorter production cycles). Furthermore due to continued losses, the SBs also had to gradually cut back on their industrial loan targets, further reducing the flow of credit to this sector.

Figure 1: Sectoral composition of loans and advances (on June 30, 2012)

Source: Bangladesh Bank

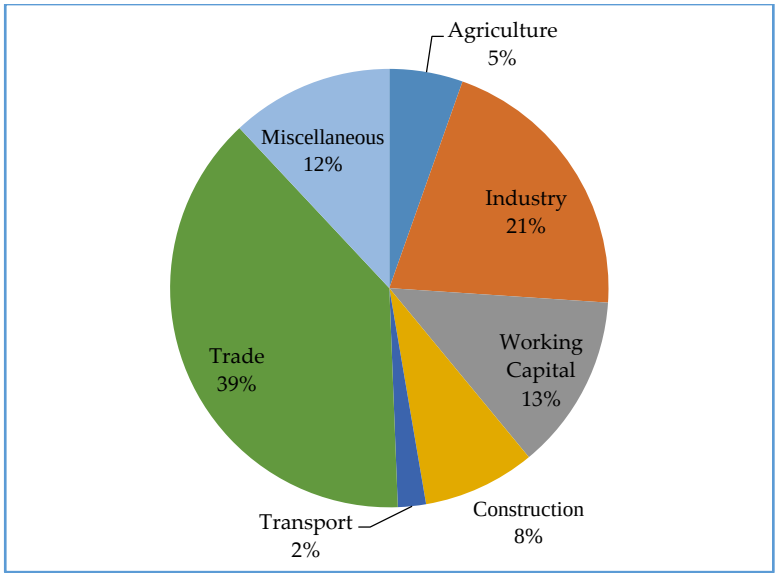
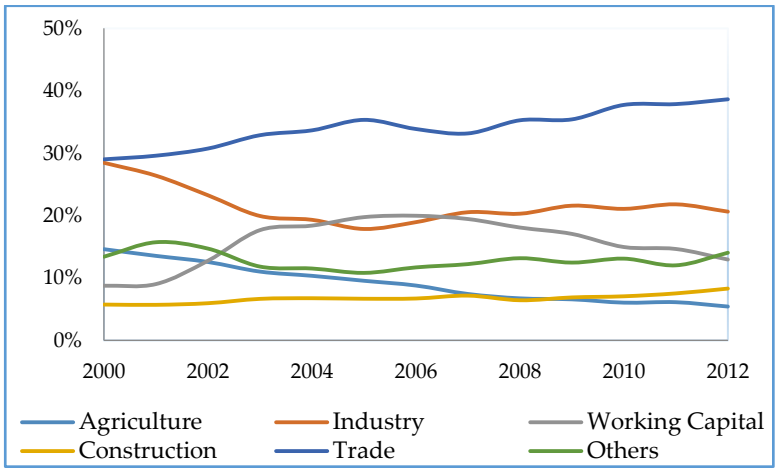


Figure 2: Trend in sectoral composition of loans and advances

Source: Bangladesh Bank



4.1.3 Short Term vs. Long Term Credit

Term structure refers to the different *terms* or *maturities* of loans. Generally short term credit is defined as bank loans with maturity of less than a year while long term or *term lending* are loans repayable over the period of a year or longer. Short term credit is usually used for *short term* purposes such as working capital needs while long term loans are used to finance fixed capital for large investments and projects. Short term credit is important for sectors with short production cycles such as agriculture and trade while long term credit is useful for financing manufacturing and industry. Therefore, as an economy moves away from agriculture to industry and services, the composition of term structure shifts from shorter to longer term credit. Thus short and long term credit play a complementary role in financing *working* and *fixed* capital requirements. Hence both are crucial for economic growth.

There is a huge body of economic literature that shows the relationship between longer term credit to the private sector and economic growth. Generally, economic growth is argued to increase with the savings invested in long-term assets. Credit products with longer maturity are essential for financing larger projects with higher returns. Therefore investment in large

projects such as heavy industry, infrastructure, etc. determines the course of long term growth of the economy.

Usually certain types of loans such as *demand loans, continuous loans* (including Over Draft (OD) and Cash Credit (CC)) etc. are treated as short term loans whereas term loans or long term loans are those provided for purchasing capital machineries, assets, factory buildings etc. The pie chart on the left below (Fig. 5) shows the composition of short and long term credit on June 2012 while the figure on the left (Fig. 6) is the trend in the shares of short and long term loans over the period of 2000-12. Two interesting observations emerge from the patterns. First, the overwhelming majority of credit disbursed by the banking system was in the form of short-term loans and advances and this pattern of loan term composition is almost unchanging throughout the period. In 2012 short term credit accounted for almost 82% of the total credit while its share was around 80% in 2001. Second, the shares of short and long term credit have surprisingly remained very stable over the past 13 years at around 80% and 20% respectively. This is a surprising observation because during that period the economy went through a significant structural shift from agriculture to manufacturing and services. Additionally the composition of trade (both export and import) also experienced substantial changes. But the composition of short and long term credit did not change in the manner expected with the structural shift in the economy.

Figure 3: Distribution of short term and long term outstanding loan in June 2012

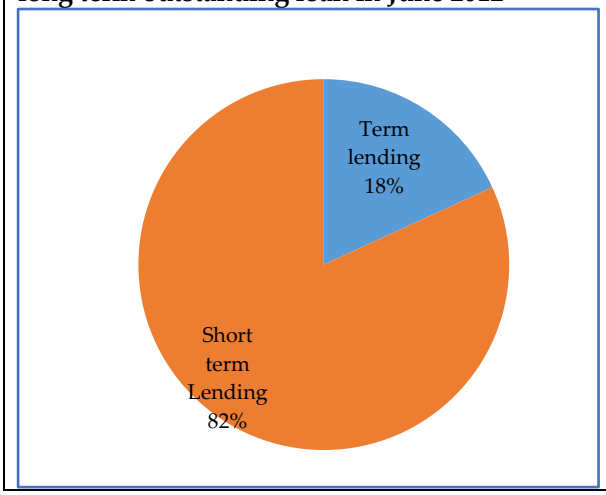
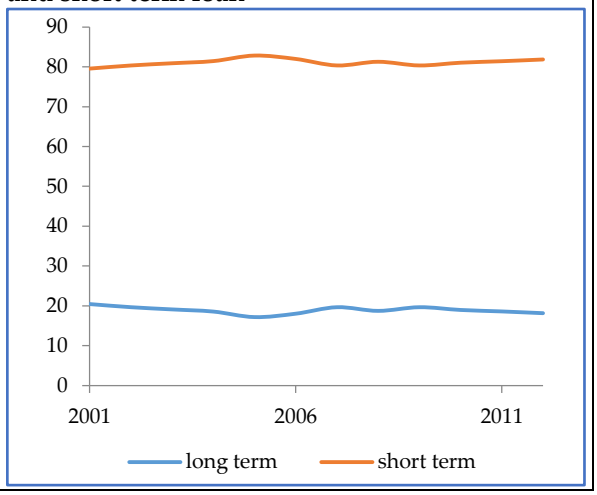


Figure 4: Trends in long term and short term loan



Source: Bangladesh Bank

Despite the significant structural shift in the economy, as well as in the banking sector itself, the shares of short and long term credit disbursed by the banking sector have not changed much over the past one and a half decade. This seemingly puzzling observation can be explained by the following underlying conditions.

- Supply Side:
  - *Mismatch between short term deposits and long term credit* – there is an insufficient supply of long term funds. At the same time, banks can earn higher returns on short term low risk assets, inclining them towards making shorter term loans.
  - *Inadequate capacity to assess risk of long term assets* – the financial sector lacks capacity to assess various types of risk of credit.

- *Lack of new instruments* - Instruments such as derivatives is currently unavailable in the market. If there were instruments like derivatives and secondary markets for loan trading, the risks associated with long term loans would be reduced.

• Demand Side:
  - The structure of the economy has changed in such a way that the demand for long term and short term credit has increased at the same pace, thereby keeping their shares constant over time. It can also be argued that the economy has not grown to the extent that the demand for long term credit is substantial and thus short term credit dominates the loan market.

4.2 Performance of the Banking Sector

Banks are substantially different from other profit maximizing firms in several important ways. First, banks collect deposits from the public and transform short term deposits into long term illiquid assets such as loans. Second, banks are exposed to a wide range of risks such as credit risk, interest rate risk, and market risk. Third, failure of one bank may trigger failure of other banks (a situation known as a *bank run*), a scenario unlikely in the case of other type of firms. Therefore usual measures of performance of firms, such as output, revenue, cost or profit, are not sufficient to evaluate the performance of banks. It requires a comprehensive set of indicators capturing a wide range of dimensions such as income, capital, asset, risk, management etc.

The **CAMELS** system has been widely used all over the world to measure the performance of banks and was originally developed in the USA. It is a supervisory rating system used to classify a bank's overall condition. It can be used to identify banks which are experiencing problems and require increased supervision.

The ratings are not released to the public but only to the top management to prevent possible situations of *bank run* on an institution which receives a low CAMELS rating. Those institutions that receive low ratings are subjected to increased levels of scrutiny by the supervising authorities.

The factors considered by this rating system are each represented by the acronym '**CAMELS**'. They are:
C – Capital Adequacy
A – Asset Quality
M – Management Efficiency
E – Earning Capacity
L – Liquidity Management
S – Sensitivity to Market Risks

The ratings are given on a scale of 1 to 5, with 1 being the best score and 5 being the worst. Bangladesh Bank introduced the CAMELS Rating System in 1993 to monitor the performance of banks in the country. Each of the components of the rating system is treated in detail below.

4.2.1 Capital Adequacy

Capital Adequacy refers to the amount of *capital* a bank or other financial institution has to hold as per requirement of its financial regulator. It is generally expressed as a ratio of the *equity* that must be held as a percentage of *risk-weighted assets*. These requirements are used to ensure that the financial institutions do not make excessive loans which expose them to the risk of becoming incapable of paying back their depositors/clients.

Types of bank capital:

- **Tier 1 (Core) capital**: Common stock, retained earnings, preferred stock, selected identifiable intangible assets *less* goodwill and other intangible assets.

- **Tier 2 (Supplementary) capital**: Reserves for loan and lease losses, subordinated debt capital instruments, mandatory convertible debt, other long-term capital instruments that combines the *debt* and *equity* features.

Capital Adequacy Ratio (CAR) or the Capital to Risk-weighted Assets Ratio (CRAR) measures a bank's *core capital* as a percentage of its *risk-weighted assets*. A bank having a higher CAR is considered as a bank with a stronger financial health which has a better capability to absorb any potential shock arising from financial risks.

Example: How bank capital helps prevent bank failure

Bank capital helps bank to avoid situations of bank failure i.e. when the bank cannot satisfy its obligations to pay back its depositors and other creditors. Let us now look at how bank capital helps in preventing banks from failing.

Consider the case of two banks, High Bank Inc. and Low Bank Inc., which are similar in all respect expect for the fact that High Bank Inc. has a higher level of capital than Low Bank Inc. Specifically, assume that the *capital to assets ratio* of High Bank Inc. is 10% while that of Low Bank Inc. is 5%. The balance sheet of the two banks looks like the following:

High Bank Inc.

Assets		Liabilities	
Reserves	10 lac	Deposits	90 lac
Loans	90 lac	*Bank Capital*	10 lac
Total Tk. 100 lac		Total Tk. 100 lac	

Low Bank Inc.

Assets		Liabilities	
Reserves	10 lac	Deposits	95 lac
Loans	90 lac	*Bank Capital*	5 lac
Total Tk. 100 lac		Total Tk. 100 lac	

As the balance sheet shows, the asset holding of the two banks are identical while they differ in their size of bank capital and deposits. They both have liabilities totaling Tk. 100 lac but High Bank Inc. has capital worth Tk. 10 lac while Low Bank Inc. has only Tk. 5 lac.

Now if both the banks experience loan defaulting and has to write off Tk. 6 lac in bad debts (i.e. loans worth Tk. 6 lac are now valued at zero), how would the financial position of the banks change? Both banks will find that the total value of their assets decline by Tk. 6 lac while

their total liabilities (only *deposits* in our example) are unchanged. Recall that, bank capital is equal to *total assets minus total liabilities* and hence the capital of both banks also decline by Tk. 6 lac. In this situation, the balance sheet of the banks would look like the following:

High Bank Inc.

Assets		Liabilities	
Reserves	10 lac	Deposits	90 lac
Loans	*84 lac*	*Bank Capital*	4 lac
Total Tk. 100 lac		Total Tk. 100 lac	

Low Bank Inc.

Assets		Liabilities	
Reserves	10 lac	Deposits	95 lac
Loans	*84 lac*	*Bank Capital*	- 1 lac
Total Tk. 100 lac		Total Tk. 100 lac	

In the case of High Bank Inc., its larger size of bank capital means that the bank still has a *positive net worth* (bank capital) after the reduction in its value of assets (loans) by Tk. 6 lac (the bank initially had a capital of Tk. 10 lac and subtracting Tk. 6 lac from this value we arrive at the new net worth of the bank). On the other hand, Low Bank Inc. initially had bank capital of only Tk. 5 lac. The reduction in the value of its assets by Tk. 6 lac means that the bank now has a negative net worth of Tk. 1 lac! But what does a negative net worth mean for the bank? This means that the total value of the bank's liabilities now exceed its assets by Tk. 1 lac and hence the bank becomes unable to pay back all of its holders of liabilities (only *depositors* in our example). The bank will then become insolvent which may result in the regulators closing down the bank.

Comparing the scenario facing the two banks, it becomes clear the bank with the higher value of capital is more capable of handling reductions in its asset value while low capital banks are more vulnerable to becoming insolvent. Thus a high capital base acts as a cushion against such risks and helps in preventing bank failures.

In order to protect the depositors' interest, Bangladesh Bank has made it mandatory for the banks to maintain a CAR which has been revised from time to time. Banks are required to maintain at least 10 percent of risk-weighted assets as capital, with core capital not less than 5 percent.

The table below shows the year wise CAR maintained by the different bank types in the country over the years. In 2012, the CAR of the SCBs, SBs, PCBs and FCBs were 11.2%, - 4.3%, 11.4% and 21.5% respectively. The SBs could only maintain the required capital adequacy ratio in 2004 and in all other years they failed to do so. In the years after 2004, they have even failed to maintain a positive capital adequacy ratio. The write offs of huge amounts of bad debts led to the low ratios for the SBs. The SCBs too could not maintain the minimum required capital for most of the years under review and this deficiency is also attributable to the same problems plaguing the SBs. SCBs complied with the minimum capital requirement only in 2009 and 2011.

The PCBs and FCBs have been able to maintain the required capital adequacy throughout the period with that of the FCBs being consistently much higher than the requirement. This excess capital of the FCBs has made the aggregate capital adequacy of the entire banking industry appear healthier than the actual scenario in recent years. Moreover, the aggregate CAR has

suffered from wide fluctuations during the period (from a low of 5.6% in 2005 to a high of 11.6% in 2009).

Table 4: Year-wise CAR maintained by different types of banks (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SCBs	4.5	4.2	4.1	4.3	4.1	-0.4	1.1	7.9	6.9	9	8.9	11.7	11.2
SBs	3.3	3.9	6.9	7.7	9.1	-7.5	-6.7	-5.5	-5.3	0.4	-7.3	-4.5	-4.3
PCBs	11.0	9.9	9.7	10.5	10.3	9.1	9.8	10.6	11.4	12.1	10.1	11.5	11.4
FCBs	18.5	16.8	21.5	22.9	24.2	26	22.7	22.7	24	28.1	15.6	21	21.5
Total	6.8	6.7	7.4	8.4	8.7	5.6	6.7	9.6	10.1	11.6	9.3	11.4	11.3

Data source: Bangladesh Bank

There are several methods for a bank to increase its required capital ratio. One way to do so is to inject money from its owners and this is a comparatively easier solution for the state owned banks. Alternatively, it can retain part of the earnings from its net profits rather than distribute them all as dividend to the shareholders. Stock dividend is also another way which adds to the paid up capital of the bank. Banks also have the option to restructure their loan portfolio by reducing investment in risky assets. It can invest more in comparatively risk-free or less risky projects but this option is not available within a short time period.

Box 1: Injection of capital to the SCBs

Under the Supervisory Review Process (SRP), Bangladesh Bank directed all banks to maintain a level of "adequate" capital, which is higher than the minimum required capital and sufficient to cover all possible risks in their business. In line with the Basel – II accord, these banks are required to maintain the minimum required capital of Taka 10213.70 crore. However, the collective capital of these four SCBs was only Taka 1350.69 crore indicating an aggregate capital shortfall of Taka 8863.01 crore. All these four banks had suffered from capital shortfall; no NCBs could maintain the required Capital Adequacy Ratio (CAR).

Table 5: Capital base and injected capital by the government

	On September 30, 2013			On December 26, 2013
	Total Risk Weighted Assets (Crore Taka)	**Capital Surplus / Shortfall**	**CAR**	**Capital injected by government (Crore Taka)**
Sonali Bank	36454.85	-4638.79	-2.72%	1995
Agrani Bank	20977.76	-2480.79	-1.83%	1081
Janata Bank	32224.07	-1573.71	5.12%	814
Rupali Bank	12480.32	-169.73	8.64%	210

D*ata source: Bangladesh Bank*

To make up the soaring capital shortfall of the SCBs, the Government of Bangladesh has injected a total of Taka 4100.00 crore to these four state-owned banks from its budget allocation on December 26, 2013. However, the government set a precondition for the SCBs to carry out a string of operational measures to improve their financial portfolios. Following the injection of fresh funds, the scenario has been improved a bit, though three SCBs still have failed to maintain the required CAR of 10%.

4.2.2 Asset Quality

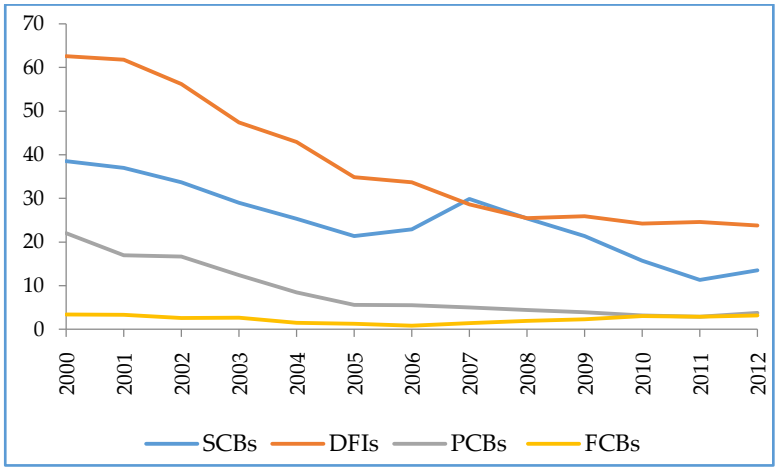
4.2.2.1 Non-Performing Loan (NPL)

We saw in the previous chapter (Chapter 3) that the assets in the banking industry have largely been concentrated in loans and advances. As loans and advances constituted a significant portion of assets, non-performing loans and advances (NPL) pose the biggest threat to the soundness of the banking system. The ratio of gross non-performing loans (NPLs) to total loans is the most important indicator for analyzing the quality of banks' assets.

Historically several issues like dominance of political interest over financial viability in selecting projects, advancement of credit to the priority sectors following government's electoral promise and ideology and managerial inefficiency have led to the high incidence of NPLs in the SCBs and SBs. However, in recent times the asset quality of the aggregate banking industry has improved to a large extent since 2000. The figure below shows the trend in the NPLs over time for the different bank categories. In 2000, SBs had the highest NPL ratio followed by the SCBs and PCBs, while the FCBs had the lowest. Over time the incidence of NPLs are found to have generally declined for all bank types. At the end of 2011, NPLs of the SCBs, DFIs, PCBs and FCBs were 11.3, 24.6, 2.9 and 2.9 percent respectively of their total loans.

Figure 5: Trends in NPLs ratio over time

Data source: Bangladesh Bank



Accurate valuation of asset is the first step to assess the financial health of a bank as the quality of asset varies significantly by bank products. Banks generally review their loan portfolios and assign loans to different categories based on the perceived risk and other relevant characteristics of the loans. Furthermore, banks recognize the fact that they will not be able to collect all the due amounts and thus maintain necessary provisions. The purpose of provisioning is to take into account expected losses. There are disincentives for banks to maintain higher loan-loss provision as it reduces profit and shareholders' dividend, although the provision is tax-deductible.

4.2.2.2 Loan loss classification

Classification Criteria

i. **Sub-standard**: if it is past due/overdue for 3 (three) months or beyond but less than 6 (six) months

ii. **Doubtful**: if it is past due/overdue for 6 (six) months or beyond but less than 9 (nine) months
iii. **Bad/Loss**: if it is past due/overdue for 9 (nine) months or beyond.

Box 2: Loan Loss Provision Criteria

I. General Provision:

i.) 0.25% against all unclassified loans of small and medium enterprise (SME) and 1% against all unclassified loans (other than loans under consumer financing, loans to brokerage house, merchant banks, stock dealers etc., special mention account as well as SME financing).
ii.) 5% on the unclassified amount for consumer financing whereas it has to be maintained 2% on the unclassified amount for (i) housing finance and (ii) loans for professionals to set up business under Consumer Financing Scheme.
iii.) 2% on the unclassified amount for loans to brokerage house, merchant banks, stock dealers, etc.
iv.) 5% on the outstanding amount of loans kept in the 'Special Mention Account'.
v.) 1% on the off-balance sheet exposures.

II. Specific Provision: Banks are required to maintain provision at the following rates for *classified* continuous, demand and fixed term loans:

i. Sub-standard: 20%
ii. Doubtful: 50%
iii. Bad/Loss: 100%

4.2.3 Managerial Efficiency: Efficiency Ratio

Proper management is one of the crucial preconditions for the sustained growth of any business and more important so for a financial institution like a bank. *Efficiency ratio* is a widely used indicator to assess the efficiency of managing bank's assets and liabilities. It is typically measured by the non-interest expenses as a percentage of total income.

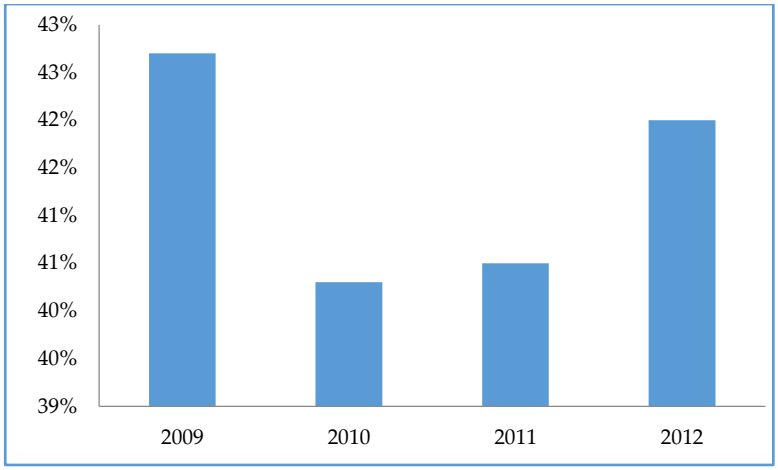
Efficiency ratio = Non-Interest Expenses / (Net interest income+ Other Income)

The non-interest expenses comprise of all operating and overhead expenses such as employee salaries and benefits, loan loss provisions, maintenance of facilities, equipment, furniture, vehicles etc. In fact, expenses borne for the activities not associated with deposit funds in the bank are known as non-interest expenses.

The figure below shows the trend in ratio of non-interest expenses to total income of the banking industry for the period of 2009-12. The ratio was 42.7% in 2009, dropped to 40.3% in 2010 and then picked up again in at 42% in 2012. This increase in this ratio in 2010-13 is due to the fact that non-interest income increased faster than the total income. For example, during the period 2011-12, the aggregate income of banking industry increased by 8.4 percent, while non-interest expenses increased by 12.6 percent.

Figure 6: Aggregate non-interest expenses to total income ratio of the banking industry

Source: Bangladesh Bank



4.2.4 Earning Capacity

4.2.4.1 ROA and ROE

There are two widely used indicators to assess the earnings and profitability of banks. These are the

- Return on Assets (ROA)
- Return on Equity (ROE).

While both are measures of the profitability of a bank, ROE represents the efficiency of the management of a bank to generate profit against investors' capital and ROA shows the capability of management to earn from their assets.

Net Income of a bank gives us an idea of how well a bank is doing but it does not adjust for the *size* of the bank. A basic measure of bank profitability that take into account the size of the bank is the Return on Assets (ROA), which divides the net income of the bank by the value of its assets. ROA is obtained by:

$$\textbf{ROA} = \frac{\text{Net Income}}{\text{Assets}}$$

ROA thus indicates how efficiently a bank is being run as it shows how much profits are generated on average by *each* taka of bank assets.

Although ROA provides information on bank profitability, bank owners (equity holders) are more interested in how much the bank is earning on their *equity investment*. This is measured by the Return on Equity (ROE) which is the net income per taka of equity capital. ROE is given by:

$$\textbf{ROE} = \frac{\text{Net Income}}{\text{Capital}}$$

Thus, ROE measures how well the bank owners are doing on their investment. Put in other words, it shows how *effective* the bank managers are in using the investors' money. ROE also indicates the rate at which the management is growing the *value* of the company.

But these two measures of bank profitability are not distinct and are in fact related in the following way:

$$\frac{Net\ income}{Capital} = \frac{Net\ Income}{Assets} \times \frac{Assets}{Capital}$$

The second term on the right hand side of the above equation is known as the equity multiplier (EM), which shows the amount of assets per taka of equity (bank) capital. Thus, we have:

ROE = ROA × EM

This expression shows us what happens to the return on equity when a bank holds a small amount of capital for a given amount of assets. Keeping ROA fixed, when bank capital increases, the value of the equity multiplier decreases and hence ROE also decreases.

Returning to our earlier example of High Bank Inc. and Low Bank Inc., we can see that the High Bank Inc. had Tk. 10 lac of capital and a total asset value of Tk. 100 lac. Thus the EM for the bank is 10 (100 ÷ 10). On the other hand, with a total asset of Tk. 100 lac, Low Bank Inc. has a capital of only Tk. 5 lac. Thus its EM is 20 (100 ÷ 5). Now assume that both banks have been run *equally efficiently* and hence they would have the same value of ROA (not matter the size of the banks).

If for example, the ROA of both banks is 1%, then we have:

ROE of High Bank Inc. = 1% × 10 = 10%
Low Bank Inc. = 1% × 20 = 20%

Clearly, the owners of Low Bank Inc. are earning a relatively high rate of return on their equity investment thanks to the low capital base of the bank. In general, given the same rate of return on assets (ROA), a smaller bank capital translates into a larger return on equity (ROE) for the bank owners. We can now see why bank owners would prefer to keep a low level of bank capital as that would mean a higher rate of return on their equity. But recall that, we saw earlier how a large capital base can help banks to prevent bank failure.

Therefore, we now have a conflicting scenario regarding the size of bank capital. On one hand, a larger capital base helps keep banks solvent while a smaller bank capital provides greater rate of return on the owner's equity. Thus bank managers have to acknowledge both the benefits and costs of a given size of bank capital and make the tradeoff between safety and higher earnings accordingly in different circumstances.

The Profit and Loss Statement

So far, we have learnt about the *balance sheet* of a commercial bank which records all its assets and liabilities. These are all *stock* variables (recall from Chapter 2). Where then, are all the corresponding *flow* variables of the bank such as income and expenditure? These are found on the *Profit and Loss Statement* of the bank. In order to understand the health of a bank or the

banking sector as a whole, we have to have a very good understanding on each component of the profit and loss statement.

A Profit and Loss Statement (P&L) is a financial statement that records the revenues, costs and expenses incurred by a company during a specific period of time, usually a quarter or a year. This statement provides information on the ability of the company to generate profits by increasing revenues and or decreasing expenses. When expenses are greater than revenues, the company will be making a loss instead and as this document shows the profit or loss made by the company, that's why it is aptly titled as the 'Profit or Loss Statement'. This statement is also known as the Income Statement.

The P&L shows the changes in the accounts of a company over a specific period of time while on the other hand, the balance sheet is a like a snapshot at a given point of time that shows what is owned (assets) and owed (liabilities) by the company. Thus using our knowledge of stock and flow variables, we can easily see that the P&L records the flow variables while the Balance Sheet shows the stock variables.

The P&L or the Income Statement is generally arranged in the following way. First the revenues generated by the company are recorded and then follows the expenses incurred. The difference between the two is the profit earned by the company before paying for taxes and provisions made for other purposes. Let us look at an example of a simplified version of the Profit and Loss Statement of a commercial bank.

Table 6: Profit and Loss Statement for XYZ Bank for the year ended 31 December 2015

2015 Taka	
A. Income	100
Interest income	80
Other income	20
B. Expenditure	80
Interest paid (on deposits)	50
Operating expenses	25
Provisions	5
C. Gross profit (A-B)	20
Tax provision (40% tax)	8
Net income after tax and provision (NIAPT)	12

First, the income earnings of the bank are provided. Income of the bank can be broadly divided into interest income and income from other sources. The total income for the XYZ bank is Tk. 100 in 2015. Next the expenditures borne by the bank are reported. For most banks, typically a large portion of the earnings are paid as interest on deposits (the source of funds for banks). Other sources of expenditure are operating expenses and provisions made for different purposes. Total expenditure for the bank during the period was Tk. 80. Subtracting total expenses from total income, we arrive at the Gross Profit of the bank equal to Tk. 20. But taxes will need to be subtracted from this figure. Taxes at the rate of 40% mean that the NIAPT for the bank was Tk. 12 in 2015.

While the discussion above introduces us to the bare bones of the P&L Statement of a commercial bank, let us now look at an actual statement to delve into a more detailed analysis.

Actual Profit and Loss Statement of a Commercial Bank

To maintain consistency, we use the Profit and Loss Statement of AB Bank Ltd. for the year ended 31, December 2015 (we examined the balance sheet of the same bank in the previous chapter).

Table 7: Profit and Loss Statement of AB Bank Ltd. for the year ended 31, December 2015

	2015 Taka
OPERATING INCOME	
Interest income/profit on investments	21228897178
Interest/profit paid on deposits and borrowings, etc.	-16,608,847,742
Net interest income	**4620049436**
Investment income	3281987184
Commission, exchange and brokerage	2964436043
Other operating income	227682558
	6474105785
Total operating income (a)	**11094155221**
OPERATING EXPENSES	
Salary and allowances	2905505487
Rent, taxes, insurance, electricity, etc.	606508831
Legal expenses	9292376
Postage, stamps, telecommunication, etc.	139947246
Stationery, printing, advertisement, etc.	168617596
Chief executive's salary and fees	12900000
Directors' fees	8783017
Auditors' fees	5285950
Depreciation and repairs of Bank's assets	600206526
Other expenses	1255511701
Total operating expenses (b)	**5712558730**
Profit before provision [c = (a-b)]	**5381596491**
Provision against loans and advances	2066527189
Provision for diminution in value of investments	44910791
Other provisions	200066450
Total provision (d)	**2311504430**
Profit before tax (c-d)	**3070092061**
Provision for taxation	**1612779701**
Current tax	2015720840
Deferred tax	-402,941,140
Net profit after tax	**1457312360**

Appropriations	
Statutory reserve	535826124
General reserve	-
Dividends, etc.	-
	535826124
Retained surplus	**921486237**
Minority interest	**7220463**
Net Profit attributable to the shareholders of parent company	**914265774**
Consolidated Earnings Per Share (EPS)	**2.42**

The first section of the Profit and Loss Statement shows the revenues earned by the bank under the heading of **Operating Income**. Total income earned is divided into:

i. *Net interest income* – *interest/profit* earned on investments *net* of that paid on deposits and borrowings etc. In 2015, the net interest income for AB Bank was Tk. 4,620,049,436.
ii. *Other operating income* – which includes investment income, various commissions earned and income from other sources that amounted to a total of Tk. 6,474,105,785.

Adding the above two items, we get the Total Operating Income of the bank which was Tk. 11,094,155,221 in 2015.

Next, the Operating Expenses of the bank are presented. Total operating expenses were in the tune of Tk. 5,712,558,730 in 2015 and consisted of expenses incurred on items like salary and allowances, rent, utility bills, fees of different types and depreciation among others.

Subtracting total operating expenses from income, we get the item titled Profit before provision. Hence:

Profit before provision = Total operating income – total operating expenses
In 2015, the *profit before provision* for AB Bank was Tk. 5,381,596,491.

Next the statement records the provisions made by the bank for different purposes which include provisions for loans and advances, diminution in value of investments and other provisions. Total provision made by the bank in 2015 was Tk. 2,311,504,430.

Subtracting *total provision* from the *profit before provision* gives us the **Profit before tax**, which was equal to Tk. 3,070,092,061. The subsequent item on the statement is the **Provision for taxation**. Notice that in this case, the **deferred tax** amount is *subtracted* from **current tax** amount to get the current tax obligation. This is due to the fact that the organization paying the tax (the payee) and the tax authority may use different methods of tax calculation (e.g. accounting for depreciation in different ways) and hence arrive at different figures of the tax payable by the organization for a given period. Whenever there are such discrepancies between the two amounts in a period, the *difference* is adjusted in the next period. For example, if the amount of tax returns filed by the organization for a given year is *more* than the amount

calculated by the tax authorities, the *excess* amount will be adjusted by *subtracting* it from the next year's tax payable. On the other hand, if the amount of tax filed is *less*, it would be adjusted by *adding* it to next year's tax obligation.

In the case of AB Bank in 2015, the deferred tax amount was negative, indicating that they had overpaid taxes in the previous year by the amount of Tk. 402,941,140. This figure is subtracted from the current tax amount to arrive at the net tax provision for 2015. Provision for taxation was equal to Tk. 1,612,779,701 for the bank in 2015.

Finally, by subtracting provision for taxation from profit before tax, we arrive at the Net profit after tax. This is the figure that finally shows us how much profits the bank has earned after paying for all sorts of obligations. The net profit after tax for AB Bank in 2015 was Tk. 1,457,312,360.

We can now easily relate to the definition of the following indicator:

Net Income after Provision and Tax (NIAPT) = *profit before provision* – (*total provision* + *provision for taxation*)

The NIAPT is the measure of *net income* that is used in calculating both ROA and ROE.

So far, from the Profit and Loss Statement we have seen the revenues earned, expenses incurred and the profits made by the company. The statement also provides some additional information pertinent to the owners and investors of the company.

The next section, called Appropriations, shows how the profits made by the bank are distributed among different uses. Tk. 535,826,124 of the profits of AB Bank in 2015 was placed as Statutory Reserve while none went towards the General Reserve or for dividend payments. This addition to the reserve resulted in the Retained Surplus of the bank being equal to Tk. 921,486,237 in 2015. Note that the measure *retained surplus* is a stock variable while additions to it (from Appropriations) are a flow. The subsequent item on the statement is Minority Interest which was equal to Tk. 7,220,463 followed by the Net Profit of the Shareholders of parent company, in the tune of Tk. 9 14,265,774.

Adding up the new additions to reserve, minority interest and profits of the shareholders, the reader can verify that the sum is equal to the figure of the Net Profit after Tax for the bank (Tk. 535,826,124 + Tk. 7,220,463 + Tk. 9 14,265,774 = Tk. 1,457,312,360). Thus, we find that the net profit of the bank in 2015 was divided into additions to reserve, payments to minority interest and profits for the shareholders.

The final item reported is the Consolidated Earnings per Share (EPS) of the bank which was equal to Tk. 2.42 in 2015. While the variable Net Profit after Tax shows how much the company was able to generate in profits during the given year, the EPS is the variable that is of more interest to the investors of the company as it shows the per share earnings of the company. A large profit may not translate into high earnings for shareholders if there is large number of outstanding shares of the company.

We now return to our discussion of ROA and ROE of the banks in the country. The table below reports the ROA and ROE of the different bank groups.

The first thing we notice is that the value of ROA (in absolute terms) is smaller than the corresponding value of ROE for each of the bank category. This is as expected, because ROE takes into account only the equity portion while ROA is based on the assets of the bank. Given the accounting identity, equity = assets – liabilities, we see that the two will only be equal for a bank whose liabilities are zero. But when the share of liabilities is larger, the equity portion is relatively smaller and so ROE becomes larger than ROA. Thus when banks have liabilities, the ROE will be larger than the ROA.
For most of the years under our review, the SCBs and DFIs have had negative values of ROE or both ROA and ROE while the PCBs and FCBs maintained positive values all throughout. As both ROA and ROE uses Net Income in its numerator, a negative value of either means that the net income of the bank in the year was negative. Therefore, the SCBs and DFIs failed to post a positive net income in 2000, 2005 and 2012. At the same time, PCBs and FCBs had much larger values of both ROA and ROE compared to the SCBs and DFIs. The higher ROA for the former bank group indicate that they have been run more efficiently than the latter group while their larger ROE means that they were also able to generate more income for each Taka of their equity capital. Comparing the PCBs and FCBs, we find that while the ROA of the former is lower than the latter, the ROE of the two are quiet similar in some of the years.

The ROA and ROE of the entire banking sector of the country has also experienced some fluctuations over the years (following an upward trend till 2010 but declining sharply in 2012).

Table 8: ROA and ROE of the bank categories

	ROA					ROE			
	2000	**2005**	**2010**	**2012**		**2000**	**2005**	**2010**	**2012**
SCBs	0.04	-0.1	1.1	-0.6		1.5	-6.9	18.43	-11.87
DFIs	-3.7	-0.1	0.2	0.1		-68	-2	-3.2	-1.06
PCBs	0.83	1.1	2.1	0.9		17.1	18.1	20.9	10.17
FCBs	2.68	3.1	2.9	3.3		26.9	18.4	16.99	17.29
Total	0.47	0.6	1.8	0.6		10.9	12.4	20.97	8.2

4.2.5 Liquidity Management

The Statutory Liquidity Requirement (SLR) for the traditional commercial banks is now 19.0 % of the total demand and time liabilities. This value is calculated on a daily basis. The SLR includes an average of 6.0 percent Cash Reserve Ratio (CRR) on biweekly basis. The banks have to keep the CRR with Bangladesh Bank and the rest of the 13 percent has to be maintained in the form of other assets, such as cash or government securities.

The SLR for the commercial banks following the Islamic Shariah is 11.5 percent. The CRR for these types of banks is the same as the other conventional banks. Other than the Basic Bank Ltd., the specialized banks do not need to maintain the SLR.

4.2.6 Sensitivity to Market Risks: Single Borrower Exposure

With a view towards ensuring better management of credit risk and reducing the credit concentration, Bangladesh Bank introduced a master circular on single borrower exposure

limit in April 2005. Compliance with the circular consequently reduces the loan concentration. As per the circular, the outstanding financing facility to a single entity must be within certain percentage of the bank's total capital as follows:

- Fund based financing: 15%
- Non-funded financing: 35%

In case of funded facilities the funds of the banks are directly used such as bank overdraft, cash finance, etc. On the other hand, non-funded facilities are those which do not involve any fund of banks directly such as letter of credit, letter of guarantee, etc.

The banks must ensure that the total amount of the funded and non-funded credit facilities shall be within 35% of the bank's total capital. However, the single borrower exposure limit for non-funded and funded financing in export sector would be 50% and 15% of the bank's total capital respectively. At the same time, loan amounting 10% or more of a bank's total capital is considered as a large loan which has to be sanctioned by individual banks as per stipulated limit against its classified loans. However, the banks have to submit statement of large loan in the specified format on a quarterly basis to Bangladesh Bank within 10 days after the end of respective quarter.

Box 3: Performance of the 4 SCBs

Table 9: Key statistics of the SCBs (on December 31st 2012)

	Sonali Bank	Janata Bank	Agrani Bank	Rupali Bank	Banking industry
Total asset (billion Taka)	753.95	511.13	378.72	172.99	7030.70
Total credit (billion Taka)	378.15	305.34	212.66	90.64	4261.50
Total deposit (billion Taka)	599.29	409.77	292.43	136.60	5498.16
Total capital (billion Taka)	22.4	11.78	-12.26	11.24	575.9
Net Interest Income (billion Taka)	-2.2652	6.7399	3.9827	3.0223	153.8
Total NPL (billion Taka)	125.98	52.41	53.80	22.63	427.3
ROA (%)	-4.18	-3.19	-4.92	0.70	0.60
ROE (%)	-140.84	-94.62	-259.94	10.34	7.80
CAR (%)	-0.94	3.69	-5.60	12.15	10.46
Ratio of NPL in total loan (%)	33.31	17.16	25.30	24.96	10.00
Efficiency ratio (%)	50.72	33.98	41.09	45.40	42.00
Expenditure-Income ratio (%)	80.05	70.65	72.79	76.17	72.83[1]

Source: Bangladesh Bank

The table above presents the core statistics on the state and performance of the four SCBs in the country on December 31, 2012. The total assets of the SCBs made up around 25.8% of the assets of the banking industry while their credits and deposits were 23.2% and 26.2%, respectively, of the total figures. The SCBs only accounted for 5.8% of the total banking capital, earning a total of Tk. 11.5 billion in Net Interest Income (which was 7.5% of the total). Notice how the four banks had a total NPL value of Tk. 254.8 billion in 2012, which was a whopping 60% of the total NPL of the banking sector of the country! This clearly reflects how the SCBs are mired with issues of loan defaulting.

While both the ROA and ROE of Ruplai Bank was higher than the banking industry average, three of the other SCBs had negative values of ROA and ROE in 2012. Turning to the CAR, we again find that only Ruplai Bank could maintain the CAR, while that of the Sonali Bank and Agrani Bank was negative. The SCBs also had much larger values of NPL in total loan ratios compared to the value for the entire banking sector. While the efficiency ratio of Sonali Bank (50.7%) was higher than the average for the industry (42%), that of Janata Bank was much lower (34%). And finally, the expenditure-income ratios of 3 of the SCBs were comparable to the industry average but that of Sonali Bank was much larger.

4.2.7 Overall CAMELS Rating

Bangladesh Bank has been using the CAMELS rating to assess the bank's performance for the last two decades. As mentioned earlier, the banks are rated on a scale of 1 to 5, with 1 representing the best rating and5 indicating the worst.

The table below shows the CAMELS rating of the banks in the country for the period of 2001-2011. In 2011 only 2 banks were grouped as 'strong' while 33 banks were labeled as 'satisfactory'. Though the number of 'satisfactory' banks increased by one in 2012, the number of 'strong' banks dropped by three which was also reflected by higher number of 'fair' banks. The number of 'marginal' and 'unsatisfactory' banks remained same in 2010-11.
The number of strong banks was 15 in 2003, the highest in the banking history. But it dropped dramatically to 3 in 2006 from 13 in 2005. Most of the downgraded banks were relegated by one step to 'satisfactory' and consequently the number of 'satisfactory' banks increased substantially. The number of 'marginal' and 'unsatisfactory' banks has also decreased over time. The trends in the distribution of the quality of banks indicate strong convergence to the 'satisfactory' and 'fair' levels.

Table 9: Number of banks and CAMELS rating since 2001

Rating	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Strong	7	9	15	12	13	3	6	2	3	5	2
Satisfactory	24	21	11	15	16	31	29	28	32	32	33
Fair	6	7	11	10	8	7	5	10	8	7	9
Marginal	14	10	10	8	6	5	6	4	4	2	2
Unsatisfactory	0	2	2	4	5	2	1	4	1	1	1
Total	51	49	49	49	48	48	47	48	48	47	47

Data source: Bangladesh Bank

4.3 Other related issues of the banking sector of Bangladesh

4.3.1 Syndicated Loan

It is a loan arrangement in which a group of lenders (called the syndicate) work together to raise funds for a single borrower. The lender group usually consists of banks and other financial institutions. The syndicated loan helps diversify the risks by sharing the costing and pooling resources and information. Syndicated loans tend to be much larger than standard bank loans. It is also argued that syndicated loan leads to more competitive loan pricing and product innovations.

Loan syndication is the most common form used for funding project finance. At the very basic level, syndicated loans are those in which the arrangers of the loan serve the investment-banking role of raising the funds for an issuer who needs credit. Usually there is a lead bank or underwriter of the loan, known as the 'arranger', 'agent' or 'lead lender' who may be putting in a proportionately larger share of the loan or performing duties like dispersing the cash flows of the loan among the other syndicate members and as well as other administrative duties.

Syndicated Loans in Bangladesh

As a result of banks' inadequate capacity to manage large and risky assets and stringent regulations that discourage risky ventures, syndicated loans are becoming popular to get around the issues. The first syndicated loan effort was carried out by AB Bank along with Dhaka Bank Ltd to arrange a syndicated loan to raise Tk. 670 million in 1997. In recent years, there has been a huge increase in the number and volume of syndicated loans. There is no data available on the trend of syndicated loan over time in Bangladesh. Standard Chartered, Prime Bank are market leaders in this field. Determination of interest rate for syndicated loans is difficult in the absence of any benchmark interest rate in Bangladesh, such as DIBOR (Dhaka Inter-Bank Offered Rate).

4.3.2 Interest Rate Spread

The wedge between lending rate and deposit rate is a key indicator for bank management, efficiency and competition in the banking industry. In a competitive market the wedge is argued to be very low. However, it is important to keep in mind that market for loan is not identical to other product market – loan market is not cleared by the market mechanism. The credit market is inherently imperfectly competitive because of the *information asymmetry* of the lenders about the borrowers and there is a sunk cost associated with the acquisition of information. This imperfection is a major source of the gap between the lending and deposit rate. Even if there is a demand for credit at a given interest rate, the bank may not be willing to supply it. Banks may not have enough information about the borrowers or cost of gathering information may be too high for the banks to lend.

Stylized facts about the IRS in Bangladesh

Table 10: Trends in deposit and lending rates and IRS

	Weighted average of all banks		IRS by bank groups				
Period (June)	**Deposit Rate**	**Lending Rate**	**IRS**	**SCBs**	**SBs**	**PCBs**	**FCBs**
2001	7.03	13.75	6.72	5.98	4.86	8.96	7.88
2002	6.74	13.16	6.42	5.74	5.11	7.23	7.83
2003	6.3	12.78	6.48	6.14	6.01	6.63	7.62
2004	5.65	11.01	5.36	4.88	3.64	5.58	7.22
2005	5.62	10.93	5.31	5.14	3.58	4.85	8.33
2006	6.68	12.06	5.38	5.37	3.64	5.05	8.52
2007	6.85	12.77	5.92	6.04	2.94	5.05	8.76
2007	6.73	12.77	6.04	5.95	2.95	5.7	8.83
2008	6.95	12.29	5.34	4.48	3.19	5.09	8.91

2008	7.31	12.31	5	3.96	3.12	4.7	9.33
2009	7.01	11.87	4.86	3.41	3.01	4.81	9.14
2010	5.95	11.23	5.28	3.69	2.25	5.49	9.30
2011	7.25	12.37	5.12	4.52	2.37	5.06	8.83
2012	8.09	13.88	5.79	5.07	2.95	5.84	9.08

Data source: Bangladesh Bank

From the table above, the following observations can be summarized:

- Interest rate spread in 2000s was lower than the previous decades.
- Interest rate spread has declined in the recent years.
- IRS varies substantially across types of banks.
- Spread is much lower for Islamic Shariah banks.
- Significant heterogeneity also exists within the type of banks.
- High IRS of FCBs is a big puzzle.
- Time-trend of IRS shows the presence of high level of persistence.

CHAPTER 5

Capital Market: Stock Price Bubbles and Bursts

In chapter 3 we learnt how financial intermediaries, stock market and bond market help investors raise capital for their businesses. This process transforms household savings into investment of the business sector. The discussion on the process of transformation in Chapter 3 allows us to see the broad picture of the roles of banks, stock and bond market in the economy. In order to take this issue further, Chapter 4 discusses the structure and performance of the banking sector in the context of Bangladesh. Following this thread, this chapter is on the capital market of Bangladesh. But unlike the previous chapter on the banking sector, we do not provide a general description of the capital market of Bangladesh, rather we pick an important issue - stock price bubble – and organize the description of capital market around this topic.

The financial market of Bangladesh saw two major episodes of stock market 'bubble' and 'bursts'- one in 1996 and the other in 2010. In both cases we saw numerous stories in newspapers on how people became frenzy to invest in capital market, selling off their land and other assets such as gold and national saving certificates and became bankrupt. The recent market crash was more devastating than the one in mid-nineties in terms of people affected and also amount of money disappeared. The question remains: why didn't we learn anything from the earlier mistake? Generally, this type of stock market crash occurs once in one or two decades, giving long enough time for bitter memories to fade away. Also, new investors who don't have any past bitter experiences enter into the market. People always tend to think this time is different from the past! The factors that caused the market fall last time does not prevail anymore! Human psychology lends a good explanation why people become delusional and make irrational choice, giving rise to such bubbles which eventually burst. We will learn the human psychology behind such irrational behavior in this chapter, though in a very cursory manner.

We believe that this issue should be included in the introductory text book of macroeconomics in Bangladesh and should become a standard common knowledge of the mass people, not only of the economists. Once we become familiar with the process how a bubble generally forms and how it bursts, it will help us to spot the next one and avoid becoming an ignorant participant in it. And at the policy level, policy makers would also be aware of such event, knowing that this type of unwanted event has been a part of capitalist society since 15th century, and more importantly, whether policies can have some roles in arresting such undesirable development.

5.1 What is an asset price bubble?

Price of asset (e.g., stock, bond, real estate, etc.) is fundamentally different from the price of consumption goods such as shirt, rice, etc. The latter is bought only for consumption purposes. But the objective of holding asset is somewhat different. People hold asset to earn a stream of

income over the life of that asset as well as the asset itself has a value and can be sold in the *secondary market*. In chapter 3, we cited the example of tree. What is the price of a tree which bears fruit annually? In calculating price, we have to consider the length of life of tree, annual harvest of fruits over its lifetime and also the price of tree itself which has market value for its wood. Therefore, the price of an asset is the sum of the expected future income and the expected value of the asset over asset's life time. If you hold a stock of a company, you get dividend periodically and you can also sell the stock when you want. The dividend and also the price of stock depend on the future growth of the company. That is, the change in price of the stock should be highly correlated with the growth prospect of the company. In simple terms, this is the *fundamental* of the stock price determination.

Let's take a brief digression from bubble formation. If the fundamentals of the stock drive the stock prices, why do prices change in minutes? The growth prospect of firms cannot swing over this short period of time. In fact, in the very short period, stock price reacts to any new information released about the company (e.g., announcement of dividend) or the industry (change in corporate tax for banking sector) or overall market such as change in regulations of floating IPO. The stock price may also react to political events such as political strike. The underlying assumption is that stock market is 'efficient' that is it can incorporate all 'public and private' information almost instantaneously and that is why we see continuous movements in prices. Since we cannot predict which information is coming, we cannot predict the price of stock in the short run. Technically speaking, stock price is said to follow 'random walk'. While referring to random walk, we always give example of a drunken sailor whose footsteps are unpredictable. Intuitively, a variable follows random walk if today's information about this variable cannot say anything about its value tomorrow.

What drives the price up in the market in very short run? Expectation about the future price (dividend and stock itself) drives the current price also. You will buy a stock at a price only when you expect that the price of that stock will rise further. This type of expectation or the speculation is the driving force of the stock market and also the key to forming bubbles in the stock market.

Formally, a bubble refers to a situation when the price of asset is significantly higher than the price determined by the *fundamental* factors for a prolong period of time. Stock price bubbles and housing market bubbles are the most prominent ones as they have the potential to affect the whole economy. Bubbles are by definition temporary and they can either be busted (drastic fall of price) or can be deflated (gradual fall of price). It is next to impossible to predict when a bubble will burst or start to deflate.

5.2 How bubble is created?

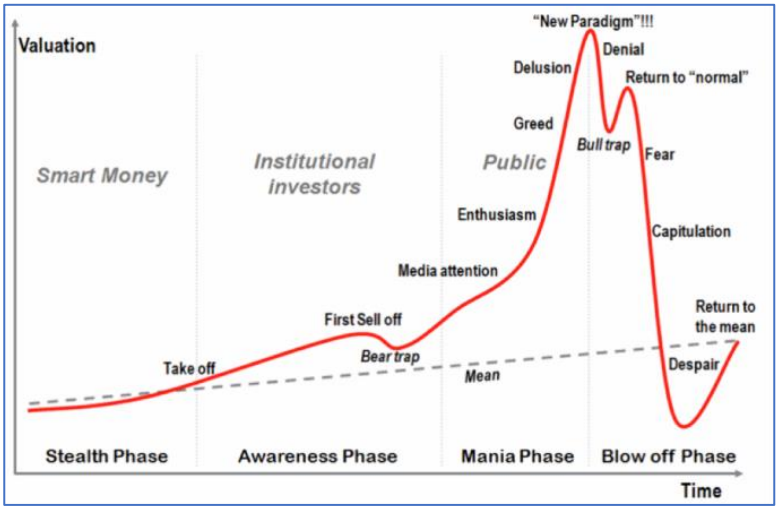
What triggers the bubbles? In almost all cases of bubble formation, some new information, new innovation or some optimism or euphoria about future triggers the creation of bubble. Once the prices start to hike, it creates some success stories which spreads very quickly through word-of-mouth and media as well. This creates a sense of *arbitrage* opportunities lying around among the mass people. People start to think that it is their once in a life-time opportunity to make quick bucks. This process in turn increases the price further and expectation that the price will go up even further continues to persist.

The situation is further exacerbated by the injection of huge amount of liquidity, particularly by the financial institutions such as banks. When a large number of people believe that they have found some opportunities to make quick money, they tend to borrow and invest in large amount in the stock market. Financial institutions such as banks and non-bank financial institutions also want to seize this opportunities to increase the return of their asset (ROA) and make quick profit at the cost of higher risk. Remember from chapter 4 that it is not the total asset but the risk weighted asset a bank must be concerned about. Banks' exposure to risk increases with greater investment in capital market. We will discuss banks' involvement in the capital market in detail towards the end of this chapter. With no new stocks in the market, excess liquidity from the public and institutions lead to inflation of the stock price. In short, bubbles get inflated when too much money is chasing too few assets, causing both good assets and bad assets to appreciate excessively beyond their fundamentals to an unsustainable level and eventually burst.

In short, some new information or innovation triggers the bubble which is further inflated through feedback from people's enthusiasm about newly found arbitrage opportunities .This situation is further exacerbated when financial institutions get involve and flood the market with liquidity. And it creates a kind of *feedback loop* which keeps on pushing price level up with the expectation that price will go up further. But this high price is not sustainable as it deviates from the fundamental by a huge margin and at some point it triggers panic. Bubbles eventually burst and the type of feedback loop that pushed the price up very quickly also kicks in but in the opposite direction. Negative stories along with massive withdrawal of money from the market lead to sharp decline of stock price.

5.3 Phases of bubbles and bursts

Figure 1: Four phases of bubble creation and burst



5.3.1 Stealth Phase

This phase is the prelude to bubble creation and occurs very quietly without much notice from the public. That it is why it is called the stealth phase. The key players in this phase are the market experts who are well-informed and actively involved in this market. Investment by this expert group is known as 'smart money'. In this phase it is very hard to predict that bubble

is coming. In short, this phase is marked by quiet investment of 'smart money' and beginning of the rise of the stock prices.

5.3.2 Awareness Phase

The increase in price starts to get noticed by many investors and they realize the arbitrage opportunities. In addition to smart money, liquidity from the financial institutions starts to flow in. As described above, good stories spreads very fast and nobody wants to miss the wagon. The feedback loop kicks in and price starts to appreciate very sharply. In this phase there can also be some short-lived sell off for cashing in the first profit.

5.3.3 Mania Phase

This is the phase of 'irrational exuberance'. People suffer from euphoria and become wild about making quick and easy income. Today's high price gives people the ground to believe that the increase in price will continue even though the prices are way off from the economic fundamentals. In this period some smart money as well as institutional money start to leave the market after taking the profit without the notice of the general public.

5.3.4 Blow off Phase

Some moment of truth arrives and suddenly people realize that the high price is not going to stay. Their confidence gets shattered and expectation revised. At this point, everybody wants to sell off their stock and leave the market. Some of them are unable to do it as there is hardly any demand for such stocks. It creates panic and it permeates through the whole market. The price starts to drop steeply with some interim phases which might indicate that the decline is temporary and the market will revert back. However, price continues to fall until it hits the rock bottom – converges back to its long term trend.

The discipline of psychology provides a *better* explanation of the behavior of the investors in the stock market especially in the 'mania phase' than the standard economic theory which is based on the assumption that all behave rationally. It is indeed very difficult to label the behavior of the investors as 'rational' when the stock market goes wild. In economics, rationality generally refers to the behavior of the people who can always take the best decision, weighing in all the possibilities. But human cognitive ability is limited. We cannot compute, process, analyze, forecast and remember infinite amount of information. There is a limit to the rationality.

What causes investors behave so unreasonably in 'mania phase? Psychology indicates that there are some *cognitive biases* of the people which they are very prone to commit. Why do people keep buying stocks when the price of the stock is too high to justify. Some kind of cognitive biases help justify themselves. People are generally **overconfident** about their individual ability in analyzing situations compared to others. At the same time people tend to believe after an event is occurred that it was completely predictable and obvious (which is in fact not true). This kind of 'I knew it all along!' type biases make them believe that high price is going to stay in the future when the current price is increasing. This type of bias is known as **hindsight bias**. The people also suffer from **confirmation bias** – people selectively search for and pay more attention to such information that support their opinion. If people

believe that some stock price will rise, he will talk to those people more who share the same belief and read more articles and blogs which confirm their prediction.

We see that overconfidence, hindsight bias and confirmation bias of human behavior all add to the 'feedback loop' of the increase in asset price we discussed before. Even if someone is free from such biases, she simply cannot ignore the group behavior because there is also some innate tendency of human being to follow the action of the group which could be rational or irrational. This is known as **herd behavior**. People don't want to be left alone and want to be a part of and accepted by group. Also, it is believed that a large group cannot make mistake or the probability of doing mistake is lower. This type of behavior in the stock market is very common – following the investment pattern of the group she thinks worth following. It is also very common that new and novice investors follow the experienced ones. If some large players in a brokerage house buy some specific stocks, it is very likely that other small investors follow their path. The tendency to follow the group behavior blindly helps increase the asset price very sharply which ultimately may turn into a bubble.

5.4 Government policies for managing bubbles

Can government policy help prick the bubble at the early stage before it gathers momentum? In order to do so, the policy makers have to be able to spot the creation of bubble in advance. However, forecasting a bubble is in fact a very difficult task. Is it the preemptive policy the right policy response? Or, policy makers should wait for bubble to suffer its natural death and take care of the aftereffects of bursting bubbles. In both cases, what is the role of the central bank and particularly the monetary policy? These are highly debatable issues with little consensus. There are two broad paradigms of policy intervention considered by the policy makers:

i. The ex-post clean paradigm
ii. The ex-ante lean paradigm

5.4.1 The ex-post clean paradigm

Consider a situation when there are indications that a bubble is being formed. It is in somewhere between stealth and awareness phase as described above. At this stage two things can happen – i) the process of acceleration of asset price gets momentum and bubble is created, or ii) the market can self-correct itself to halt bubble creation. The participants of the market realize the overvaluation of asset price and correct it accordingly. In fact, the latter scenario happens in the stock market very often and mostly unnoticed. Given these two scenarios, the choice of intervening in the market by the policy makers in the early stage of bubble formation is very difficult. If the scenario (ii) is right and the government actively intervenes in the market by some stringent regulations on banking sector or by tightening money supply, the consequences on the overall economy can be adverse and long lasting. In short, robust identification of bubble formation in advance is very challenging and **the ex-post clean paradigm** therefore calls for policy inaction in the formation stage but active intervention after it begins to burst or die down. If government intervenes with its limited information about the formation of bubble, it may destabilize the economy more than it stabilizes. The observation of the Alan Greenspan, Chairman of the U.S. Federal Reserve in the testimony before the Committee on Banking and Financial Services in 1999 is worth noting "there is a

fundamental problem with market intervention to prick a bubble: it presumes that you know more than the market … identifying a bubble in the process of inflating may be among the most formidable challenges confronting a central bank, pitting its own assessment of fundamentals against the combined judgment of millions of investors"

In order to follow the *ex-post clean* policy, government has to be very confident about the tools at its disposal which can minimize the harmful effect of bursting bubble.

5.4.2 The ex-ante lean paradigm

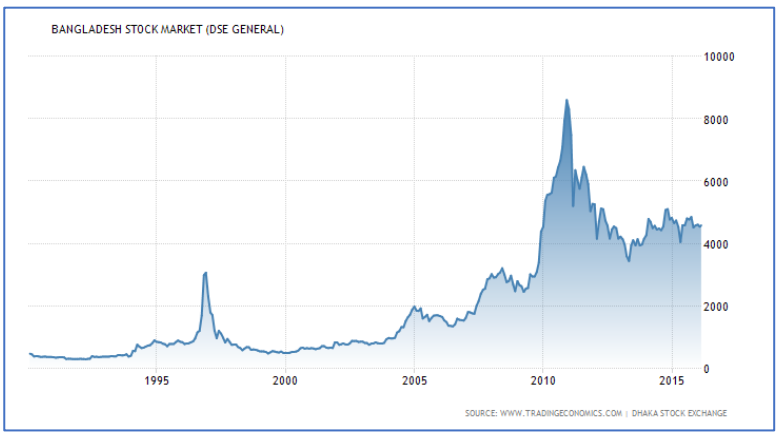
This school of thought advocates that the aftereffect of bursting bubble may not be manageable and can lead catastrophic effect on the economy. That is, if we weigh in the cost and benefit of early vs. late government interventions, according to this proponent, loss of welfare of the citizens is much higher if we wait to let the bubbles grow and burst.

Policy makers often deal with the situations when they don't have complete information about the market. Therefore, policy intervention by the government with partial information is not an unusual matter. Further, if the bubbles are created by flooding of liquidity by the banking sector, the policy makers can have very accurate and timely information about this development and can act on it. In fact, the policy makers should be able to distinguish between the *rational* component and *irrational* component of the price increase, especially in the *mania phase* described above. In this phase irrational behavior of the investors who care less about the fundamentals of the market may become so obvious that it can be spotted easily for taking pre-emptive measures.

Over the last 25 years, the Federal Reserve Bank of USA has never used pre-emptive policies to manage bubbles, rather the focus has been on aftereffect cleaning by reducing market interest rate once the bubble bursts. However, the global financial crisis offered some lessons on how to deal with such asset bubbles and brought the proponents of these two opposite views much closer. It is now well recognized that the loss of welfare of the citizens is very high if the policy makers wait for bubbles to burst and intervene only to clean up its aftereffects. Rather a policy mix of regulatory, monetary and macro-prudential are required in both ex-ante and ex-post phases of bursting bubbles.

5.5 The Twin Peaks: Stock price bubbles and bursts in Bangladesh

Figure 2: Trends in stock price movement since 1990



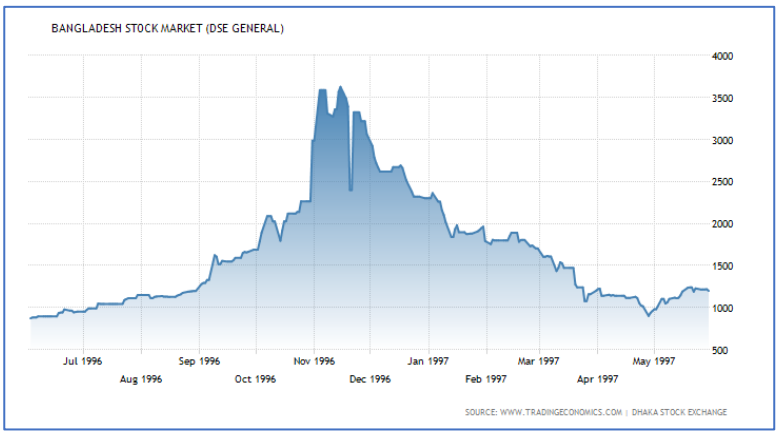
5.5.1 The 1996 crash

The 1996 crash was rather different from the more recent one in 2010-11. During that time, the number of BO account holders was only about 300,000 with most of them being new to the market. Shares in paper form were traded in front of the DSE and it was very difficult for investors to separate fake ones from the real. There were no automated trading systems, market surveillance was weak and no precautionary mechanisms like *circuit breakers* were in place.

From 1991 to the end of 1995, the DGEN index rose by 139.3% to reach at 834 points and thus began the bullish run of the market. But the more spectacular growth was observed in 1996 when the index skyrocketed by 337%. During the same year, compared to July, the index in November was 280.5% higher. The CSE experienced similar growth in share prices with its index increasing from 409 to 1157 points within the span of a year.

But this run did not last for long as the abnormal high prices began to recede and the stock market of the country witnessed its first crash. From November 16 to December 22, 1996, the index declined by 38.21% and fell further 29.31% in March, 1997 compared to the December 22 level. This means that the total decline during the 4 month period was a whopping 56.32%! The value of share halved in just four months. In April 1997, the DGEN dropped to its lowest point of 957 and stood at where it was 10 months ago, having lost almost 70% from its highest point of November 1996. This declining trend in the index continued until April 2004 and during this 7 year period, it rarely crossed the 1000 point mark. The figure below sheds light on the movement of share prices in the country during that period. The crash can clearly be seen from the price movements.

Figure 3: 1996 stock price bubble and crash



5.5.2 The 2010-11 crash

Similar to any other episode of market crash, the 2010-11 crash was preceded by a strong bullish run of the market. The creation of the bubble can be traced back to 2009 when the excess liquidity in the banking system began to emerge. The major timeline of this market crash can be viewed as between the months of December 2010 and January 2011. On December 5, 2010, the DSE General Index registered its highest ever value of 8918.51 points accompanied by a turnover value of Tk. 32.50 billion. This was brought about by the financial institutions and banks selling large volumes of shares to show high return on investments in their balance

sheets. The exorbitant prices of brokerage license also indicate the extent of frenzy the market went through in the period 2008-2010.

Table: DSE brokerage license price

Year	Buyer	License Price (Taka)
1998	NCC	400,385
1999	Dhaka Bank	9,120,000
2002	Prime Finance	7,612,500
2005	Pubali Bank	8,000,000
2006	Mutual Trust Bank	8,000,000
2006	IDLC	15,225,000
2007	National Bank Limited	17,750,000
2007	Islami Bank	24,453,399
2008	Al Arafah	40,261,999
2008	Shahjalal Bank	58,994,699
2009	IFIC	74,989,000
2009	Bank Asia	153,319,000

But this large volume of share offloading in the market led to prices being adjusted downwards and on 19 December 2010, the DSE witnessed the sharpest one day fall in share prices so far, losing 551.76 points or 6.71%. Activities of ICB, SCBs and market regulators were able to bring some kind of adjustment to the market with the resulting improvement in prices between 20th and 30th December 2010.

But the positive trend did not last for long as share prices began to plummet again from 3rd January 2011 onwards as news of the liquidity crisis of financial and non-financial institutions became known to the investors. The decline from the 2nd to 10th of January was substantial and has been attributed to *trigger sales* by investors. On January 10, the DGEN lost 660 points or 9% while the CSE index declined by 914 points or 6.8% within 50 minutes of trading, setting new records for falling share prices. The SEC had no other alternative but to shut down trading on both the stock exchanges to prevent further downfall. Angry investors took to the streets to demonstrate against this freefall in prices.

Upon initiatives of the BB and SEC, institutional buyers started to buy shares and the market recovered 15.6% of the General index on 11 January, making the largest one day gain in its history. But prices started to decline again on 18 January, hitting the lowest market turnover in nine months with Tk. 8.49 billion. The ensuing fall in prices brought the investors to the streets again and the SEC was forced to close all trading for the second time within 8 days.

Although several measures were adopted and applied by the government, BB and regulators to rectify and improve the condition of the market, the downward trend in prices could not be reversed for long and finally the DGEN reached its lowest point of 5579 during 7 and 14 February 2011. The figure below traces the movements in share prices during that period and both the bullish run and the crash can be seen from the share price index data.

Figure 4: 2010-11 stock price bubble and crash

The market crash of 2010-11 was preceded by the creation of a market 'bubble'. The primary reason behind this bubble creation was the buildup of excess liquidity in banks at that time due to: lower export demand (global recession in 2008); ongoing energy crisis particularly power failure dampened demand for investment funds; lower demand of bank credit in financing import orders; downward trend in major commodity prices in the global market and high growth rate of broad money (M2) as an unintended consequence of keeping the Taka from appreciating

5.6 Major causes of bubbles

1. Weak regulation
2. Market manipulation
3. Greater involvement of banks in stock market

5.6.1 Weak regulation

As discussed before, it is very difficult to spot a bubble in advance and act adequately. There is always a chance of over reacting by the regulatory bodies. In a country like Bangladesh when the first stock price bubble was created in 1996, both the players of the market and the referees were novice in dealing such crisis. Malpractices of brokerage houses were rampant in the face of faulty settlement mechanism. The use of the faulty DVP (delivery versus payment) system that eluded transparency in transaction settlements and gave rise to fake transactions. There were numerous cases of conflict of interest between the members of SEC, DSE and brokers were identified but were not taken care of. In fact there was a dearth of fundamentally sound securities in the market and too much money was chasing a few securities. But there was no oversight from the central bank in controlling money supply.

The regulatory bodies did not learn much from the mistakes of 1996 in the following market crash in 2010. Market regulators did not perform in their proper roles as guardians of the market, rather some of them were reported to be directly or indirectly involved in the scam. Some of the regulatory decisions and institutional bottlenecks argued to be responsible for exacerbating the situation in 2010 are listed below:

- Absence of demutualization of exchanges – market controllers were also players in the market, giving rise to a conflict of interest in properly guiding the market

- Faulty pre-IPO and IPO process – the pre-IPO and IPO issuance processes were manipulated to increase share prices on launch; an illegal kerb market was set up in the pre-IPO stage
- Introduction of uniform face value of shares – the face value of all share prices were set at Tk. 10 from larger denominations; although this did *not* affect asset or revenue of the listed companies, it was wrongly perceived positively by naïve investors
- Use of private placement – reduced the number of shares for public trading and in the process inflated prices; trading was done outside the market which is illegal; in some cases placement was offered at below IPO price so that those with private placement could benefit
- Omnibus account – which are not under the surveillance of the SEC were used in carrying out illegal stock transactions
- Asset revaluation – using weak asset revaluation techniques, some companies inflated the value of their assets and hence gave wrong information about their financial soundness; this made the shares appear more attractive to the investors
- Book building method – corrupt issuers and issue managers used the book building method (method for price discovery of initial offers) to increase share price initially upon issuance
- Artificial and Serial trading – manipulators used artificial and serial trading to increase the volume of transactions and hence share prices
- Issuance of right and preference shares – SEC did not have proper guidelines for the issuance of right and preference shares; companies took advantage of this
- Suspicious transactions of big market players – some individual and institutional investors were found to be the top buyers and sellers during periods of abnormal increase and decrease in share prices; their large volume of transactions affected the whole market
- Direct listing – some companies obtained approval from SEC for direct listing in the exchange and came to the market with inflated prices; SEC or the exchanges did not probe into the matter of unjustified prices

5.6.2 Market manipulation

The stock markets of the developing countries generally see three types of manipulation strategies based on information, action and trade. Spreading of false and misleading information can push the price up for some stocks and manipulators can make quick profit from it. This **information based manipulation** is very common in developing countries. Even in the USA in 1920s, there was a (mal) practice called 'trading pools' where a group of investors would buy a few stocks first and then spread some good rumors about the pool of stocks. When the price is high, this group would sell the stocks and leave the market. **Action based manipulation** aims at changing the perceived value of some stocks (other than trading). Most commonly cited example of action based manipulation is take-over-bids. When a company acquires another company (target company), the acquiring company offers a price of the shares of the target company. The take-over bid or the price offered for the shares of target company is subject to manipulation. High bid-price can be offered to push the stock price up. The manipulators then sell their shares and eventually lower bid-price is offered. The most common and hardly detected one is the **trade based manipulation.** In this case a large trader or a group of traders manipulate price by simply trading some stocks. One of the

most common practice of trade based manipulation is known as 'pump and dump'. Manipulators trade among themselves to push the price up of one or a group of stocks artificially. Seeing greater profit making opportunities, naïve traders also keep on purchasing the same stocks and the prices keep on soaring. When the manipulators think the price has reached its peak (enough is enough!), they sell all of their stocks to the naïve investors and get out of the market. The price drops immediately and keeps on falling until it comes down to the pre-manipulation level.

While there are ample anecdotal evidences of information and trade based manipulation, there is hardly any study on such aspects of the capital market of Bangladesh.

5.6.3 Commercial banks' involvement in capital market

Commercial banks' greater exposure to the capital market is argued as one of the prime causes of the formation of bubble and its subsequent burst. We have leaned earlier that institutional money play a big role in creating bubble. Conceptually, a bank can get involved in capital market in two major ways:

i) Direct investment: Purchasing stocks directly through private placement and also from the secondary market. This investment shows up in the asset side of the balance sheet of the banks.

ii) Lending: Disbursement of loans and advances through capital market operations. These operations are generally conducted through the operations of brokerage or merchant banks.

A bank with a brokerage house or merchant bank can earn from four different sources of the capital market.

i) Interest income: Interest income derived from loan disbursement in capital market operation through both merchant bank and brokerage

ii) Capital gain: Capital gain from sales of investments of shares.

iii) Dividend income: Dividend income from direct investment.

iv) Fees, commissions and brokerage: Fees, commissions and brokerage from merchant bank and brokerage operations

Banks have incentives to divert their portfolio to the capital market if the rate of expected return from the capital market is higher than the return from lending to the private real sector. This may make a bank reluctant and 'lazy' in disbursing credit to the private sector, even if there is huge idle liquidity. The cost of idle liquidity can be well compensated by the income from the capital market. Higher expected return from the capital market may induce banks to reject socially desirable large projects but which have higher risks associated with them (e.g., physical infrastructure, etc.).

Greater exposure to capital market which is subject to high degree of volatility impairs the quality of asset of the banking sector. In order to make quick profit, banks often invest a large share of portfolio directly in the stock market and also lend to the investors of the stock market through their brokerage house and investment banks. It posits a huge risk not only to the bank

involved, but also to the whole financial sector. Banks are not specialized institutions in stock market trading and have little skills and experiences in assessing related risks.

In order to shed light on the asset of the banking sector, let's assume that there are only three assets in the economy – money, credit and stock. We also assume there is no currency, which makes deposit and money synonymous. Also there is no bond. The only interest rate is the lending rate r. The banks' equity (capital) is assumed to be zero. So, deposit is the only liability of a bank.

Hypothetical balance sheet of a bank

Asset	Liability
Reserve (R) Bank Loan (L) Stock (S)	Deposit (M)

The reserve ratio is μ, that is, $R = \mu . M$, where R is reserves and M is money.
Thus, from the balance sheet identity: $M = \mu M + S + L$, using S for stocks and L for loans.
That is, the investible fund, $M(1 - \mu)$, is allocated between loan L and stock S.
If α is the proportion of loan holding, $\alpha = \frac{L}{M(1-\mu)}$ in total investible fund, $1 - \alpha$ is allocated to stock (S).

This $1 - \alpha$ is determined by the size, stock-market experience, profitability and also risk bearing capacity of the banks. Larger banks with greater risk bearing capacity may invest more in stock market. Some banks can be more aggressive (less risk averse) than others and invest more in the capital market. Managers and directors of some banks may have experiences in working with/in capital market may feel comfortable investing more assets in stock market than others. These banks may have more inside information about the stock market. As a result, banks with merchant banks or brokerage houses may have higher investment in the market.

Figure 1: Ratio of capital market investment to asset

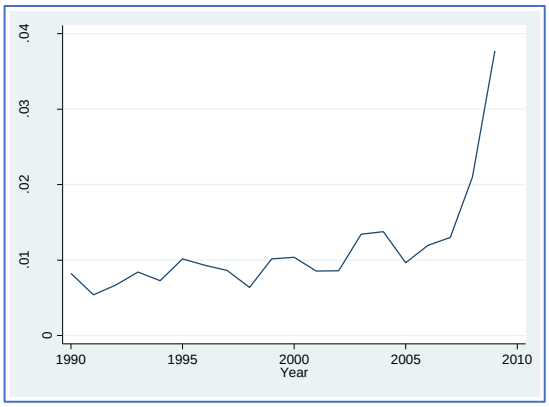
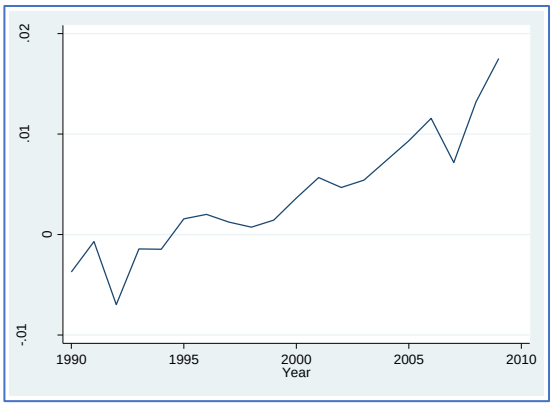


Figure 2: Trends of net profit after tax for all banks



Towards the end of 2006, there were some new developments in the local financial market. The growth of credit to the private sector slowed down and commercial banks piled up huge idle liquidity during 2007-08. Recent global financial crisis of 2007 and local infrastructural bottleneck are argued to have contributed to this slowdown of private credit growth. But,

surprisingly the banks' profits were sky-rocketing. There were also no downward adjustments of the lending rates. Some bank level observations reveal that income from the capital market was contributing largely to the growth of profit of the banks (see Figures 1 and 2).

The share of investment in capital market in total asset (Figure 1) remained stable at around 1 percent till 2006. It saw a steep increase after 2006 and it quadrupled in just 3 years. In 2009, the share was about 4 percent of total asset. Figure 2 shows that ratio of net profit after tax to total asset for all banks became positive in the year 1995 and it started to increase slowly since then. During the period of 2007-09, the ratio registered a steep increase similar to the capital market investment of the banks. In short, it is clear from the above figures that the banks invested aggressively in the capital market in the period 2007-09 and made huge profits.
The SEC and the central bank were also perplexed about how to limit banks' exposure to the capital market. SEC changed its decision regarding margin loan ten times in ten months! Investors borrow from the merchant banks using their shares as collateral. The loan ratio of 1:1.5 implies that the investor can borrow 150 Taka against his 100 Taka worth of shares. The Box below shows how regulatory bodies change their decision regarding banks' exposure to capital market.

Box 1: Changes in laws regarding banks' capital market exposure during 2010

Margin Loan

In

- February 01, 2010 - The loan ratio 1:1.5
- February 01, 2010 - The stock allowed for margin loan, P/E should be below 50
- February 03, 2010 - The loan ratio 1:1
- March15, 2010 - The loan ratio 1:1.5
- June 15, 2010 - The stock allowed for margin loan, P/E should be below 40
- July8, 2010 - The loan ratio 1:1
- September 06,2010 - Suspended netting facilities for non-marginable shares
- September 21, 2010 – The price of marginable stock considered by adding NAV and closing price and divided by two.
- November 21, 2010- The loan ratio 1:0.5

Capital market exposure limit for banks: 15th June 2010

- As per the provisions stated in section 26(2) of Bank Company Act 1991, it is mentioned in the same section that no bank can invest in shares of various companies in aggregate with an amount of 10% of total liabilities of its own.
- Also no banking company can hold shares in any company whether as pledge or mortgagee or absolute owner of an amount of 30% of total of its own paid-up share capital and reserves, or 30% of the paid-up capital of that company, whichever is less.

Single Borrower Exposure: July 22nd 2010

- The exposure limit has been set at Tk. 100 million in the case of merchant banks and Tk. 50 million for brokerage houses.

Subsidiary of Brokerage and merchant bank: 15th June 2010

- The banks will not be allowed to conduct merchant banking or brokerage house business from October 1, 2010 without formation of subsidiary companies for the purpose.

Banks' excessive exposure to the capital market is nothing new under this sun. Even during the time of stock market crash and widespread bank failure in 1929 in the USA, banks' excessive investment in capital market is well documented and analyzed. In fact, in 1933 two congressmen – Mr. Glass and Mr. Steagall - put together an act which is popularly known as Glass-Steagall Act (GSA). This act separated activities of investment bank from the commercial bank. This act lasted about seven decades before it was repealed in 1999.

After the financial crisis of 2007-08, the debate over the importance of acts like GSA resurfaced. Nobel laureate economist Joseph Stiglitz was one of the proponents for reenacting GSA. He argued that "when repeal of Glass-Steagall brought investment and commercial banks together, the investment-bank culture came out on top. ….The most important consequence of the repeal of Glass-Steagall was indirect - it lay in the way repeal changed an entire culture. Commercial banks are not supposed to be high-risk ventures; they are supposed to manage other people's money very conservatively. It is with this understanding that the government agrees to pick up the tab should they fail. Investment banks, on the other hand, have traditionally managed rich people's money - people who can take bigger risks in order to get bigger returns. When repeal of Glass-Steagall brought investment and commercial banks together, the investment-bank culture came out on top. There was a demand for the kind of high returns that could be obtained only through high leverage and big risk taking".

Reading list for instructors and advanced students

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CHAPTER 6
Measuring Cost of Living

By cost of living we generally mean the cost a family incurs for buying goods and service to meet the basic needs such as expenses on food, medical care, education, housing, recreation, etc. The living standard of a country or even a place critically depends on the cost of living of that country or place. If the cost of living goes up, it eats up the purchasing power of money. Now, the same amount of money can buy less amount of goods and services. An increase in income does not mean that that a person is better off; higher cost of living may offset the increase in income. Hence, the citizens are very sensitive about the issue of cost of living as it affects their daily lives. The Government also tries to contain the price level within the comfort zone of the citizens and takes credit for successfully doing so. Let's consider the following few cases

Case I
Suppose Mr. Mahbub is a service holder and his salary is Taka 30,000 per month and his boss told him that he would get an increment of 6% from the next year. Would Mr. Mahbub be better off with this new salary next year than now? Would his standard of living really improve?

The answer is: Mr. Mahbub needs to know how the cost of living would change in the next year. After taking into account the cost of living adjustment, the pay hike may not raise Mr. Mahbub's standard of living.

Case II
Mr. Mahbub's elder brother Mr. Monir started his first job with a salary of only Taka 10,000 per month back in 1996 and he is very happy to tell his younger brother that how lucky he (Mr. Mahbub) is to get a job that pays three times of his own starting salary. But is Mr. Mahbub really lucky in terms of getting higher salary than his brother?

Again the answer lies in the cost of living standard. After adjusting for the cost of living, Mr. Mahbub may not be better off now with his salary of Tk. 30,000 than his brother with only Tk. 10,000 back in 1996.

Case III
Now Mr. Mahbub is transferred from Dhaka to Barisal. Would his standard of living rise? Should he complain about this transfer in the light of the change in his purchasing power? If the cost of living is lower in Barisal than Dhaka, Mr. Mahbub might be better off there.

These are some of the cases that call for the use of a measure of the cost of living to evaluate various scenarios and compare the general well-being of the people. As indicated, it varies from place to place and from time to time. This can be used to compare how expensive it is to live in one location compared to another. As a small salary in a place that has a low cost of

living may provide a better standard of living than a greater salary in a place that has higher cost of living.

6.1 How to measure cost of living?

It would be too expensive and impractical to keep track of the cost of living of every household in an economy which consume millions of goods and services. Hence, the cost of living of a *representative household* is estimated instead. The method of estimating the cost of living of a representative household leads to the construction of Consumer Price Index (CPI).

6.1.1 Consumer Price Index (CPI)

The CPI is a measure of the *weighted average* of prices of a *representative basket* of consumer goods and services. It is calculated by taking prices for each of the item in the basket and then averaging them by their respective weights in the consumption basket. The CPI is an *index* and not a value in terms of money because it is expressed as a percentage of what the *market basket* costs in a *base* period.
In our country the Bangladesh Bureau of Statistics (BBS) estimates the CPI of representative rural and urban households of the economy on a monthly basis and thus reports three sets of CPIs: national, rural and urban.

6.1.1.1 How to construct CPI? A simple example

The following provides a simple example on the construction of CPI.

Step I: Define the market basket of a representative consumer.
For simplicity, assume that there are only 2 goods in the economy: rice (food) and shirt (non-food). Thus the basket of goods for our simple economy is made up of these two items only. Additionally through household survey, it is found that an average consumer (or a representative one) spends 60% of her total expenditure on rice and the rest on shirts (40%).

Step II: Calculate the cost of the 'market basket' at current price and base year price.
Assume that the current (2015-16) price of rice is Taka 30/kg and that of shirts is Taka 200/piece while they were Taka 25/kg and Taka 180/piece respectively in the base year (2005-06). Although these two items are part of the consumption basket, they cannot be treated equally as they have different relative importance in the representative consumer's overall expenditure. To get around this problem, each of the items of the basket is assigned a weight corresponding to its share in the total consumption expenditure of the typical consumer.

We already know:

- Weight of Food (Rice) = 60% or *0.6*
- Weight of Non-Food (Shirts) = 40% or *0.4*

Next we can have the weighted price of the market basket at current and base year prices:
Weighted price of 'market basket' in current year = 30 x 0.6 + 200 x 0.4 = 98
Weighted price of 'market basket' in base year = 25 x 0.6 + 150 x 0.4 = 75

Step III: Calculate the CPI by dividing the price of the basket in the current year by its price in the base year and multiplying the result by 100
Therefore,

CPI = 100 * (Price of 'market basket' in current year/ Price of 'market basket' in base year)
= (98/75) × 100 = 130.67
Thus the CPI in the current period 2015-16 is found to be 130.67. But more importantly, what does it mean?

This means that Tk. 130.67 today can buy the same goods (rice and shirt) that Tk. 100 could buy back in the reference period i.e. the base year of 2005-06. In other words the price of the market basket has increased by 30.67% in the 2015-16 from the base year. Thus the price levels in our simple two-good economy increased by about 31% during the period under review.

We can summarize the steps of CPI calculation:

- The market basket of a representative consumer is determined
- Weights are assigned to the basket items according to their share in total expenditure
- CPI measures the cost of living *relative* to a base period

6.1.1.2 Biases in the CPI

It is generally regarded that the CPI overstates the actual cost of living due to the following reasons:

Substitution bias – CPI is not able to take into account the substitution effect that takes place when prices change. When the price of a certain good in the consumer basket increases by a large amount, consumers will tend to substitute cheaper alternatives e.g. when the price of coffee goes up relative to tea, people will tend to buy more tea than coffee. This is the *substitution effect*. But the CPI calculation cannot capture this as it assumes a fixed basket of goods and services.

Quality bias – Over time due to improvements in technology, the useful life time of certain products will improve and thus they will last longer. e.g. the life span of car tires has increased over time but the CPI is unable to reflect such improvements in product quality.

New Product bias - It takes a long time to recognize new products and their inclusion in the basket. New products are not included until they have become very common and thus dramatic price decreases associated with new technology products are not properly reflected in the CPI.

Outlet bias – In the US and other developed countries, there is a shift in consumer shopping from brick and mortar stores to online stores and other e-tailers (online retailers). These are still not well-represented in the CPI.

The presence of these biases has the effect of overestimation on the calculated CPI and this has led some economists to conclude that the bias in the CPI for USA is about 1 percentage point on an annualized basis. The solution to this problem lies in frequently updating the base period when the items in the basket and their weights are adjusted to better reflect the existing market scenario.

6.1.1.3 CPI of Bangladesh: How does BBS estimate CPI?

The National Accounting Wing of the Bangladesh Bureau of Statistics (BBS) has been regularly constructing and disseminating CPI data for the country. Monthly prices of the different items in the basket are collected to construct CPI on a monthly basis while annual indices are prepared by averaging the 12 month's values. The reference groups are the average urban and rural households and the national CPI is calculated by combining the two indices.

In calculating the indices, all the goods and services included in the market basket are classified under 8 commodity groups. The commodity groups and their respective weights in the rural and urban indices will be presented later on.

The following describes the procedure of data collection that is employed by BBS in constructing the CPI.

- **Market**: The data on market prices is collected from selected markets and outlets in the country by trained field staffs of BBS. Data is collected from 64 urban and 64 rural markets i.e. one urban and one rural market from each of the 64 districts of the country. Additionally price data is also collected for the Dhaka Metropolitan City from 12 selected markets by the prices and wages section of the National Accounting Wing. This makes the total number of urban markets sampled stand at 76 (64+12). The selected markets in the various areas are typically large markets but Super markets are excluded.

- **Outlets**: There are several outlets in the market that sell various consumer items. From these market outlets, 3 are selected for price data collection. Usually the big outlets that sell a variety of items are selected for this purpose. The outlets are from different regional levels like urban, rural, district and divisional headquarters.

- **Data Collection:** The price data are collected from the outlets during the peak hours of transaction. The process requires that the price collectors act and bargain like real buyers in the market and make actual purchases of the selected commodities. The data is checked immediately after collection to make sure that the prices of the correct commodities (as specified in the CPI product list) have been obtained.

- **Selection of the CPI basket items**: The items in the CPI basket must be as close as possible to be representative of the purchases of a typical consumer in the country. In order to so the total number of items is divided into groups and sub-groups and then from each group a representative sample is taken to include in the list. The BBS conducts the Household Income Expenditure Survey (HIES) in every five years and the HIES data is used for this purpose. The national basket comprises of rural and urban ones. The *rural basket* consists of **318 items** (food 133 and non-food 185) while the *urban* one is made up of **422 items** (food 151 and non-food 271**)**.

- **Selecting the Base year**: Construction of any index number requires a base year/reference year for comparison between periods. Ideally the base year used in CPI should be a 'normal' year that is free from economic, social and political disturbances so that the comparisons are closer to 'normal' conditions and hence more meaningful.

In practice, the year of HIES survey is used as the base year, because different types of weights used in constructing CPI come from HIES data. Last four HIES surveys were conducted in 1995-96, 2000-01, 2005-6 and 2010-11. Currently, 2005-06 is used as the base year. Previously it was 1995-96.

- **Determination of the weights**: This is another essential aspect of the CPI construction. As stated earlier the CPI is a weighted average of the prices of the items due to their differing relative importance in the total expenditure. From the nationally representative survey - HIES, the average household expenditure on the 8 broad categories are calculated for rural and urban areas. Then ratios are calculated by simply dividing expenditure on each category by total expenditure. The table below presents the category wise weights used for the urban and rural areas, including the number of items used in each group. Food, beverage and tobacco are grouped as *Food* item. In rural and urban areas, the weights on food are 61.41 and 46.52 respectively. Describe the weights. The weights on *non-food are 58.59 an*d 53.48 respectively. The non-food category is divided into 7 sub-categories listed below.

Table 3: Number of items and group weights, base year: 2005-06=100

	Rural		Urban	
Group	**No. of items**	**Weights**	**No. of items**	**Weights**
Food, Beverage and Tobacco	**133**	**61.41**	**151**	**46.52**
Food	119	*57.04*	137	*43.18*
Beverage	05	*1.40*	06	*1.23*
Tobacco and Product	09	*2.97*	08	*2.11*
Non-Food	**185**	**58.59**	**271**	**53.48**
Clothing And Footwear	64	*6.90*	66	*6.72*
Gross Rent, Fuel and Lighting	7	*12.30*	17	*19.64*
Furniture and Furnishing; Household Equipment and Operations	43	*4.65*	57	*4.88*
Medical Care And Health Expenses	10	*3.38*	26	*3.65*
Transport & Communication	18	*4.69*	33	*7.86*
Recreation, Entertainment; Education and Cultural Services	23	*3.42*	34	*5.87*
Miscellaneous Goods and Services	20	*3.25*	38	*4.86*
Total	318	*100*	422	*100*

Source: BBS

6.1.1.4 How national CPI is calculated from rural and urban CPIs?

In the case of National CPI, all urban and rural indices are combined using as weights the total country wide urban and rural household expenditure i.e. the average monthly urban/rural expenditure multiplied by the total number of urban/rural households available from population census data. Thus the relative size of urban and rural expenditures determines the weights attached to them in deriving the National CPI.

The table below shows the ***weighing pattern*** used in the calculation of National CPI and using the information from the table, we have:

National CPI = (***64.89*** × rural CPI) + (***35.11*** × urban CPI)

Table 4: Weighing patters of CPI National, Base: 2005-06=100

Locality	Average Monthly HH Exp. (Tk.)	No. of HH (million)	Total Monthly Exp. (million Tk.)	Weight (%)
Urban	X	a	aX	***35.11***
Rural	Y	b	bY	***64.89***
National	Z	c	cZ	***100***

Source: BBS CPI Methodology

Therefore, aX/cZ = 35.11 and bY/cZ = 64.89

- ***Formula used***: Actual formula used for constructing CPI is more complex than the one used in our example. There are various statistical formulas for constructing indices such as the CPI. In the majority of the countries, the ***Laspeyres*** formula for computing index numbers is used in constructing the CPI. It is the *weighted arithmetic mean* of *price relatives* with the weights being the *base year* values. The BBS also uses this formula to calculate the CPI for the country.

The Laspeyres formula is:

$$\text{Laspeyres Price Index} = \frac{\sum_j W_j \sum_{ij} P_{ij}^c W_{ij}}{\sum_j W_j \sum_{ij} P_{ij}^B W_{ij}}$$

Pc denotes current price and Pb denotes base year price. i= number of items in each group and j is the number of groups. Therefore, Pcij is the current price of item i of group j and Pbij is the base year price of item i of group j. Wj is the weight of group j while Wij is the weight of item i group j. Note that the only difference between the numerator and denominator is the current price and base year price. Remember in chapter 2, where we calculated real GDP (GDP at base year price) we did similar calculation but kept price constant because we are interested to capture the *real* changes in output. But in this case, we are interested to capture the change in price. So, we let prices to vary and keep expenditure share (weights) to be constant at base year.

Let's take the following example.

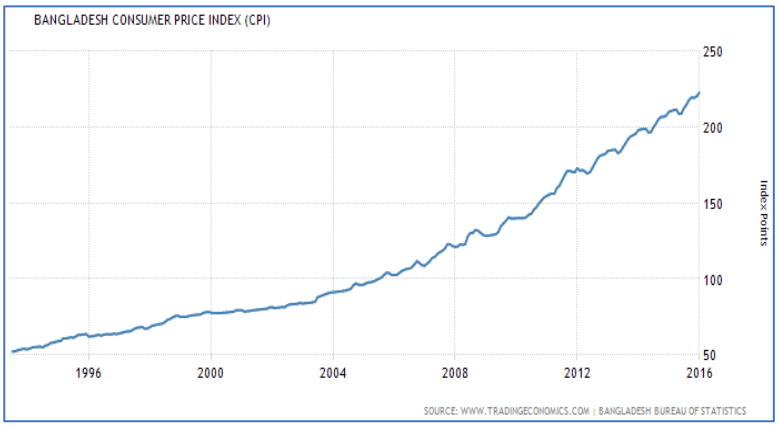
Numerical Example 1: Suppose there are two groups of commodities - food and non-food. Food includes rice and lentil and non-food includes shirt, trouser and shoe. Prices of each item, weight of the items in the group and weight of the groups themselves are given in the following table. Note that all weights are base-year weights:

	Group I (Food)		Group II (Non-food)		
Wight across groups	0.6		0.4		
Items	Rice	Lentil	Shirt	Trouser	Shoe
Weight within the group	0.70	0.30	0.70	0.30	0.10
Base year price	100	20	50	200	80
Current year price	130	30	70	250	100

$$\text{Laspeyres Price Index} = \frac{0.6[130\ x\ 0.7+30\ x\ 0.3]+0.4[70\ x\ 0.7+250\ x\ 0.3+100\ x\ 0.1]}{0.6[100\ x\ 0.7+20\ x\ 0.3]+0.4[50\ x\ 0.7+200\ x\ .3+80\ x\ 0.1]}\ x\ 100$$
$$= 130.88$$

The following chart plots the General CPI for Bangladesh over the period of 1996-97 to 2011-12. The steady rise in CPI over time depicts the underlying inflation experienced by the economy during the period. In additional to General CPI, Food and Non-Food CPI are also constructed by the BBS.

Fig 1: Trends in CPI: 1991 – 2016 (Base: 2005-06)



Mr. Mahbub's story: Revisited

Now we are in better position and equipped with the appropriate tools to reevaluate the situation facing Mr. Mahbub from our earlier case study examples. Let us look again at the three scenarios separately.

Case I: If the inflation (as measured by the CPI) in the economy is less than 6%, then the *Real Income* of Mr. Mahbub will be higher with the raise in his salary. Thus he will be able to purchase more goods and services with his higher income in the next year compared to the current year.

Using the information and assuming an inflation rate of 4%, we have:

- % change in Real income = 6% (change in nominal income) - 4% (inflation) = 2%

Thus the real income of Mr. Mahbub has increased by 2% which will enable him to consume more goods and services and hence he will be better off.

6.1.1.5 Real vs. Nominal Income

Real Income is defined as the income that is obtained after taking into consideration the effects of inflation. Therefore we have:

Real Income = Nominal Income/CPI

From the above we can also get following: (see box below for the formula used)

% change in **real income** = % change in **nominal income** – % change in CPI (**inflation**)

Box 1: Useful formula for calculating changes or growth

i. Z = X × Y
% change in Z = % change in X + % change in Y

If Z is the product of X and Y, then the percentage change in Z is given by the *summation* of the percentage changes in X and Y

ii. Z = X/Y
% change in Z = % change in X - % change in Y

If Z is obtained through the division of X by Y, the percentage change in Z is the percentage change in Y *subtracted from* the percentage change in X

Case II: Assuming that the base year is 1996 and that the CPI in 2014 is 300, we have:

Real income of Mr. Mahbub in 2014= 30,000/300 = 100
Real income of Mr. Mahbub's elder brother in 1996 = 10,000/100 = 100

Their real incomes are same in 1996 and 2014! Their salaries have the same purchasing power i.e. can buy the same amount of goods and services, compared between the periods 18 years apart! Based on their purchasing powers, the two brothers will have the same standard of living albeit in different periods!

Case III: Cost of living is most likely to be lower in Barisal compared to Dhaka. Although in our country, regional CPI is not calculated, it is a general understanding that the prices of essentials in the capital is considerably higher than in the other districts. Thus Mr. Mahbub will be better off moving to Barisal than staying in Dhaka as his real income will be higher there.

Developed countries construct CPI for even their cities and thus they have a wider coverage of the data on cost of living which enables more comparison between places.

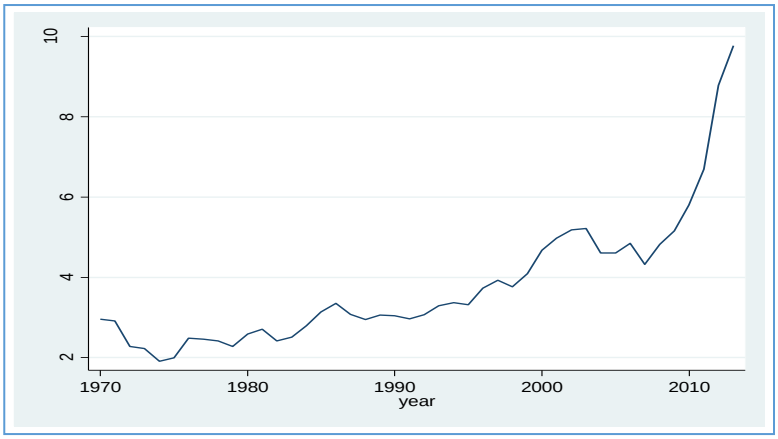
Note that *real income* does not have any clear interpretation. It can only be used for comparison between the incomes across regions and over time. However, one can use the price of a **single commodity** to get a nicer interpretation. Real wage in developing countries is sometimes expressed in terms of the amount of rice that can be purchased by the nominal wage.

In this case, we have:

Real wage = Nominal wage/ price of one kilogram of rice

The figure below plots the movements in real wage (measured in terms of kilograms of rice purchased) for agriculture over time. The real wage increased slowly during the 70s and the 80s, started to pick up the pace in the 90s which continued into the 2000s. From the latter half of the 2000s, the real wage depressed for a while but since then has risen at a tremendous pace. Thus the growth in real wage has been substantial in recent years.

Figure 2: Trends in real wage in agriculture



Source: Data on rice price is collected from Statistical Pocketbook, BBS and wage data is from Monthly Statistical Bulletin, BBS.
Note: Rice price is the annual average retail price of all divisional headquarters. Daily wage data is the annual average of non-food (cash) wage for male workers.

6.2 Inflation

So far in the chapter we have been looking at the measurements and various aspects of the CPI measure of the cost of living. But the main reason we need to look at the CPI data is to track the change in price, i.e. inflation in the economy. This is what we will turn to next.
The CPI data enables us to calculate the inflation rate in the economy. This section will look into how the rate of inflation is obtained from CPI data. There are several ways to evaluate the rate of inflation from the CPI data. The following presents the commonly used methods in inflation calculation.

1. **Monthly** Inflation = $12 *[(CPI_t – CPI_{t-1})/ CPI_{t-1}]* 100$ [t = month, t-1 = previous month]

This measure shows the change in the price level between two adjacent months and then multiplies it by 12 to arrive at the annualized rate of inflation. Thus the monthly inflation rate in June 2015 is given by:

$$\text{Inflation (June }_{2015}) = 12 \times [(CPI_{\text{June 2015}} – CPI_{\text{May 2015}})/ CPI_{\text{May 2015}}]\times 100$$

2. **Point to point** inflation = $[(CPI_{i,t} – CPI_{i,\,t-1})/ CPI_{i,t-1}]* 100$

[i,t= i-th month of year t; i,t-1 = i-th month of year t-1 (previous year)]

This measure of inflation is estimated by BBS for our country. Similar to monthly inflation, but the point to point inflation tracks inflation between the same months of *consecutive* years. Thus it is the percentage change in the CPI in the past twelve months.
For example, the point to point inflation of June, 2015 will be given by:

$$\text{Inflation (June}_{2015}) = [(CPI_{\text{June, 2015}} – CPI_{\text{June, 2014}})/ CPI_{\text{June, 2014}}]\times 100$$

This has the advantage of taking care of the changes in price due to seasonality. For example, as we know, during month of Eid, prices generally rise due to higher demand. If we calculate *monthly* inflation, we might observe a steep increase in inflation rate between the month of Eid and its previous month. However, if we calculate point to point inflation, that is, we consider the same month of previous year (assuming the Eid occurred in the same month in the previous year) we might not get high inflation. In fact, point to point inflation smoothens

out the seasonal fluctuation. But sometimes, knowing the changes in price level in two consecutive months may be more important than ironing out the edges in the price movement. If the price level goes up from one month to the next, point to point will not be able to capture it.

3. **12 month average** inflation: The percentage difference between the *average* CPI of last 12 months and the average CPI of the corresponding previous 12 months.

This is another important inflation measurement tracked by the BBS. The measure shows the change in the average CPI of past 12 months relative to the previous 12 months. The 12 month moving average (MA) inflation rate is given by:

12 month MA inflation = [(avg. CPI last 12 months – avg. CPI previous 12 months)/ avg. CPI previous 12 months] × 100

For example, the 12 month average inflation for June 2015 will be given by:

MA. Inflation (June, 2015) = [avg. CPI July, 14 to June, 15 – avg. CPI June, 14 to May, 15]/ (avg. CPI June, 14 to May, 15)] × 100

The advantage of the 12 month MA inflation measure is that the short term fluctuations in the price level are smoothened as a result of the averaging process and thus it provides a better picture of the general inflation trend. This measure may be influenced by past period values and thus may not correctly depict the *current* inflation when there are substantial fluctuations in the monthly prices.

6.3 Other Measures of Price and Inflation

6.3.1 Core Inflation

From the discussion above, we see that 12 month moving average or point to point inflation tend to address the fluctuation of the price level. However, fluctuation still persists in the price level because of the very nature of the composition of the consumption basket. Some items are more volatile than others. Thus we need a measure that is free from the effects of the fluctuating elements, especially from policy (e.g., monetary policy) point of view. This is the main idea behind the concept of *Core Inflation*.

Core inflation is defined as the long run or persistent component of the measured inflation that is tied in some way to money growth i.e. the supply of money. It intends to take out the volatile components from the CPI data to construct an index that is more accurate of the general price movements. Thus core inflation is the steady or persistent component of inflation that is free from disturbances that only have temporary effects on price levels. Separating the core part from the general inflation will provide a relevant *target* for monetary policy (this will be introduced in the next chapter).

Bangladesh Bureau of Statistics (BBS) does not construct the core inflation. Since the conduct of monetary policy and its role has become increasingly important in the economy of Bangladesh, BBS should consider it seriously.

6.3.2 Producers Price Index

The CPI measures the change in the prices from the point of view of the consumers/buyers. But there is another index, the Producers Price Index (PPI) that looks at the changes in the price level from the perspective of the manufacturers/producers. The PPI measures the average change in the price of a basket of representative goods and services sold by manufacturers and producers in the wholesale market. The PPI is also called the Wholesale Price Index (WPI) in some countries. The PPI thus reflects the average changes in the prices received by domestic producers for their output. In some countries the PPI data is used for the purpose of inflation measurement.

An important feature of PPI is that it can be used to predict the CPI. This is because the prices that are received by the manufacturers for their output will ultimately reflect the prices paid by the consumers for the finished product. When the producers experience price increases, they will be passed on to the consumers and hence the PPI can be a good predictor of the CPI. Though BBS constructs the PPI, it is not widely quoted or publicized. Another agency of the government, named Department of Agricultural Marketing (DAM) under the Ministry of Agriculture collects and publishes whole price data for a wide range of products.

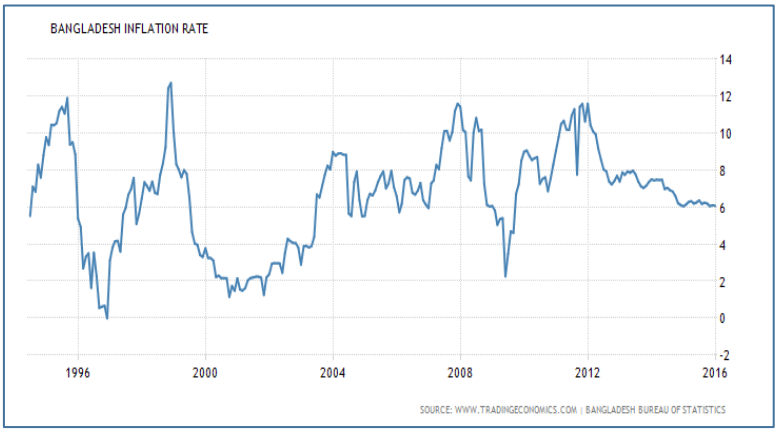
6.3.3 GDP Deflator

In chapter 2, we have already learnt about GDP deflator which is also a measure of price level. Unlike CPI, which measures the price of only the consumption goods, GDP deflator considers all the goods and services of the economy. The formula used to calculate GDP deflator is:

DGP deflator = GDP at current market price/GDP at base year price

Since GDP is estimated annually, the ratio of both nominal and real GDP is also annual. GDP Deflator is not a very popular measure of price in Bangladesh as it can only be calculated on annually. Policy makers as well as citizens want to know price information at a higher frequency than yearly basis.

6.4 History of inflation in Bangladesh



The figure above shows the trend of inflation in the country over the period of 1994-2016. We observe that inflation was very volatile – with large ups and downs before 2004. It shot up as high as 12 percent in 1999 before hitting the floor of 0%. Early 2000s saw very low inflation,

hovering in the vicinity of 2%-4% and then the price level rose steadily during the first half of the 2000s, reaching double digit figure again in 2008, and then dropped sharply to a little over 2% in 2009. It rose again to a little over 10% in 2011 and then slide down slowly to about 8% in FY13. The inflation has been on the declining trend since 2013.

The next diagram plots the 12 month moving average inflation data for the period of FY97 to FY13 (Base: 95-96=100). The 12 month moving average inflation is seen to have experienced large fluctuations during the period under review. It rose sharply in FY98, fell and began a steady climb during the first half of the 2000s. The average inflation then rose to nearly around 10% in FY08, dropped subsequently but rose to enter double digit figures in FY12. The inflation has seen then declined with the most recent estimate putting it at 6.21% in October, 2015.

6.5 Nominal and Real Interest Rate

We already learnt about nominal and real variables in Chapter 2. We introduce this issue in this chapter as the measures of cost of living or the inflation has significant bearing on the other prices (price of money) such as interest rates

The relationship between the real and nominal rates of interest is given by the following equation:

Real Interest Rate = Nominal Interest Rate – Inflation

i.e. the real interest rate is the rate that is obtained after accounting for the effect of inflation from the nominal interest rate. But, which interest rate do we care about the most – nominal or real?

Suppose you deposit a sum of money with an annual interest rate of 7% (the interest rate quoted is the nominal one). How much do you *really* gain after one year?

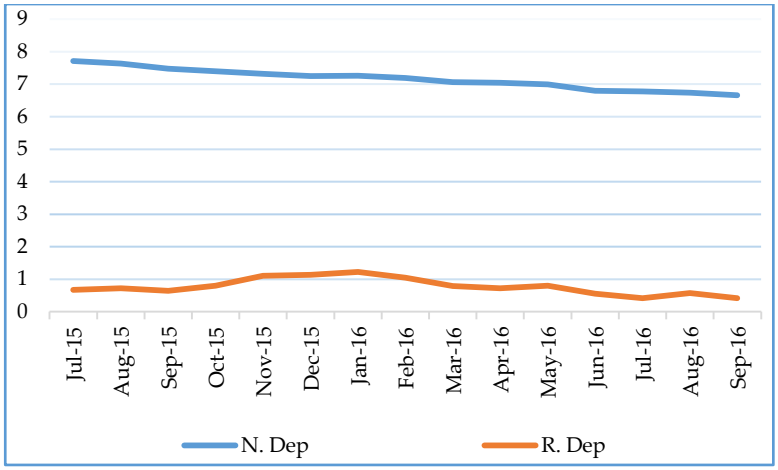
The answer lies in the fact that the ongoing inflation in an economy has the effect of eroding away the purchasing power of money. Thus, with the presence of inflation, the real value of a fixed sum of money will decline over time. Therefore to arrive at the real rate of return, which is the real interest rate in this example, we need to account for inflation in the nominal interest rate. The relationship is as given by the equation above and thus we need to subtract inflation from the nominal interest to arrive at the real interest.

For example, if you purchase a bond yielding 6% and the inflation is also 6%, then the real interest rate or the real rate of return is:
6% - 6% = 0%

Thus your purchasing power gain will be zero from the returns from the investment. It is the real interest rate that matters. Market forces of supply and demand for loanable funds determine the real interest rate because both the borrowers and lenders care about the real interest rate.

Figure 5: Nominal and real Deposit rate (%)

Source: Bangladesh Bank



The following diagram shows the movements in the real and nominal interest rates for deposits of the banks. The real rate has been arrived at by subtracting the inflation rate from the nominal rates reported. For deposit rates, the scheduled banks weighted average interest rates have been used while the monthly point to point measure has been used for inflation. The question is: Do depositors consider inflation while making decision about their money? Ideally, yes. During the period under consideration, both the nominal deposit and advance rates followed downward trends and the movement in the real variables closely resembled them.

6.5.1 Ex-ante and Ex-post Real Interest Rate

Ex-ante ➔ before;
Ex-post ➔ after

The terms ex-ante and ex-post are from Latin origins and mean '*Before*/*After* the fact or event'. In Economics, we use the terms to denote predicted (*expected*) return or output with '*ex-ante*' and actual (*realized*) return or output with '*ex-post*'.

In incorporating the effects of inflation on the interest rate, ex-ante interest rate uses *inflation expectation* whereas the ex-post interest rate uses the *realized inflation*. Thus financial contracts that involve payments to be made into the future uses the ex-ante real rate of interest in setting up such deals.

The examples summarize the important aspects of ex-ante and ex-post inflation rates. If you are going into a contract which will pay off 10% in the next year and you expect the CPI to rise to 7%, then your ex ante real rate of interest is 10% - 7% = 3%. But if the actual rate of inflation in the next year turns out to be 10%, then your ex post real interest rate becomes nil (10% - 10%)

These observations can be generalized into the following rules. i. When inflation is higher than expected - lenders lose, borrowers win. ii. When inflation is lower than expected - lenders gain, borrowers lose.

6.5.2 Fisher's hypothesis

Fisher's hypothesis, also called the Fisher effect is the proposition that the variations in nominal interest rate can be explained by inflation, leaving real interest rate more or less stable. Fisher's hypothesis thus suggest that the nominal interest rate and inflation move together. This holds fairly well for US economy. Does it hold for Bangladesh?

CHAPTER 7
Money: Supply and Demand

Money is an intricate part of the modern human life and almost all of us can never imagine a life without it. It has played a vital role in the development of the modern economy and society. But what exactly is money? Throughout recorded history money has been different things at different times and places but what has remained unchanged is the all-important feature and functions of money. Understanding of the process of creation of money as well as the factors that determine the demand for money is critical for understanding *monetary side* of the economy (e.g., money supply, price, interest rate, etc.) and how it interacts with the *real* side. The conduct of monetary policy, its effectiveness in achieving its target in lowering inflation and stimulating the economy thorough greater supply of credit and lowering lending rates depends on the in-depth understanding of the creation and supply of money.

7.1 What is money?

The economist's definition of money is a little different from the sense in which the term is used in everyday language. In economics 'money' is defined as anything that is generally accepted as payment for goods and services and for paying back debts. Therefore, currency consisting of bank notes and coins certainly falls under this category and hence is one form of money. When people talk about money in their everyday lives, they are referring to currencies.

But for economists just defining currencies as money would be very restrictive as there are other things that can perform similar functions. Take the case of bank check: you can use them to pay off bills, settle debts or even pay for your purchases. Thus checks (drawn on checkable deposits**)** should also be treated as money. But in the broader sense, saving deposits can also be seen as money if they can be easily converted into cash currency or checkable deposits.

Another additional complication arises when the term money is used in everyday language as a synonym wealth. Thus when people say "Mr. X is rather rich, he has tons of *money*" they are actually referring to his wealth – the accumulation of his savings and the total values of the various assets that he owns, including stocks, bonds, houses, yachts, etc. Although money is an asset for the person in its possession, what makes it different from other assets is its inability to earn interest.

The term money is also sometimes used to refer to income. Therefore when we hear people say that "Mr. Y has a great job, he earns a lot of *money*', they are referring to his income – the *flow* of earnings per unit of time. But money is a *stock* concept– the amount at a specific point of time and not a change over time (please refer to Chapter 2, Box 1 for a detailed discussion on flow vs. stock variables). Thus income cannot be treated as money and hence our definition of money is different form its sense when used to refer to wealth and income. In short, we can only say that money is what money does. To summarize the above:

- Money is anything which is accepted as payment for goods and services and for paying back debts
- Money and *income* are not the same (same goes for *wealth*)
- Money is also an *asset* (interest free)

We will begin our discussion with the important subject of the *function of money* in the economy.

7.2 Function of Money

No matter what form money may take - be it cowry shells, beads, rocks or precious metals like gold and silver - it serves to perform these 3 primary functions in the economy:

7.2.1 Medium of Exchange

Money is the medium via which goods and services are paid for in almost all types of market transactions in the economy. Therefore it acts as the medium of exchange through which goods and services are exchanged for one another. As we can see from our own experience of day to day economic transactions, money is what is used to buy goods and services from the market and it is also what we are paid in as salary and wages for our services rendered.

By performing as the medium of exchange, money eliminates the issue of *double coincidence of wants*, which is present in any economy that relies on the system of *barter*. A barter economy is one in which goods and services are directly exchanged for one another. But this system gives rise to several issues as made apparent by the following example.

Consider a Barter World, a village economy which still hasn't invented money and thus relies on the direct exchange of goods and services. Mr. Potatohead is a resident of the village who only grows potatoes. Now one fine day, Mr. Potatohead finds himself craving for the taste of fresh fishes. As he cannot catch fishes himself, he knows that he has to visit the village fishmonger – Mr. Ruhi. From his experience of living in a barter economy, Mr. Potatohead knows that he has to take potatoes with him to exchange for fishes with Mr. Ruhi. But on visiting Mr. Ruhi, Mr. Potatohead is disappointed to find that Mr. Ruhi does not want any potatoes today but rather he fancies chicken. What will Mr. Potatohead do now?

One possible solution to the issue lies in the fact that Mr. Potatohead can now exchange his potatoes for chicken and bring back the chicken to Mr. Ruhi in order to get the fish. But not only does he need to find someone willing to exchange potatoes for chicken, the process will also entail additional expenses in the form of time and money used in travelling to and from the chicken farmer. The expenses involved in the process are termed as *transaction costs* and they are very high in a barter economy as the *double coincidence of wants* – finding someone willing to exchange the exact goods and services as required (which in our example is potato for fish) - has to be satisfied. Thus we can now clearly see the major flaw with the barter system – if the double coincidence of wants is not met, no transactions will take place.

Now let us see what happens when we introduce money into the economy. Now Mr. Potatohead does not have to worry about finding someone willing to exchange potatoes for

fish. He can simply sell his potatoes for money and then use it to buy fishes from Mr. Ruhi, who in turn can use the money to buy chicken and so on like this. Thus not only is the problem of double coincidence of wants avoided but the transaction costs involved (both time and money) are greatly reduced as well. This frees up more time for the inhabitants of the economy which they can now use in their own production activities.

Therefore we can now see how money promotes efficiency in the economy by reducing the time spent in the exchange of goods and services for one another. At the same time it also helps to improve efficiency by allowing people to *specialize* in what they do best (for Mr. Potatohead it would be growing potatoes). Thus money is the oil that lubricates the wheel of the economy by reducing transaction costs and improving efficiency by encouraging specialization and the *division of labor*.

For any commodity to effectively perform the function of money, they must meet the following criteria:

i. It must be easily standardized, making it easy to set its value.
ii. It must be widely accepted and easily recognized i.e. universally acceptable.
iii. It must be divisible, so that it is easy to 'make change'.
iv. It must be easy to carry around and transport (low weight and easily accessible shape and size).
v. It must not deteriorate quickly (breakdown or decay easily)

As mentioned above many forms of money have satisfied these criteria and taken many unusual forms over the course of history including strings of beads, tobacco, cigarettes, livestock, etc.

7.2.2 Unit of Account

The second important role of money in the economy is that it provides a *unit of account* i.e. it provides a *measurement of value* in the economy. The prices of goods and services in any modern economy is measured and denoted in terms of money. For example, the way we measure weight in kilograms and distance in kilometer, the same way the value of a good or service is measured (and quoted) in terms of money. Thus it is money which enables us to measure the value of the good or service that we buy or sell in the market.

To illustrate the point of the function of money as a unit of account, let us take another look at our primitive Barter World. As Barter World has no money, how is the value of the good and the services in the economy quoted? Recall that this economy depends on the direct exchange of goods and services. Thus when Mr. Potatohead wants to buy fishes, he needs to know the price of fish in terms of potatoes. But when he craves for chicken he needs to know the price of chicken in terms of potatoes and so on like this for all the other goods on the economy. This is simple enough when there are only say 3 goods in the economy and there will be only three prices (for example: number of fishes in exchange for in kg of potatoes, Amount of potatoes in exchange for number of chicken and number of fishes in exchange for number of chicken).

But matters get much complicated when there are 10 goods and services in the economy. Now a total of 45 different prices have to be known to be able to compare prices and exchange each good for another. With 100 goods, there are 4950 price; with a 1000 goods there are 499,500 prices! Just imagine walking into a modern superstore that houses more than 1000 goods and looking at 499,500 different prices as the price tag of each of the items would have 999 different prices! You may end up returning empty handed from the store rather than spend the entire day reading the price tag with 999 items! The formula used to find the number of prices for **'N'** items is given by **[N*(N-1)] ÷2.**

As before let us introduce money in the economy and see its effects. Now the prices of the 1000 items in the supermarket would be quoted in terms of units of the money like Taka and there would be 1000 prices instead of 499,500. Now the price tag of each item would have a single price instead of 999! Thus money makes it easier for us to compare different prices and also allows us to compare incomes and earnings.

Thus it becomes really clear now how money makes the economy run more smoothly by reducing transaction costs as the number of prices to be considered is greatly reduced. This beneficial effect of the use of money becomes more apparent as the number of goods and services increases with the growing economy.

7.2.3 Store of Value

The third role that money plays in the economy is that it functions as a *store of value* i.e. it acts as a store of the purchasing power that is embedded in it. A *store of value* can save the purchasing power of money from the time the money is received (as salary, earnings or compensation of any other form) until the time it is spent to buy goods and services.

But money in its role as a store of value is not unique; any asset – be it money, stocks, bonds, lands, houses, property, artwork, gold etc. – can serve to act as a store of value or wealth. Some of these assets have certain properties and functions that are far superior to that of money. For example, houses can also provide a roof over our head in addition to storing value, assets such as bonds and stocks are subject to interest earnings and dividends while artworks and gold jewelry also provides us with positive utilities. Why then do we need to hold money? The answer lies in the fact that money is the most *liquid* of all assets. Liquidity refers to the relative ease and speed with which an asset can be converted into a medium of exchange. Liquidity is highly desirable as it enables us to make immediate exchange of goods and services with money.

Money is the most liquid asset as it itself is the medium of exchange and does not need to be converted into anything else. To put matters into perspective, imagine that you go to the local superstore to buy groceries with a bar of gold. You then discover that the superstore does not accept gold but only money. Then you need to convert the gold into money. But the nearest goldsmith is far away and it'll cost you a great deal to go there, convert the gold into cash and then come back to the store. Imagine the amount of extra work you would need to go through just to buy groceries! These expenses related to the conversion of an asset into its most liquid form (money) are also transaction costs and can be prohibitively high.

The effectiveness of money as a store of value depends on the price level in the economy. Recall that inflation has the unwanted ability of eroding away the purchasing power of money. When the price level rises from one period to another, buying the same amount of goods and services will require larger sums of money. But if your income does not increased accordingly, you will find that your purchasing power has fallen greatly. If the price level doubles overnight, the purchasing power of your fixed income will be halved! During high inflation the value of money falls sharply and thus people would be willing to hold less money (and forgo the convenience of liquidity) as the value of the medium of exchange itself is falling. This is especially true during *hyperinflation* – periods of extreme inflation when the price level rises by, say 50% per month. Therefore even though money is the most liquid asset, people will hold a combination of different assets to get the optimal mix of liquidity, store of value and interest earnings.

7.3 History of money

We will now briefly turn the pages of history to look at the evolution of money over time and how it has helped shape the modern world.

Money, in one form or another, has been a part of human history for at least the last 3000 years. Before that it is assumed that a barter system existed. Over time a type of currency developed involving easily traded goods like animal hides, salt and weapons. These traded goods served as the medium of exchange although the value of each of the unit of the goods traded were still negotiable. This system of barter and trade spread across the world and is still practiced in some parts of the world today.

Around the time of 1100 BC, the Chinese started to make use of miniature replicas of tools and weapons instead of using actual ones as the medium of exchange. But the shape of these items was not very friendly and easy to handle in everyday use and thus they too were abandoned for the less prickly shape of a circle, which became some of the first coins. Although the Chinese were the first to make use of recognizable coins, the first minted coins were created in the region of Lydia (now part of modern western Turkey).

In 600 BC the Chinese moved from the use of coins to paper money. By the time the famous explorer Marco Polo visited China in 1200 AD, the Chinese Emperor had a good control on both money supply and various denominations. The Chinese notes also came with the inscription 'All counterfeiters will be decapitated'! Thus the art of currency counterfeiting must have started in the ancient times.

Up till 1600 AD, the Europeans were still using coins helped by the supply of precious metals from their colonies. The pound (the British currency) was originally an amount of silver weighing a pound! Eventually the banks started using bank notes for their customers to carry around instead of coins and these notes could be taken to the banks at any time and converted into their face value's worth of gold or silver coins. These paper money were very similar to our currencies today but were issued by banks and private institutions instead of the government or a central agency. The first paper currency issued by European governments was actually those issued by the colonial governments in North America. The first instance

was in Canada, back then a French colony. In 1685 soldiers were issued playing cards denominated and signed by the governor to use as cash instead of coins from France.
With the shift from coins to paper money, Europe experienced an increase in the amount of international trade taking place. Banks and the ruling class began to purchase currencies of other nations in order to aid in their trading and in the process created the first currency market. This ushered in the era of increasing international trade.

Later on, in the 21st century, we can now see the continued evolution of money as the use of Debit Cards, mobile payments and virtual currencies increase and which may very well one day altogether replace the use of paper currencies.

7.4 Types of Money – Evolution of the Payments System

Over the course of time, several items have been used to perform the functions of money. These can be broadly categorized under the heading of the following:

Commodity Money: Money which has intrinsic value i.e. the item used as money itself has a value: e.g. metals such as gold, copper, silver etc. The value of the object used (e.g. gold) determined the value of the money. This was the major form of money used during earlier periods but understandably was very inconvenient to carry around. Hence their use waned over time.

Fiat Money: Money which has no intrinsic value. Initially paper currencies were issued to be convertible into coins or into a quantity of precious metal. But over time the currency has evolved into fiat money – paper currency decreed by governments as legal tender, which means that legally it must be accepted as payment for debts, but not convertible into coins or precious metals. Paper money and coins are also called 'currency' e.g. notes issued by central banks of nations. Although paper currency is much lighter than coins or precious metals but they can be easily stolen and difficult to transport in bulk. This lead to the development of the next step of the payments system: bank checks.

Bank Money: Anything for which you can write a check. Personal checks are not legal tender, not as liquid as currency. A bank check is an instruction from the account holder to his bank to transfer the stated amount of funds from his account to the account of the person depositing the check. They can be used much like money to make payments and settle debts but are not that liquid. The primary advantage of check is that they facilitate large transactions without the need for carrying around big sums of money. Thus check have improved the efficiency of the payments system. But the problem with check is that they require time and costs to be settled and for the funds to be accordingly transferred.

Electronic Payment: With the advent of new and cheap technology, the banking system has benefitted from the use of electronic payments – using the electronic banking system provided by banks to pay for bills and expenses. This is especially helpful for the payment of utility bills and also saves costs and time involved in the payment process. Thus it makes the clearing process faster and efficient and can act as substitute of bank checks.

E-Money: Electronic payments mechanism can also act as substitute for cash in the form of Electronic Money (or E-Money) – money that exists only in electronic form. The first type of e-money developed was in the form of Debit Cards – cards that enable consumers to purchase goods and services by electronically transferring funds from their bank accounts to the account of the business. Upon making a transaction, it directly deducts money from the buyer's checkable account. It provides the convenience of not carrying around cash or physical checks.

Having looked at how the payments system has evolved over time and the increased usage of electronic means of payments in transactions, one can predict that we are moving towards a cashless society from our humble beginnings in the barter system.

Box 1: Is Credit Card money?

No. The answer may come as a bit of a surprise as we can use credit cards to make purchases and thus it seems to perform the functions of money. But recall that, to be money, it has to be able to store value. When you make a purchase using a debit card: the payment the bank makes on your behalf is money and so is the repayment that you make to the bank. But the credit that the bank provides you is just an obligation of repayment and it cannot be used like money to say make purchases or settle debts. Thus credit cards are not money.

7.5 Who prints money?

From our discussion earlier we learnt that initially private banks and institutions could issue and print their own money. Until the mid-19th century commercial banks were able to do so but over time the role of printing and creating additional supply of money was vested solely with the Central Bank or other monetary authority of the country. Now the issuance of bank notes is authorized and controlled by the national governments of the countries. The first bank to be authorized with the sole rights to issue banknotes was the Bank of England in 1694 and thus it was given monopoly power over the printing and supply of money in the economy.

7.6 How is money measured? How much money is in the economy?

To be able to answer the two questions above we need to realize that the definition of money as anything that is acceptable as payment for goods and services is too broad of a definition to work with. Money can be anything that people is willing to accept as payment and thus it really depends on people's behavior. But to be able to measure money, a more precise definition is needed that will tell us exactly what assets are to be included. These measures of money supply are also referred to as *monetary aggregates*.

The money supply in the economy is measured through the Monetary Survey - an aggregate balance sheet of all banks in the economy that issues currency in the country. In the case of Bangladesh, it will be the balance sheet of the Bangladesh Bank. The methodology followed in the survey is that given by the IMF.

Narrow Money (M1): The first item of monetary aggregates is Narrow Money, also called M1, which consists of:

i. Currency in circulation (C) – Notes and Coins; also known as Currency Outside banks; this is also called as M0.

ii. Demand Deposits (DD) in the banking system. Deposits are also money as they are short term deposits that can be converted into currency relatively easily and quickly. They can be also be used to repay debts. Demand Deposits include current account, savings account and traveler's check among other short term deposits.

Thus we have: M1 = C + DD

Broad Money (M2): First define a type of money termed as Quasi Money (QM) and which includes time and savings deposit (TD) in the banks and any foreign currency deposit (FC) of residents. Now Broad Money (M2) which includes all liabilities in the banking system and is defined as:

Broad Money (M2) = Narrow Money (NM) + Quasi Money (QM)

Thus M2 includes everything in M1 and additionally includes savings deposits (e.g. Post Office savings deposits), time deposits (e.g. fixed deposits of different terms) and foreign currency deposits.

Having studied the monetary aggregates, let us know see the definition used by the Bangladesh Bank (BB). The table below provides the actual components reported by the Bangladesh Bank in their money supply statistics.

Table 1: Components of Money Supply

(Taka in million)					
Components	**October, 2014**	**September, 2014**	**October, 2013**	**Percentage Changes of October, 2014 over**	
				September, 2014	**October, 2013**
1. Currency Outside banks	831087	872988	754409	-4.8	10.16
2. Deposits of Financial Institutions with Bangladesh Bank (except DMBs)	4269	4402	3356	-3.02	27.21
3. Demand Deposits with banks	587203	620249	519254	-5.33	13.09
4. Time Deposits with banks	5786879	5752394	5126154	0.6	12.89
5. Money Supply (M1) (1+2+3)	1422559	1497639	1277019	-5.01	11.4
6. Money Supply(M2) (4+5)	7209438	7250033	6403173	-0.56	12.59

Source: Bangladesh Bank

Therefore the Bangladesh Bank uses the following definitions:
M1 = Currency outside banks + Deposits of financial institutions with Bangladesh Bank (except with deposit money banks) + Demand deposits with deposit money banks

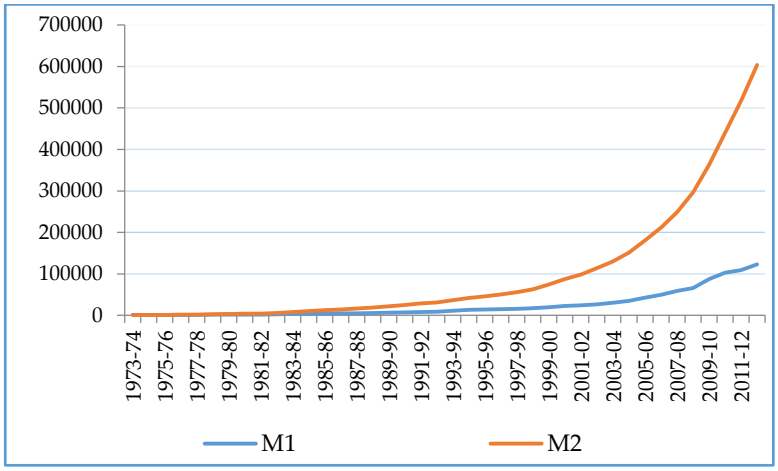
M2 = M1 + Time Deposits with commercial banks

Deposit Money Banks (DMB) are depository institutions that have liabilities in the form of deposits payable on demand, transferrable by checks or otherwise useable for making payments. Put simply, these are the commercial banks in the country.
But in addition to the commercial banks there are also other types of financial institutions in the country that can make out loans to the public but is not able to accept deposits. Thus financial institutions like leasing companies are not considered as DMBs. All financial institutions including DMBs have to keep a certain portion of their reserves as deposits with the Bangladesh Bank (BB).

The figure below shows the trends in the two components of money supply - M1 and M2 over time for Bangladesh. As can be seen from the diagram, both the components of the money supply has increased over time but with M2 experiencing much higher growth than M1. As M1 consists of only circulating currencies and short term deposits, the growth in the longer term deposits have increased over time with the growth of the economy which lead to the higher growth of the M2 component (which includes the longer term deposits).

Figure 1: Trends in M1 and M2 (in Crore Taka)

Source: Bangladesh Bank



Now we look at the process of money creation by the actions of the central bank and the commercial banks in the economy. Though money is printed by the central bank, the amount of money the economy is ended up with depends on the behavior of four actors, including the central bank.

a. The Central Bank of the country
b. Commercial Banks – those that accepts deposits from the public and uses them to make loans
c. The Depositors – who deposit their money in the banks
d. The Borrowers – who uses the funds from the banks for their own purposes (be it for business or for consumption).

Understanding of the balance sheet of the central bank is central to the idea of money supply process and the conduct of monetary policy. The interaction between the central bank and the commercial banks is reflected in the balance sheets of these two institutions and thus it is important to have a good grasp of their balance sheets. In chapter 3 we learnt about the balance sheet of the commercial banks. Now we will turn our attention to the central bank.
A sample balance sheet of a central bank is shown below.

Table 2: Balance sheet of Central Bank

Assets	Liabilities
Net Foreign Assets	**Currency in circulation**
- Official international reserves (gold and silver)	**Reserves of banks**
- Foreign currency account	
- Foreign investment	
Net Domestic Assets	
- **Net Domestic Credit**	
o Loan to banks, other FIs, employees	
o Government Securities	

We will begin our discussion with the liabilities side of the balance sheet.

7.6.1 Liabilities

Currency: This is the paper money and coins outside the banking system and in circulation in the hands of the public is a liability for the central bank as the central bank issues these currencies and promises to pay back the bearer with an equal sum of money. For example if someone brings a Tk. 50 note to the Bangladesh Bank and demands payment, the Bangladesh Bank is obliged in its duty (as the issuer of the notes) to pay back the person in the form of notes of: Tk. 20, Tk. 10, Tk. 5, Tk. 2, Tk. 1 or in any combination of the notes that adds up to Tk. 50. The notes are IOUs (short for *I Owe You*) that people are willing to accept as a medium of exchange due to their trust on the central bank of the country.

Reserves: These are the money of the commercial banks that are kept as deposit with the central bank and as also as cash in the vaults of the commercial banks. All commercial banks have to have an account with the central bank for the purpose of keeping reserves. Recall from our earlier chapters that the reserves are an *asset* for the commercial banks but they are a *liability* for the central bank as the banks can demand payment on them anytime and the central bank is obligated in its role to pay them back with bank notes.

The total reserves of the banks are divided into 2 categories:

a) Required Reserve: which the central bank requires the commercial banks to hold. The size of required reserves is determined by the Required Reserve Ratio – the certain fraction that must be held as reserve for every Taka of deposit with the banks. In Bangladesh, it is known as Cash Reserve Ratio (CRR) which is now 6 percent of the total deposits.

b) Excess Reserves: any additional reserve the commercial banks choose to hold to pay the depositors when they make withdrawals.

7.6.2 Assets

The assets of the central banks can be divided into the broad categories of Net Domestic Assets (NDA) and Net Foreign Assets (NFA).

Net Domestic Assets (**NDA**): It consists of net domestic credit and investment in government securities.

1) Net domestic credit: It includes its credit to banks, financial institutions and also to the employees of the Bangladesh Bank. Note that it does not include the credit disbursed by the commercial banks. Commercial banks' credit, which is the asset of the commercial banks, has nothing to do with central banks' asset.

2) Government securities: It is the net claims on government. Often the government borrows from the central bank by issuing Treasury bonds. The central bank can also buy bonds from the commercial banks in order to inject money into the economy. These bonds are the asset of the central bank. We will learn later that these government securities play a vital role in conducting monetary policy in the economy.

Net Foreign Assets (**NFA**): the sources of net foreign assets are receipt from export income, remittances, foreign aid, FDI, etc. Since, monetary systems used to follow 'Gold Standard' where gold was the only asset of the central bank, all central banks in the world has been historically holding a large amount of gold. This gold standard was abandoned in 1973, following the historic Bretton Wood agreement. All financial assets denominated in foreign currency are primarily held in the following forms: Foreign currency accounts, foreign investment such as investment in US treasury bonds, gold and silver and foreign currency loan to banks. It is interesting to note that the gold and silver deposits are kept in the Bank of England and at the bank in Motijheel by the BB. These reserves can also be lent by the central banks to each other.

The Table below shows the actual balance sheet of the Bangladesh Bank at 30 June, 2013.

Asset of Bangladesh Bank

Bangladesh Bank
Consolidated Statement of Financial Position as at 30 June 2013

Assets	Notes	2013 Taka '000	Restated 2012 Taka '000
Foreign currency financial assets			
Foreign currency accounts	4	400,668,902	249,373,468
Foreign investments	5	619,498,073	444,691,920
Assets held with International Monetary Fund	6	129,535,058	121,652,558
Gold and silver	7	30,888,999	43,237,047
Claims from gold transactions		9,888,170	14,005,843
Foreign currency loans to banks	8	62,201,818	40,823,997
Other foreign currency financial assets	9	3,257,453	2,991,004
Total foreign currency financial assets		1,255,938,473	916,775,837
Local currency financial assets			
Taka coin and cash balances	10	912,143	924,638
Reverse repurchase agreement	11	32,690,170	153,769,820
Loans to the Government of Bangladesh	12	304,676,986	373,067,868
Local currency investments	13	8,221,755	7,664,638
Local currency loans to banks, financial institutions and employees	14	118,056,512	111,634,940
Other local currency financial assets	15	2,337,873	1,752,385
Total local currency financial assets		466,895,439	648,814,289
Total financial assets		1,722,833,912	1,565,590,126
Non-financial assets			
Property, plant and equipment	16	29,240,605	28,687,383
Intangible assets	17	911,915	838,617
Other non-financial assets	18	6,643,867	6,369,464
Total non-financial assets		36,796,387	35,895,464
Total assets		1,759,630,299	1,601,485,590

Liabilities and Equities of Bangladesh Bank

Liabilities & Equity			
Liabilities			
Foreign currency financial liabilities			
Foreign currency deposits from banks and financial institutions	19	140,040,206	157,626,977
Liabilities with International Monetary Fund	6	168,729,820	173,921,133
Total foreign currency financial liabilities		308,770,026	331,548,110
Local currency financial liabilities			
Notes in circulation	20	746,382,617	642,007,492
Short term borrowings	21	49,830,996	-
Local currency deposits from banks and financial institutions	22	371,149,908	329,012,080
Other local currency financial liabilities	23	92,953,477	49,907,382
Total local currency financial liabilities		1,260,316,998	1,020,926,954
Total liabilities		1,569,087,024	1,352,475,064
Equity			
Capital	24	30,000	30,000
Retained earnings	31	46,493,169	41,710,052
Revaluation reserve	25	74,903,095	141,248,857
Currency fluctuation reserve	26	24,759,279	22,562,352
Statutory funds	27	14,467,046	13,917,046
Non statutory funds	28	14,226,290	14,266,067
Other reserve	29	11,063,896	10,775,652
General reserve	30	4,600,500	4,500,500
Total equity		190,543,275	249,010,526
Total liabilities and equity		1,759,630,299	1,601,485,590

Now we are equipped with the two basic tools – balance sheet of commercial bank and balance sheet of central bank – for analyzing money supply process in the economy. The key now is to establish the link between *monetary base* – money the central bank creates and monetary aggregates - money that grows from monetary base. Before going into details of the creation of money and money supply process, we introduce another important monetary accounting concept known as monetary survey. Monetary survey refers to the consolidated balance sheet of the commercial banks and the central bank. First, we need to identify the common items on the both balance sheets.

Balance sheet of the central bank	
Asset	**Liability**
Net Foreign Asset	Reserve Money
Net Domestic Asset	**Held in banks**
Net claims on the government	Held outside banks
Claims on the commercial banks	**Deposits of commercial banks**
Balance sheet of commercial banks	
Asset	**Liability**
Currency held in vaults	Deposits
Deposit at the central bank	**Liabilities to the central bank**
Domestic Asset	
Credit to private sector	
Credit to public sector	

First, we sum up the assets and liabilities of the central bank and commercial banks. The items of the same colors identified above cancel out from the balance sheets. The claim on the commercial banks which is an asset of the central bank is a liability of the commercial banks. The cash reserve held in the vault of the commercial banks is a liability of the central bank. Similarly, commercial banks' deposit with the central bank is a part of their asset while it is a

part of central bank's liability. After cancelling out the same items from both the sides of consolidated balance sheet, we end up with the following balance sheet. Note that the sum of all liabilities of the consolidated balance sheet is the M2 of the economy.

Consolidated Balance Sheet	
Assets	**Liabilities**
Net foreign asset Net domestic asset - Net claims on the government - Credit of commercial banks to government - Credit of commercial banks to private sector	Currency held outside banks Deposit (demand and time)
Total assets	Money (M2)

7.7 Creation of money and money supply process

7.7.1 The Monetary Base

The two liability components of the central bank – currency and reserves – makes up what is known as the Monetary Base. It is also knows as Reserve Money, Base Money or High Powered Money. This is the amount of money under the control of the central bank. That is, the central bank can directly influence the monetary base through its *monetary policy instruments*.

Thus we have:

Currency in circulation + Reserves = Monetary Base (High powered money)

MB = C + R

At this stage, before going into the details of the conduct of monetary policy, it is important to keep in mind that the monetary aggregates (M1 and M2) and monetary base are not the same. Monetary base gets amplified to become monetary aggregates through the actions (i.e., lending) of the commercial banks. That is, say for an example, an increase in the base money by Tk.1 created, via the actions of the commercial banks leads to an increase in the supply of money by more than Tk. 1.

To illustrate the point further, consider the following scenario:
Suppose Bangladesh Bank purchases T-bond (treasury bonds – a type of government security) worth of Taka 100 from the banking sector. This action is known as an *open market purchase*. How does it affect the money supply in the economy?
To answer this question we look at the changes that this action brings forth in the balance sheets of the central and commercial banks. First look at the balance sheet of the commercial bank.

Balance sheet of the Commercial bank		
Assets		**Liabilities**
Securities	-100	
Reserves	+100	

The selling of Tk. 100 worth of securities by the commercial banks reduces their holding of securities by Tk. 100 but also increases their reserves by Tk. 100 from the sales proceeds. Their liabilities remain unchanged by the process.

Now look at the balance sheet of the central bank.

Balance sheet of the central bank			
Assets		**Liabilities**	
Securities	+100	Reserves	+100

For the central bank, assets increase by the amount of Tk. 100 in securities but their liabilities also increase by the same amount. This is because the commercial banks will either deposit the money in their account with the central bank (as reserves) or cash it in for currency (as part of vault cash). In either case it becomes part of the *reserve* of the central bank.

Thus the net effect of this open market purchase of Tk. 100 is that reserves are increased by the same amount and with no changes in the amount of circulating currency, the monetary base also increases by Tk. 100. On the other hand, if the commercial bank was to cash in the money for currency from the central bank, the reserves would remain the same but the currency in circulation would increase by Tk. 100. But in both cases, the effect on the monetary base would be the same: it would increase by Tk. 100.

7.7.2 Secondary Money Creation: Role of Banking System (Deposit Multiplication)

Recall from earlier we mentioned that an increase in Tk. 1 in the monetary base increases the money supply by more than Tk. 1. This is achieved through the process of *multiple deposit creation*, a topic on which we will focus on now.

Suppose in our above example that the Tk. 100 of open market purchase (of T-bonds) by the central bank was from a commercial bank – Bank A. From the sale of the securities, the reserves of the bank increases by Tk. 100.

Bank A's balance sheet looks like:

Bank A			
Assets		**Liabilities**	
Securities	-100		
Reserves	+100		

Assume that the commercial banks do not want to hold this additional reserve as it does not earn any interest. This reserve is in the form of excess reserve. Bank A does not need to set aside a part of it as *required reserve* as there is no change in checkable deposit with the sale of the securities. Note that required reserve is based on deposit.

Now suppose that the Bank A makes a loan of Taka 100 to Mr. Shimul. That is, the increase in reserve is converted into additional loan of Taka 100 at the Bank A. Following the loan of Tk. 100, the balance sheet of Bank A looks like:

Bank A			
Assets		**Liabilities**	
Securities	-100		
Loans	+100		

Now assume that Mr. Shimul does not want to keep the amount of loan in cash but rather deposits it into his account with Bank B. Also assume that the CRR (i.e., required reserve ratio), as set by the central bank, is 10%. Now Bank B has Tk. 100 worth of deposits of which 10% (Tk. 10) is required reserves but the rest is available for providing loans. Bank B then lends the available Tk. 90 to Ms. Josefa with a check. Bank B's balance sheet now looks like the following:

Bank B			
Assets		**Liabilities**	
Reserve	+10	Checkable Deposit	+100
Loan	+90		

Ms. Josefa has a bank account with Bank C, with which he deposits the loan of Tk. 90 from Bank B. Bank C also lends to Ms. Kohinur who has an account with Bank D. Bank C's balance sheet after the loan:

Bank C			
Assets		**Liabilities**	
Reserve	+9	Checkable Deposit	+90
Loan	+81		

So far, using the initial Tk. 100 of additional reserves in the banking system has led to the creation of total checkable deposits of Tk. 271 (= Tk. 100 + Tk. 90 + Tk. 81). If we assume that all banks make loans for the full amount of their excess reserves then the above process of checkable deposits creation will continue.

The table below summarizes the changes in the balance sheet of the various banks involved in the process.

Table 4: Multiple Deposits Creation

Bank	Increase in Deposit (M)	Increase in loans	Increase in reserve (R)
A	0	100	0
B	100	90	10
C	90	81	9
D	81	72.9	8.10
.			
.			
Total	1000	1000	100

Note: using CRR 10% and Tk. 100 increase in reserves

Let's take the case of deposit:

Total deposit creation = 100 + 90 + 81 + …….

$= 100 + 100 \times 0.9 + 100 \times (0.9)^2 + ….$

$= 100 (1 + 0.9 + (0.9)^2 + …….)$

$= 100/ (1-0.9) = 1000$

[Formula used: **$1+ x + x^2+x^3+\ldots\ldots = 1/ (1-x)$]**

Therefore, the change in reserve (monetary base) of Taka 100 brings about the change in deposit of Taka 1000. Remember the definition of different monetary aggregates such as M1. Checkable deposit is a part of M1. Therefore, an increase is checkable deposit is the increase in money supply in the economy. In this example, the reserve (base money) gets amplified by 10 times! This extent of increase depends on the required reserve ratio. That is, ideally, by fixing CRR and changing the reserve, Bangladesh Bank can control the money supply in the country.

But if, say for example, Mr. Shimul would not deposit the proceeds in the bank and rather kept it as currency under his pillow, the multiple deposit creation process would cease. How much money to hold as cash and how much to deposit in the bank depends on the behavior of Mr. Shimul. We will learn more about the behavior of a person regarding his financial decision under 'demand for money' later in this chapter. The behavior of the *economic agents* is something beyond the control of the central bank and commercial bank, though policies such change in deposit rate can influence them. Therefore, it is also important to understand the demand side of money.

Furthermore, banks do not necessarily invest all of their excess reserves but rather a fraction of it. This is because they have to keep some of the reserves in hand to meet the demand of depositors when they make withdrawals. This also slows down the deposit creation process by the commercial banks.

7.7.3 Relationship between Deposit, Reserve and CRR: The simple money multiplier

Suppose that banks do no hold any excess reserve i.e. in excess of their required reserve. In this case, the total amount of *required reserves* (CRR) for the banking system will equal the total *reserves* (R) in the system.
Thus we have: CRR = R (reserve)
Let, D= deposit
r = required reserve ratio with $0<r<1$

Next we know that the total amount of required reserve is given by the required reserve ratio r times the total amount of checkable deposits, D.
Thus, we have: R = r x D

Changing sides, D = (1/r) x R

Next we take the change in both sides of the equation which gives us:
⇨ Change in D = (1/r) × change in R [r is fixed]
1/r is known as the *simple money multiplier.*
Applying the above formula in our example,
Change in D = (1/0.1) × 100 = 1000, which is the change in the money supply

Thus,
Change in *money supply* = 10 × change in *monetary base*
If the reserves increase by Tk. 100, the checkable deposits (money) must increase by Tk. 1000 (=10 × Tk. 100) when required reserve ratio is 0.10.

Hence the *money multiplier* in this example is equal to 10. In fact the increase is by the factor of the reciprocal of the required reserve ratio.

7.7.4 Money multiplier: Revisited

In the last section we derived the money multiplier in a simple context when there is no currency and excess reserve to highlight the intuition behind it. Now will expand the definition of money multiplier when there are currency and excess reserve in the baking system.

The money multiplier (m) measures the change in the money supply (M) due to the change in the monetary base (MB).

$$M = m \times MB$$

m gives us what multiple of monetary base is transformed into money

Let us define,
c = C/D = currency ratio
e = ER/D = excess reserve ratio
We know, Total reserve R = Required Reserve (R) + Excess Reserve (ER)
= r × D + ER

Thus, Monetary Base (MB) = R + C = r × D + ER + C
= r × D + e × D + c × D
= D (r + e + c)
⇨ D = [1/(r + e + c)] × MB

Money supply (M) = C + D = c x D + D = D [1+c]
= [(1+c)/(r + e + c)] MB

Therefore, money multiplier **m = (1+c)/(r + e + c)**

The above formula for money multiplier sheds light on the fact that the extent of amplification of monetary base (reserve) critically depends on the behavior of the central bank, commercial bank and depositors.

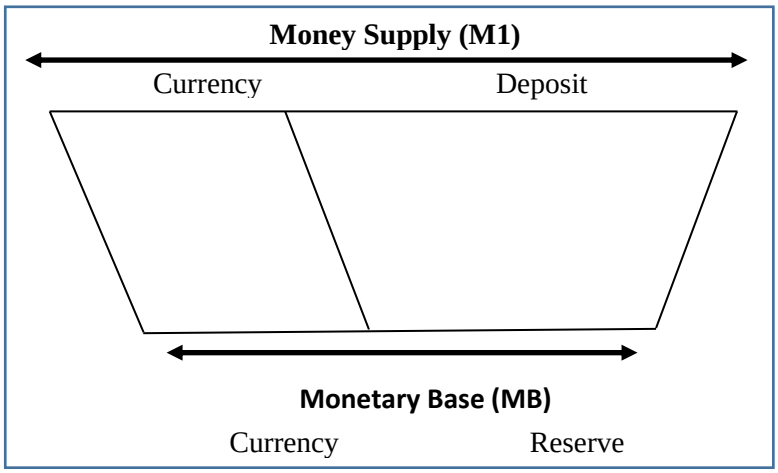
Central Bank (r): When the central bank raises the required reserve ratio, the impact on the money supply creation is lessened due to lower value of the multiplier (r ↑ ➔ m↓). The intuition is that less money is left for loan when r is increased. As the deposit creation depends on bank's lending, an increase in r slows down the money creation process by the banks.

Depositors (c): When the depositors prefer to hold more cash than make deposits, the currency ratio increases and thus the multiplier is reduced. This leads to the lower increase in the money supply (c ↑ ➔ m↓)

Banks (e): Banks may increase their excess reserves during periods of high demand for cash withdrawals by their depositors e.g. before Eid festivals. When they do so, it serves to increase the excess reserve ratio, lower the amount credit disbursement and thus reduces the multiplier. Hence the impact on money supply is lower (e ↑ ➔ m↓).

The diagram below shows the Money Stock Pyramid which depicts the relationship between the volume of M1 and monetary base. It shows that amount of currency in monetary base and M1 remain the same while the reserve gets multiplied and becomes deposit in the banking system. The difference between M1 and monetary base is the multiplication effect of the money multiplier.

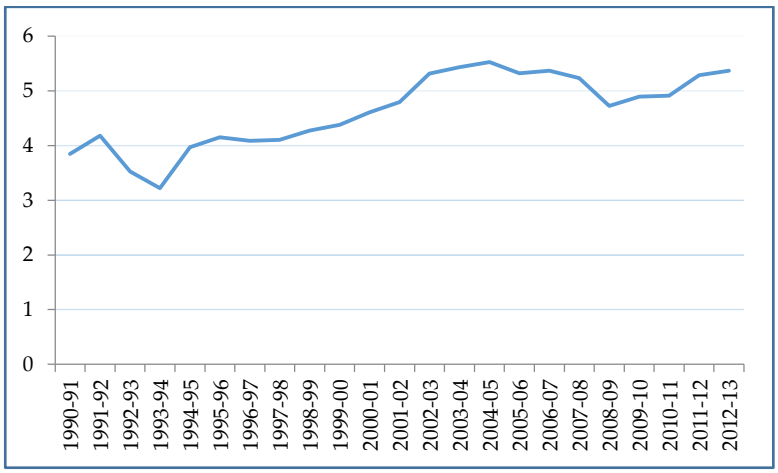
Figure 3: Money Stock Pyramid



The figure below plots the data for the money multiplier in the country over the period of FY 90 to FY 12. The multiplier increased steadily from the mid-90s and with higher growth from the early 2000s. It experienced a decline during the latter half of the 2000s but has continued to increase since then.

Fig 5: Money multiplier of Bangladesh

Source: Bangladesh Bank



7.8 Money supply curve

The supply of money in a modern economy is controlled by the central bank or other monetary authority in the country that has the monopoly power over the printing and supply of money. Thus the supply of money is determined arbitrarily and not influenced by the rate of interest. Hence the supply curve of money is a vertical line when plotted against the rate of interest (see Figure 1 below).

7.9 Demand for money

As we discussed before, the role of money multiplier in determining the money supply depends on the behavior of the borrowers and depositors. The price of money – the interest rate – also hinges on how much money people want to hold in different forms of assets.
At first glance the issue of demand for money may appear to be a bit trivial. After all, don't we all want more money to buy more goods and services? And hence our demand for money should be infinite (or at least as much we can possibly get)! But recall from our previous lessons that money is a stock variable (and not a flow) and that income and wealth are not money. When we talk about the demand for money in economics, we are referring to how much of the wealth of an individual would that person be willing to hold in the form of money at any point in time.

7.9.1 Why do people hold money?

Holding wealth in the form of money earns zero or very little interest. Thus the *opportunity cost* of holding money is the forgone interest payments. Additionally, money has no intrinsic value, it cannot provide us with services that other assets can e.g. a house can keep us warm while a golden jewelry can make us happy. But in spite of this, people still need to hold money for several reasons. The famous economist John Maynard Keynes in his *liquidity preference theory* states that are three motives why people hold money: the *transaction* motive, the *precautionary* motive and the *speculative* motive. We next turn to each of them in detail.

7.9.1.1 Transaction motive

The demand for money arises from the fact that people hold money for the purpose of carrying out day to day transactions. Keynes also followed this classical view and suggested that this component of money demand is determined primarily by the level of transactions that people carry out. The volume of transactions is in turn determined by the level of income of the individuals and hence this component of money demand is also proportional to the level of income. In short, as income increases people demand more money to finance higher amount of transactions.

7.9.1.2 Precautionary motive

Keynes suggested that in addition to holding money for performing transactions, people also hold money as a cushion against an unforeseen or unexpected need. Thus if people hold money as a precaution against unforeseen needs then they will be able to pay for things like emergency bills for hospitalization. Similar to the transactions motive, this component of

money demand is dependent on the level of transactions which in turn is dependent on the level of income. Thus, the precautionary demand for money is also proportional to income.

7.9.1.3 Speculative motive

So far the components of money demand we saw were found to be only dependent on the level of income. But Keynes identified another component that set his theory apart from the *classical view* that only income determined money demand. This is the speculative motive for holding money, which depends on both wealth and interest of the economy.

Suppose there are only two types of assets in the economy: money (which earns no interest) and bonds (which earns interest). When people expect the yield of the bonds (interest rate) to rise, they will hold more bonds and less money. The opposite would be true when the expected yield of bonds is low. Therefore, we can conclude that the demand for money balances is negatively related to the rate of interest.

7.9.2 Money Demand Function

By putting the three components together, we can have the *money demand function* – which shows how the demand for money balances is determined by the different factors.

That is,

Demand for money balances = **f** (Interest rate, Inflation, Income)

The money demand function shows that people want to hold more money if his income increases and also if the opportunity cost of holding money decreases. Since the interest is the opportunity one has to forgo if one holds money, increase in interest rates would induce people to hold less money. We can see that the demand for money is also influenced by the price level in the economy. People may want to hold more money to keep the purchasing power constant as inflation rises. Suppose, you go to college every day by bus and if bus fare increases, you need to hold more money in your wallet. On the contrary, since inflation eats away purchasing power, people may not want to hold much money. Thus the effect of inflation on demand for money is not unambiguous.

What is the opportunity cost of holding money- nominal or real interest rate? Opportunity costs are opportunities (in this case payments) forgone when one action is chosen over others. Suppose, you hold Taka 100 for a year. The nominal interest rate is 8% and rate of inflation is 6%. What are you losing by holding money? If you were to hold bond or deposit the money in the bank you could earn Taka 8 which has the purchasing power of Taka 2 [8-6= 2] after one year. So, your *real* income would be 100 + 2 = Taka 102. But if you hold money for a year, you would also lose the same purchasing power of money. That is, after one year, Taka 100 would be equivalent to Taka 100-6 = 94 in real terms. Therefore, the opportunity cost of holding money is 102 – 94 = Taka 8 which is the nominal interest rate! Since inflation affects both money and bond holding, they cancel out when we calculate the opportunity cost of holding money.

Opportunity cost of holding money = nominal interest rate – inflation – (-inflation)
= nominal interest rate

In fact, people want to hold a certain amount of *real money balances* (as opposed to nominal amount) which accounts for the price level. That is, for a given purchasing power of money, money can be used for serving the different motives. This demand would be positively related to the level of income and negatively related to the rate of nominal interest. Therefore, we can define a simple money demand function for real balances as the following:

$$\frac{M^d}{P} = f(i, Y)$$

Where, $\frac{M^d}{P}$ – demand for real money balances,

i – Nominal interest rate, and

Y – Income level.

The following summarizes the effects of the various factors on the demand for real money balances. The third lines for each of the factors illustrate the mechanism via which the change in the given variable brings about the change in money demand.

7.9.2.1 Money demand function revisited: A simple model

A simple model of money demand for the whole economy can be given by the following:

$$\mathbf{M^d = k(i).\ GDP}$$

where M^d is the money demand function and the term k(i) is a the factor by which the GDP is multiplied by to arrive at the money demand. It means that for a given interest rate, demand for money grows proportionately with GDP. Th term k (i) is determined by the rate of interest and, as we learnt before, and is negatively related to the interest rate. Thus when the interest rate is high, this multiple k(i) will be smaller and hence money demand also will be lower. Using the fact that the demand for money is inversely related to the interest rate, keeping all other factors constant, we can get the demand curve for money which shows the quantity of money demanded at each level of interest rate. Figure 1 below plots the relationship between money demand and interest rate.

Putting supply of and demand for money together: Determination of interest rate

Figure 1: The money demand and supply curve

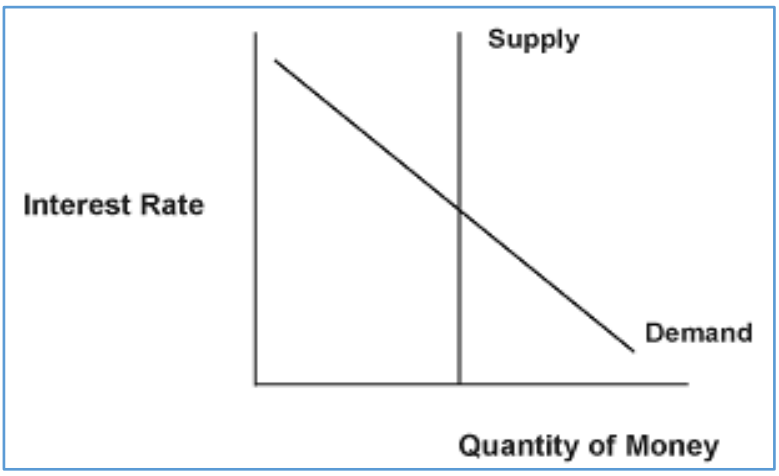
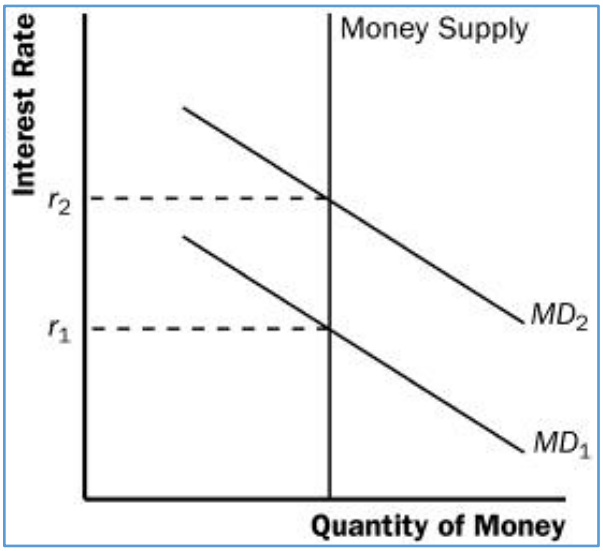


Figure 1 also plots both the supply curve and demand curve for money. Putting the two together, we get the equilibrium in the *money market*. This is the equilibrium level of money demanded and supplied in the economy and resulting interest rate.

Now let us go through some scenarios which will help illustrate the effects that take place following changes in either the money supply or demand.

What happens when *demand* for money increases due to an increase in income (GDP)?

Fig 2: Increase in Money Demand

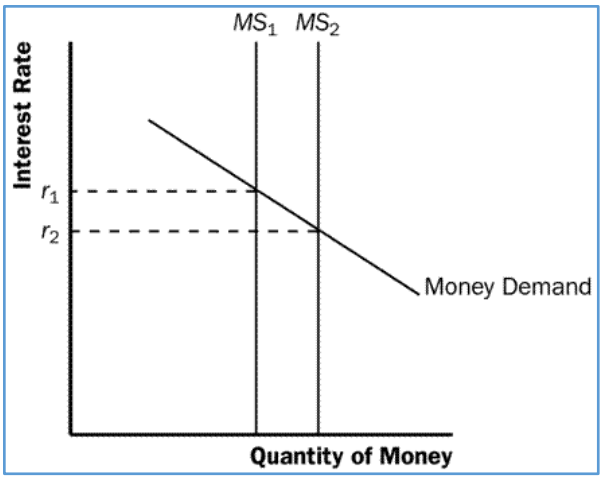


This increase in the money demand pushes up the equilibrium rate of interest for a given supply of money.

- What happens when *supply* of money increases?

The supply of money in the economy is controlled by the central bank of the country. When the central bank increases the supply of money in the economy, it causes the **money supply curve** to shift to the **right**.

Fig 3: Increase in Money Supply



With the increase in the supply of money in the economy, the price of money – the interest rate - should be lower. How does it work? There is more money in the hands of the public

than they would like to hold. In trying to get rid of the excess money, the public will demand more bonds and hence the price of bonds will rise. Recall that as the price of bonds rise, the interest rate falls. You can also think of in terms of bank deposit. With lots of money floating around, people may want to deposit the excess amount which they do not want to hold in bank. Thus banks may be flooded with deposit and they are forced to lower deposit rates as banks have to pay interest on deposit.

In a developing country like Bangladesh, when central bank increases money supply, the money does not end up with the public directly. It is the commercial banks who get the excess money first and it reaches the hand of people through lending. Therefore, when banks have more *reserve* through government's *open market operation*, banks have more liquidity to lend than before for a given demand. It decreases the lending rate to business and also to other banks. We will learn more about this issue in next chapter on monetary policy.

7.10 Is it the money market or the bond market that determines the interest rate?

As we have learnt by now, the price of bonds in the bond market and the interest rate in the money market in the economy moves in opposite direction. This means that if we know about the conditions in the bond market then we also know about the money market. Bond market is just the mirror image of the money market. Hence when the money market is in equilibrium, the bond market is also effectively in equilibrium. Analysis of one market is sufficient to understand the movement of interest rate.

To make this clearer, say for example that the market for money is not in equilibrium with the demand exceeding the supply. In such a situation, people are willing to hold more money than they currently are. As people demand more of money than bonds, the demand for bonds fall and hence the price of bonds also falls. But as the price of bonds decline, the interest rate increases in response. Thus the result is that the increase in the demand for money has pushed up the interest rate until people are willing to hold to lower amount of money. Thus as the money market reaches a new equilibrium with higher interest rate, the bond market also reaches a new equilibrium with lower bond prices. Hence we reach our conclusion made earlier that studying one market is sufficient to know about the other.

How the interest rate is set in a developing country like Bangladesh? More importantly, when we talk about interest rate, which interest rate are we talking about? There are hundreds of different lending and deposit interest rates in the economy – lending rates of the banks and financial institutions, deposit rates of various short term and long term deposits, interest rates of very short term T-bill, short term and long term interest rates of T-bonds, interest rates at which banks lend and borrow among themselves, interest rates of the national saving certificate, etc.

In Bangladesh, it is the money market that dominates the financial landscape. We learnt in earlier chapters that the bond market is very immature and there are only 2 private sector bonds. Most of the bonds are treasury bonds (T-bonds) where only a few banks, called

primary dealers, can trade these bonds. Therefore, it is money market in Bangladesh - supply and demand for money – that influences the interest rates more than the trading of bonds.

7.11 Velocity of money – The Classical view

The demand for money analysis made earlier in the chapter was due to Keynes. But before him, the classical economists put forwarded the quantity theory of money, particularly from the works of the American economist Irving Fisher. Fisher wanted to find the relationship between the total amount of money in the economy and the total value of goods and services produced in the economy. As this relationship shows the amount of money held for a given level of aggregate income, hence this is also a theory of the demand for money.

7.11.1 Fisher's equation

Using M to denote the money supply, P the aggregate price level and Y the total output in the economy, we have P×Y as the total expenditure on the final goods and services produced in the economy. P×Y is also hence the aggregate nominal income or the nominal GDP of the economy.

The demand for money in the economy is given by P×Y because the total amount of output multiplied by the price level is equal to the total amount of money spent in the economy. This must equal the demand for money. The bridge that links money supply M to the aggregate nominal income P×Y is the concept of *velocity of money* (V). The velocity is defined as the number of times one Taka is spent to buy goods and services in a year. That is, it shows how fast the money changes hands. Velocity is thus the rate of turnover of money.

The money supply M times the velocity V should equal the money demand.

Supply of money = Demand for money

$$\mathbf{M \times V = P \times Y}$$

The above expression is known as the *equation of exchange* and it shows that the quantity of money multiplied by the number of times the money is spent in a given year is equal to nominal income.

Rearranging the above,

$$\boldsymbol{V = \frac{P \times Y}{M}}$$

Velocity of money = Nominal GDP/Money stock

Thus the velocity of money is obtained by dividing the nominal GDP by the money supply. For example say that the nominal GDP of a country is Tk. 100 while the money supply is Tk. 10. Thus the velocity of money in this economy is 10 (=Tk. 100/Tk. 10).

7.11.2 The quantity theory

To arrive at the famous *quantity theory of money* from the equation of exchange, Fisher assumed that the velocity of money is constant in the short run. If V is assumed to be constant, then from the above equation we have that the nominal income is only determined by the quantity of money in the economy. For a given level of output Y, the price level in the economy will

only depend on the quantity of money (the money supply) if V is treated as a constant. For example if the money supply in the economy is suddenly doubled, then M×V doubles and hence so must P×Y, the nominal value of output. For a given level of output, this translates into the fact the price level must also double. This is the main outcome of the quantity theory: *The price level is proportional to the growth of money supply.*

As the quantity theory can tell us the amount of money demanded for a given level of aggregate income, this is in effect also a theory of money demand. To see this, we can rearrange the equation of exchange to get:

$$\boldsymbol{M = \frac{1}{V} \times PY}$$

As in equilibrium the quantity of money in the hands of people is equal to the quantity demanded, we can replace M by M^d (money demand). Using *k* to denote the constant 1/V, we can write:

$$\boldsymbol{M^d = k \times PY}$$

As $\boldsymbol{k}$ is a constant, the volume of transactions generated by a given level of nominal income PY determines the quantity of money demanded M^d in the economy. Hence the quantity theory tells us that the demand for money is solely a function of income. This is where Keynes departed in his theory of money demand by recognizing the fact that interest rate also affects money demand.

This is the monetarist view of the money demand as it sees money supply as the only factor that affects the price level. The classical economists viewed that during normal times the economy would be operating a full employment and hence output would be close to its long run level. Hence they could view the output as fixed and so this theory only holds in the long run.

CHAPTER 8
Monetary Policy

In the first chapter we introduced two broad questions around which the whole discipline of macroeconomics has evolved – one deals with the short run issue of economic fluctuation (business cycle) and the other is on long term economic growth. We also listed some policies that address these issues. This chapter introduces monetary policy which is the culmination of many concepts and building blocks we have developed in the last few chapters.

Monetary policy is an important device for the central bank of a country to maneuver the economy in the short run – to stimulate the economy when it is in slump or stagnation and cool it down when it is overheated. Monetary policy is all about the *art and science* of influencing the money supply, credit flow and interest rate in the economy in order to impact the level of price and output. It is also an *art* because conducting monetary policy is more than a mechanical drill with some numbers and algorithms; the experiences, judgment and craftsmanship of the policy makers play a vital role. There is no unique monetary policy framework which is suitable for all countries as it depends on objectives, the structure of the financial market and the economy in which it operates. It is also likely that an economy may experience different monetary policy frameworks over time as the domestic economy and international financial landscape change.

The potency of monetary policy – the extent to which changes in money supply can impact the real economy - is still one of the moot issues in macroeconomics. This is more debatable in the context of developing countries where the conducive environment required for monetary policy to be effective is primarily absent. What makes this chapter different from other text book is that it offers a comparative analysis of the tools and targets of monetary policy between the developed and developing countries and also an account on why it is difficult for the developing countries to mimic the developed countries in conducting monetary policy. This chapter will largely draw on the experiences of Bangladesh economy.

8.1 How monetary policy works

Policy Instruments ➔ intermediate targets ➔ macroeconomic goals

Like any other policy, monetary policy has also some specific macroeconomic goals. These goals may vary with the level of development of economies. The monetary authority or the central bank can't achieve the goals directly. It has to rely on a set of *policy instruments* and *intermediate targets.* Policy instruments are the banking variables over which the central bank has full control such as open market operation, repo and reverse repo, altering Cash Reserve Ratio, etc. Choice of the policy instruments depends on the state of the financial market and the economy. These policy variables are set to influence some intermediate targets such as inter-bank interest rate, money supply (M2), etc. The central bank remains vigilant about that the relationship between policy instruments and the intermediate target and hope that it will be stable so that central bank can fairly predict the change in intermediate target by changing

the policy instruments. Most of the developed countries such as USA use inter-bank interest rate (i.e. federal fund rate) as the intermediate target while most of the developing countries use monetary base as the intermediate target. Targeting inter-bank interest rate requires a well- functioning and competitive banking sector, which the developing countries tend to lack. We discuss these issues of instruments, targets and broad macroeconomic goals in reverse order primarily in the context of Bangladesh. Bangladesh Bank announces Monetary Policy Statement (MPS) in every six months. The examples of this chapter dwells on the MPS for January- June, 2015.

8.2 Goals of Monetary Policy

There are two major goals of monetary policy

1. Stabilization of price and output
2. Stabilization in the financial sector

The main objective of monetary policy is to contain inflation and stimulate output and employment growth. Achieving the goal of containing inflation has been found easier than impacting the output and employment in a developing country. Sometimes it is said about monetary policy that 'you could pull on it to stop inflation but you could not push on it to halt recession'. We can compare it with kite flying – we have more control over a kite when we pull the strings but less control when we loose the strings. It is important to keep in mind that supply-side shocks such as natural disaster, political instability, international price level, etc. contribute to the increase in price level more than the demand shocks (i.e., drop of public confidence) in developing countries. Monetary policy can only impact the demand side where demand comes from the consumers and investors. That is, monetary policy cannot play any role in combating inflation if the changes in price is due to supply shocks.

Impacting output and employment through the monetary policy requires that the channels that link between policy instruments and policy goals work perfectly and predictively. These channels are formally known as transmission mechanism. Unlike developed countries, transmission mechanism is very weak in the developing countries. Therefore, setting the monetary policy goals of impacting real economy can be very ambitious for developing countries. MPS states the following two goals on inflation and economic growth:

- Target for achieving 6.5% inflation by June 2015.
- Target of achieving real GDP growth of 6.5%-6.7% by June 2015.

Central bank as the regulatory body is also responsible to stabilize the financial market. The regulatory role in ensuring discipline in the market, especially in the banking sector is seen as one of the major tasks of the central bank in developing countries. Apart from regulatory, monitoring and supervisory role of the central bank, monetary policy, by using tools of monetary policy, can also have strong impact on the financial market to ensure stability and discipline.

8.3 Targets of Monetary Policy

Since instruments of monetary policy cannot pin down the ultimate macroeconomic goals, central bank requires some intermediate steps though which policy instruments exert impact

on the goals. Choice of effective targets depend on the efficacy of the instruments to impact the targets as well as the efficacy of the targets to impact the goals. By changing money supply, the central bank of the developed countries can reasonably hit the predetermined inter-bank interest rate (federal fund rate in USA).

Bangladesh Bank uses two types of targets – operational and intermediate target.

Operational target: High powered money (monetary base)
Operational target is the direct result of the policy action. For example, if the central bank injects money into the economy by purchasing government bonds (i.e., open market purchase), it can immediately impact the amount of monetary base. The operational target is within the control of the central bank. Can the Bangladesh Bank fully predict the growth of monetary base? Put differently, can it hit the target level of monetary base through open market operations? Let us look at the balance sheet of the central bank again.

Balance sheet of central bank	
Asset	**Liabilities**
Net foreign asset Net domestic asset	Currency (C) Reserve (R)

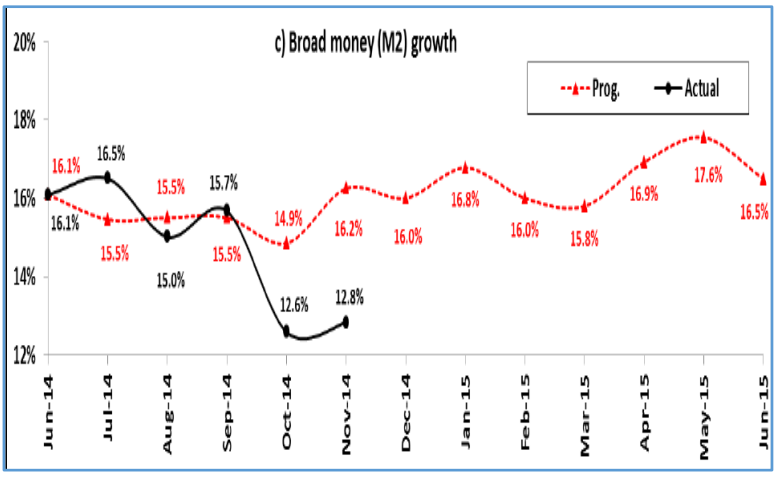
As we know, Monetary Base (H) = C + R

The sources of monetary base are the assets of the central bank - net foreign asset and net domestic asset. Net foreign asset includes the remittances and export earnings. These components are very volatile – the growth changes from year to year considerably. The other component of asset is the net domestic asset which is mostly central banks' loan to the government and commercial banks. This part also changes substantially over time. However, the central bank can minimize the fluctuations of monetary base due to external factors using some measures called 'sterilization'.

Intermediate target: Monetary aggregate (M2)
Intermediate target is the most crucial step to link the operational target with the macroeconomic goals. The Bangladesh Bank wants to impact growth and inflation in the short run by targeting a desired level of the growth of M2. Remember the relationship between monetary base (operational target) and the money supply (intermediate target) from chapter 7. They are linked by money multiplier and it depends on the behavior of banks (excess reserve), central bank (CRR) and depositors (currency holding).

Therefore, if the relationship between the operational target (reserve money) and the intermediate target (M2) is fairly stable, the central bank can reasonably target the monetary growth. But in practice, currency demand by the depositors and demand for excess reserve by the banks are very unstable. The following Figure taken from MPS shows how the growth of actual M2 deviates from the projection. It highlights the extent of difficulties the Bangladesh Bank faces in hitting the target level of growth of M2.

Fig 1: Broad Money (M2) growth – monthly (%)



8.4 Instruments of Monetary Policy

As discussed before, there is a wide range of policy instruments available to the central bank. The choice of instrument depends crucially on their effectiveness in impacting the intermediate targets. Here we will discuss the instruments Bangladesh Bank frequently uses.

8.4.1 CRR (Cash reserve ratio)

The fraction of deposits that the commercial banks are required to keep as reserves with the central bank and in their vaults as cash. Currently the CRR in our country is 6%. Let us again look at the balance sheet of a hypothetical bank:

Balance sheet of a hypothetical bank (CRR = 0.06)			
Asset		**Liability**	
Cash Reserve	Taka 6	Deposit	Taka 100
Loan	Taka 104	Capital	Taka 10
Total	**Taka 110**	**Total**	**Taka 110**

Suppose, there are only two assets of the bank – cash reserve and loan. For the sake of simplicity, also assume that there is no excess reserve – all loanable fund is loaned out. Total deposit is Taka 100 of which Taka 6 is the required reserve (CRR is 0.6) and Taka 104 is the loan. Now suppose, central bank raises CRR to 0.10. What will happen to intermediate target (M2)?

Balance sheet of a hypothetical bank (CRR = 0.10)			
Asset		**Liability**	
Cash Reserve	Taka 10	Deposit	Taka 100
Loan	Taka 100	Capital	Taka 10
Total	Taka 110	Total	Taka 110

In order to meet the higher cash reserve, the bank has to cut down its loan to Taka 100. As a result it slows down the deposit creation process by the banks. More formally, the size of the money multiplier will be smaller and it will lead to slower growth of M2.
CRR = 0.06 ➔ money multiplier = 1/0.06 = 16.66

CRR = 0.10 ➔ money multiplier = 1/0.10 = 10

Therefore, an increase in CRR is a contractionary policy which shrinks the growth of the money supply in the economy through lower money multiplier effect. Changing of CRR impacts the availability of loanable fund as we see before. Therefore, it can impact the flow of credit to the private sector and the real economy. So, we can write the possible channels of impact as follows:
CRR ↑ ➔ M2 ↓ ➔ liquidity available for credit ↓ ➔ private sector credit↓ ➔ investment ↓

CRR ↓ ➔ M2 ↓ ➔ liquidity available for credit ↑ ➔ private sector credit ↑➔ investment ↑

When the CRR is increased, banks have lesser funds that they can give out as credit and so both private sector credit and investment declines. The opposite is true when the CRR is decreased. Also think about when there is an excess liquidity in the banking sector which is very common in Bangladesh. Will the two channels described above still work?

In USA, CRR is hardly used because the objective of affecting interest rate can be more effectively done with other instruments such as open market operation. The objective of targeting the inter-bank interest rate (federal fund rate) can be done more accurately with open market purchase than changing CRR.

8.4.2 SLR (Statutory liquidity ratio)

It includes both CRR and 'near money' items such as bonds, treasury bills and gold among others. Besides the CRR, commercial banks are also required by the central bank to maintain a certain fraction of their deposits in the form of these items.

SLR is currently 19% of total deposits in our country. By changing the SLR, the central bank can also change the composition of asset, especially the credit flow of the banking sector in the country as we see in the case of CRR.

8.4.3 Open Market Operations

Open Market Operations (OMO) refer to the purchase and sale of government securities by the central bank from the commercial banks in order to control the supply of money in the economy. The term *open market* is in reference to the fact that the central bank conducts purchase and sale in an open and competitive market.

8.4.3.1 Open Market Purchase (Expansionary monetary policy)

When the central bank purchases government bonds from the banking sector (in exchange for money), it increases the reserve (liquidity) of the banks. That is, the monetary base (reserve money) increases. Through multiple credit expansion, it further increases the money supply in the economy.

Balance sheet of a hypothetical bank (CRR = 0.10)			
Asset		**Liability**	
Cash Reserve	Taka 10	Deposit	Taka 100

Loan	Taka 70		
Bond	Taka 20		
Total	Taka 100	Total	Taka 100

Balance sheet of the central bank			
Asset		**Liability**	
Foreign Asset (foreign reserve)	Taka 5	Reserve of banks	Taka 10
Domestic Asset (T-bond)	Taka 5		
Total	Taka 10	Total	Taka 10

Let's assume that there is no capital requirement for the bank. It will simplify our story. Total deposit (Taka 100) is distributed among Cash reserve (Taka 10), loan (Taka 70) and bond (Taka 20). The balance sheet of the central bank is in the lower panel. The source of reserve (Taka 10) is foreign asset (Taka 5) and domestic asset (Taka 5). Now suppose, the central bank purchases Taka 10 worth of bond from the bank and pays the bank with cash. Therefore, after this open market purchase, the balance sheet of the bank and the central bank will like the following:

Balance sheet of a hypothetical bank: after OMP			
Asset		**Liability**	
Cash reserve	Taka 10	Deposit	Taka 100
Excess reserve	Taka 10		
Loan	Taka 70		
Bond	Taka 10		
Total	Taka 100	Total	Taka 100

Balance sheet of the central bank: after OMP			
Asset		**Liability**	
Foreign Asset (foreign reserve)	Taka 5	Reserve of banks	Taka 20
Domestic Asset (T-bond)	Taka 15		
Total	Taka 20	Total	Taka 20

Now, the bank has given up Taka 10 worth of bond and get (excess) reserve of Taka 10 which will be showed up in the asset and liability side of the central bank. Note that all reserves of the bank are kept with the central bank. Thus the central bank has just created Taka 10 of high powered money (monetary base). As the bank has now more liquidity available to loan out, it will lend it to others who will deposit to their banks and total deposit will increase. This process continues and the amount of money the economy ends up depends on the size of the multiplier. We have already learnt this process in chapter 7. So, we see that targeting money supply, which is the total deposit of the banking system in our example, by changing monetary base is not a simple one. As we discussed before, it depends on numerous factors which are not in control of the central bank.

8.4.3.2 Open Market Sale (Contractionary monetary policy)

When the central bank sells government bonds to the banking sector, it draws down reserve and the monetary base. Therefore, money supply also decreases. The open market sale is just

the mirror image of open market purchase. The central bank also suffers from lack of adequate control over the money supply.

8.5 How does Bangladesh Bank set the target of reserve money and M2?[2]

In practice, Bangladesh Bank follows the following method in setting targets for the following six months in the Monetary Policy Statement (MPS).

a) Setting 'safe limit' of monetary expansion

By using simple quantity theory of money, which we have learnt in Chapter 7, Bangladesh Bank calculates an approximate figure of the monetary expansion. Let us take an example.

The quantity theory of money states that

$$MV = PY$$

$m + v = p + y$ [taking log in both sides and then first differentiating with respect to time]

Smaller caps are the percentage change of the large caps. It shows that the percentage change in money supply plus percentage change in velocity of money is equal to the inflation and growth rate of output. Let's assume:

$$p = 6.5\%, v = -1.5\%, y = 7\%.$$

The velocity of money (GDP/M2), as we have seen in chapter 7, is a downward slopping curve. Recent estimates shows that percentage decline of velocity of money is about 1.5%.
Therefore, we can calculate,

$$m = p + y - v$$
$$= 6.5\% + 7\% + 1.5\% = 15\%$$

It suggests that the growth of M2 should be to the tune of 15% if GDP grows at 7% and inflation is 6.5%.

b) Projection of M2 from the balance sheets of the central bank and commercial banks

In chapter 7, we have learnt about the 'monetary survey' - the consolidated balance sheets of the central bank and commercial banks which is an uniform reporting format of the aggregate banking variables (both commercial and central) across all countries, put forwarded by IMF. It distinguishes between domestic and foreign assets of the commercial banks and the central bank and add them up to get money supply (M2). Recall

$$NFA + NDA = M2$$
$$\text{Change in NFA} + \text{change in NDA} = \text{change in M2}$$

Projection of Balance of Payment, especially the forecast on the growth of remittance and net export for the next six months give a strong indication of the future growth path of NFA. NDA has two major parts – credit to the private sector and credit to the government. Projection on the demand for credit is made based on the current macroeconomic situation and future

[2] This part benefits from the presentation titled "Building Blocks of Monetary Policy in Bangladesh" by Dr. Akhtaruzzaman, Economic Advisor, Bangladesh Bank on April 7, 2015 at General Economics Division, Planning Commission, Government of Bangladesh

outlook. On the other hand, government's budget deficit and its likelihood of government borrowing from the banking sector helps estimate the possible changes in credit to the public sector. These two projections about private and public credit are used to calculate the target change of M2.

This target is analyzed against the 'safe target' derived from the quantity theory of money.

c) Projection of monetary base

As we know, the money supply is linked with monetary base through money multiplier, we can set the target level of the growth of monetary base (H).

$$M2 = \text{money multiplier} \times H$$

$$\Rightarrow \quad H = M2/\text{money multiplier}$$

How open market purchase and sales are conducted?

In order to understand how open market operation works, it is imperative to have a comprehensive knowledge on the market of the government securities.

Table: Primary Issue/Auction of 30-day BB Bill, 91-day, 182-day & 364-day T-Bills, and 2-yr, 5-yr, 10-yr, 15-yr and 20-yr Treasury Bonds

Issue date	Tenor and name	Bids Received			Bids Accepted						
		No of bids	Face value (Cr. Tk.)	Range of yields (%)	No of bids	Face value (Cr. Tk.)	Sale value (Cr. Tk.)	Range of yields (%)	Weighted average Price (taka)	Cut off yield (%)	Devolvement Yield (%)
19/02/2015	30-day BB Bill	4	273.0000	5.2500	4	273.0000	271.8269	5.2500	99.5703	5.2500	
23/02/2015	91 days T.Bill	31	1619.7400	7.35-8.00	7	600.0000	589.1919	7.35-7.37	98.1986	7.3700	
16/02/2015	182 days T.Bill	24	1107.2800	7.55-8.75	5	600.0000	578.0833	7.55-7.65	96.3472	7.6500	
23/02/2015	364 days T.Bill	33	1411.4500	7.92-9.00	14	500.0000	463.1815	7.92-8.05	92.6363	8.0500	
04/02/2015	2yr T.Bond	25	503.6800	8.40-9.00	8	278.9600		8.40-8.50		8.5000	
11/02/2015	5yr T.Bond	38	900.0300	9.45-10.00	18	500.0000		9.4800		9.4800	
18/02/2015	10yr T.Bond	32	873.3100	10.85-11.25	9	388.3900		10.8500		10.8500	
25/02/2015	15yr T.Bond	35	712.1900	11.40-11.70	6	150.0000		11.4000		11.4000	
25/02/2015	20yr T.Bond	39	625.8100	11.97-12.40	2	150.0000		11.97		11.9700	

Source: Bangladesh Bank website.

8.6 The market for government securities

Apart from the use of taxes to generate revenues, governments can issue securities that they sell to the public to raise funds for various purposes. Hence the securities are debt obligations of the govt. They are usually considered to be the safest of all tradable securities as the govt. is very unlikely to default on its loans; it can always increase taxes, issue new securities or even print more money to raise new funds.

The table above shows the issuance and auction of the various government securities by the Bangladesh Bank in the country. They are of different *tenors* (time to maturity) and hence have differing rates of *yield*.

The government/central bank securities traded in our country today is of the following three types:

- Bangladesh Bank (BB) bills,
- Treasury bills (T-Bills) and
- Treasury bonds (T-Bonds).

Before we get into further discussion on the issue and auction of bonds and bills, let us go through some definitions first.

Bangladesh Bank (BB) bills – These bills of the Bangladesh Bank generally have maturity of 30 days.

Treasury Bills (T-Bills) – These are the securities with maturity periods of less than a year and currently includes the 91, 182 and 364 days T-Bills.

Bangladesh Government Treasury Bonds BGTB (T-Bonds) – These securities have maturity periods of more than a year and currently consists of the 2, 5, 10, 15 and 20 years T-Bonds.

Next we discuss some terminologies related to the anatomy of government securities which will help us understand the auction in Table above.

Tenor – refers to the time that must elapse before a security becomes due for payment. Simply put, this is the maturity period of the security.

Range of yields – The range of yield rates for govt. securities that are bid in by the Primary Dealers in the auction.

Cut off yield – The yield above which submitted yields are rejected while those below are accepted in the auction process

Devolvement – Devolvement refers to fact that when a security is undersubscribed (i.e. there are fewer bids than the offered number of securities) during an offering, the underwriting entity has to purchase the unsold securities. Thus in this context devolvement entails the buying of the unsold securities offerings by the appointed Primary Dealers (PD).

Devolvement yield – The rate of yield obtained in the case of devolvement of the issued securities. Devolvement can be on the PDs or on the Bangladesh Bank.

8.6.1 How are the T-Bills and BGTBs issued?

Weekly (usually on Sunday) auctions of Treasury Bills are held following a pre-announced auction calendar with a specified amount. Bidders quote their prices. The Auction Committee determines the cut-off price from the offered prices.

Weekly (usually on Tuesday) auction of BGTB of a particular tenor is held following a pre-announced auction calendar with the specific amount. In case of new issue bidders quote their expected yields and in re-issue auction they have to quote price.

The auction process
The auction of the government securities can be either yield based or price based.

Yield Based Auction
This auction method is generally used when a new security is issued by the government. Investors (the PDs) bid in their yield terms and the bids are arranged in an ascending order. The cut-off yield is arrived at the yield corresponding to the notified amount of the auction. This cut-off yield is taken as the coupon rate for the security. Those bidders who have bid at or below the cut-off rate are the successful ones while the bids higher than the cut-off yield are rejected.

Price Based Auction
This method is used in the re-issue of existing government securities. Bidders quote in terms of price per face value of the securities. The bids are then arranged in a descending order and the bidders who have bid at or above the cut-off price are the successful ones while bids below the cut-off value are rejected.

The minimum bid amount in an auction is Tk. 1 lac (0.1 million) and its multiples. Apart from the PDs, individuals wishing to buy the securities have to do so through the PDs in auction and can also buy in the secondary market from any PDs/Banks/NBFIs. The securities cannot be cashed in before the date of maturity but the holders can sell them in the OTC or secondary market.

Now that we have reviewed the necessary terms and terminologies related to the issue and auction of the government securities, let us briefly look at a typical auction report. The information on auctions by the BB is given in the form of bids *received* and *accepted*. For example, in the auction of the 2yr T. Bond on 04/02/2015, we have the following information:

- A total of 25 bids were received for this security with a face value of *Tk. 503.68* crore and the offered yields were in the range of 8.4-9.0%.
- From these bids, a total of 8 were accepted by the auction committee with a face value of *Tk. 278.9600 crore* and within the yield range of 8.4-8.5%, implying that the cut-off yield was set at 8.5% for this particular security in the auction.

This is how the yield rate of the securities is determined by the market through auctions by the PDs. For BB Bills and T-Bills, the sale price is less than the face value of the bills as the bills are sold at discount. In the situation that the securities have to be devolved by the Bangladesh Bank, the devolvement yield is set at the rate of the cut-off yield for the security.

8.6.2 Repo (Repurchase Agreement) and Reverse Repo

These are the instruments used by the central bank for short term liquidity management in the banking sector.

Repo is a type of short-term borrowing for dealers in government securities. Repo involves the following: One of the parties involved in the transaction sells the security to the other party with the promise that he will buy it back at a certain date in the future. The buyback price of the securities will be higher than the selling price and this constitutes the interest earned in making the loan. This is the *repo rate*. The use of securities in the process can be viewed as collateral for the loan made. For the party that sells the security and agrees to buy it back in the future, it is a repo. For the party at the other end of the deal that buys the security and agrees to sell it back at a future date, it is a reverse repurchase agreement or *reverse repo.*

Generally repo and reverse repo are defined from commercial banks' point of view.

Repo and reverse repo form part of the liquidity adjustment facility provided by the central bank in the economy. In case of repo, the commercial banks sell government securities to the central bank, usually on an overnight basis, and buys them back, generally, on the following day. Its 'tenor' however varies from 1-7 days. Banks can borrow for short term from the central bank to avoid default on CRR using repo. The rate that the central bank charges the commercial banks on these short term borrowings is the repo rate.

The opposite occurs in case of reverse repo. In a reverse repo transaction, commercial banks purchase government securities form BB and lend money to the central bank, thus earning interest on the loans made, which is the reverse repo rate. Central banks mop up the excess liquidity of the banking sector using reverse repo.

Ideally by using repo and reserve repo, the central bank can target inter-bank interest rate. Repo injects money to the banking system and thus put a downward pressure on the interest rate. On the other hand, reverse repo mops up liquidity from the banking system and puts upward pressure on the interest rates. These two forces are skillfully used with to pin point the inter-bank interest rate. But in a developing country like Bangladesh, where interest rate is not targeted, repo and reverse repo are largely used for short term liquidity management in the banking sector.

Repo and reverse repo rate are use, as discussed, to influence the liquidity in the banking sector. Repo rate is the rate at which the central bank of a country lends money to commercial banks in the event of any shortfall of funds. Repo rate is the discount rate at which banks borrow from BB. Reduction in repo rate will help banks to get money at a cheaper rate, while increase in repo rate will make bank borrowings from BB more expensive. If BB wants to make it more expensive for the banks to borrow money, it increases the repo rate (a contractionary

policy). Similarly, if it wants to make it cheaper for banks to borrow money, it reduces the repo rate (an expansionary policy).

The table below presents information on the Repo and Reverse Repo auctions held by the Bangladesh Bank.

Table 2: Repo with Bangladesh Bank

Auction date	Tenor	Bids received			Bids accepted		
		Total bids	Amount (cr Taka)	Range of rate (%)	Total bids	Amount (Cr. Taka)	Cut-off rate (%)
31/07/2014	3	1	50	10.2500	1	30	10.25
	Total	1	50		1	30	
27/07/2014	4	1	50	10.2500	1	30	10.25
	Total	1	50		1	30	

Table 3: Reverse Repo with Bangladesh Bank

Auction date	Tenor	Bids received			Bids accepted		
		Total bids	Amount (cr Taka)	Range of rate (%)	Total bids	Amount (Cr. Taka)	Cut-off rate (%)
24/02/2015	1	5	907	5.2500	5	907	5.2500
	Total	5	907		5	907	
23/02/2015	1	5	1018	5.2500	5	1018	5.2500
	Total	5	1018		5	1018	

8.6.2.1 Why repo rate is higher than reverse repo rate?

Think about the opposite! Banks are borrowing from the central bank (repo rate) at a lower rate and lending it back to the central bank (reverse repo rate) at a higher rate!! It simply does not make sense - there would be *arbitrage opportunities* for the commercial banks allowing them to earn a free income. Hence this cannot be true but the opposite holds as the banks will have no incentives to do so (pay higher interest rate on loans from the central bank than they make on their deposits with the central bank).

Generally repo rate is 100 *basis points* higher than the reverse repo rate. Basis point is a unit of measurement used for interest rates and other percentages in finance. It is equal to 1/100 of 1% or 0.01 and is used to denote the percentage change in a financial instrument. Thus a 1% change is equal to 100 basis points and 1 basis point is equal to 0.01.

8.6.2.2 Reverse Repo vs. CRR: which one to use to mop up excess liquidity?

Given that both the Cash Reserve Requirement (CRR) and the reverse repo can be used to mop up the excess liquidity (i.e. supply of money) with the banking sector, the question arises as to which one of the instruments is better suited for the job.

- Increase in CRR does not involve paying interest to the banks for parking their money with the central bank.
- In case of reverse repo, banks get paid for the money lent to the central bank.

Why then the central bank uses reverse repo instead of increasing CRR?

Inter-bank repo

There are in general money market instruments for short term liquidity management used by the players in the money market. The interbank lending market is the market where banks extend loans to one another for a specified term and the interest rate charged on the loans is the interbank rate. Most of these loans are of maturities of one week or less, the majority being overnight. Therefore there are also inter-bank repo and reverse repo rates for the trading of funds between banks.

The central bank requires the commercial banks to hold adequate amounts of liquid assets such as cash in order to manage the potential withdrawals by clients. When the banks can't meet the liquidity requirements, they will need to borrow money from the interbank market to make up for the shortfall. On the other hand, there will be some banks with reserves in excess of the required amount which they can lend out to the banks in need of money and earn an interest in the process. This interest rate is the *interbank rate*.

The following table presents the information on interbank repo agreements between banks in the country. For example, on 01/02/2016, the number of repo transaction was 19 with a total value of 2200.6916 crore Taka. The range of tenors for the repos was 1-7 days and the interest rate ranged from 2.25% to 4.50%, with the weighted average rate of 2.86%.

Table 4: Inter-Bank Repo

Auction date	Volume		Repo Tenor	Interest rates	
	No. of transactions	Total amount (Cr Taka)	Range of tenor in days	Interest rate (%)	Weighted average rate (%)
01/02/2016	19	2200.6916	1-7	2.25-4.50	2.8600
31/01/2016	15	1507.5534	1-7	2.25-4.00	2.8600
28/01/2016	18	1867.0402	1-7	2.25-4.00	2.9300

Source: Bangladesh Bank

If liquidity is available at 2.87% from other banks, why a bank would want to borrow from the central bank at higher interest rate? It would not. That is why, we don't see any recent repo auction and quite a few reverse repo auctions.

8.7 Transmission Mechanism of Monetary policy

It is well accepted that although monetary policy may lose its effectiveness over the long run, in the short run it has the ability to influence the real economy. We have also learnt about some channels through which monetary policy impacts the real economy. The set of all plausible channels that work for an economy constitute the transmission mechanism for that economy. However, in developing countries the transmission mechanism is not as strong as in the developing countries. In fact, in most of the cases, the channels do not work well in the absence of well- functioning financial market. Highly developed and competitive financial market is required to transmit the effect of any policy change by the central bank into other markets such as markets of reserves (interbank money market) and market for loanable funds

of banks, secondary markets of short term and long term government securities, foreign exchange market and other asset markets such as real estate. Changes in the conditions of these markets result in the changes in *aggregate demand* of the economy to affect the real economy.

First, we will learn how the transmission mechanisms work in the context of developed countries. This will serve as the ideal case or the benchmark against which we will discuss these issues for a developing country like Bangladesh.

The figure below traces the path how open market operation in developed countries can impact different interest rates, giving rise to the different channels of transmission mechanism. Let us assume that the central bank conducts open market purchase and injects liquidity into the banking system. With more liquidity available in the market for inter-bank trade, it puts downward pressure on the inter-bank interest rate. This thing happens only when there is a high degree of competition in the market for reserve – banks competing with each other for reserve. What about the market for reserve in Bangladesh? How competitive is it? In most of the time, with huge idle excess liquidity, there is hardly any competition among banks for extra liquidity. As the inter-bank interest rate goes down, the competitiveness in the credit market also pushes down the lending rate. That is, if one bank does not lower lending rate, other banks would do and grab the market since money is now available at cheaper rate in the inter-bank market. This is known as the **credit channel** of the transmission mechanism. Note that the credit channel of a developing country may be different from that of a developed one. Instead of working through lowering lending rate, the channel may work through making greater availability of credit for business. The central bank can make credit available in larger quantity and at cheaper rate through open market purchase and lowering CRR.

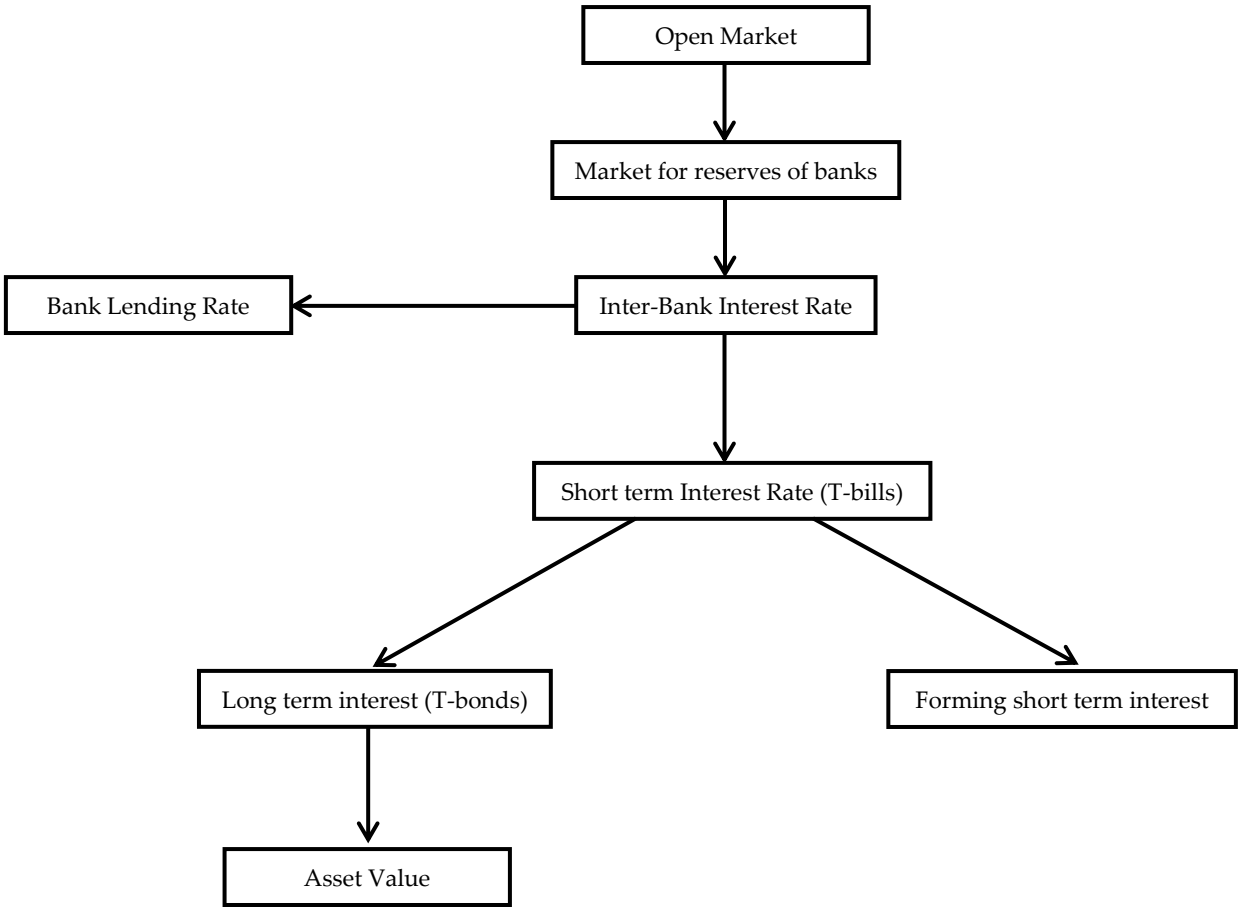
Let's go back to our original query of transmission mechanism of developed countries. Lower inter-bank interest rate also pushes down other short term interest rate such as T-bills. Suppose in the short run, say one month, banks have two options for investment – T-bills and short term lending to other banks. If the inter-bank lending rate goes down, banks will be more willing to buy T-bills. As a result demand for T-bills will rise and so does price. This leads to a decrease in yield (interest) of T-bills too. This is the **interest rate channel (short term)** of the monetary transmission mechanism.

This lower short term interest rate also exerts downward pressure on the long term interest rate such as T-bonds, long term business loans, etc. We know that long term interest rates are generally higher than the short term interest rates and they are highly correlated. While short term interest rate affects mostly household behavior, long term interest rate impacts investment decision of the firms. This is the **long term interest rate channel** of the transmission mechanism. Long term interest rates are generally used as the discount factors to estimate the future stream of income from an asset of long maturity such as real estates. Therefore, prices of such assets depend on the long term asset. This is the **asset channel** of the transmission mechanism.

Lower domestic interest rate of short term government securities also impacts foreign short term interest rates under perfect capital mobility and flexible exchange rate. As the short term interest rate gets lower, capital flows from domestic to foreign countries. That is, people will

buy foreign government securities which gives higher interest rate than the domestic one. This will also increase the demand for foreign currency and will lead to exchange rate depreciation for the domestic country. It will boost exports and impact the real economy. This is the **exchange rate channel** of the transmission mechanism.

Figure 2: Transmission mechanism of open market purchase



Box 1: Stanley Fischer, Vice Chairman of Board of Governors of the Federal Reserve System on monetary policy of the developing countries

Crockett Governors' Roundtable 2015 for African Central Bankers, University of Oxford, Oxford, United Kingdom
June 30, 2015

".....(International Monetary) Fund approach to monetary policy….emphasized money targets. But this approach has become less tenable as economies have evolved and matured. As you know, the effectiveness of such a framework depends, among other things, on the stability of the money demand function and on the structural relationship between monetary aggregates and macroeconomic variables. These relationships tend to shift as the financial system develops, making money targeting frameworks less effective--as we know from the historical experience of monetary policies in advanced economies.
For this reason, advanced economies abandoned them, and some emerging market economies followed suit, generally, in favor of inflation targeting frameworks, with short-term interest rates as the main instruments and the use of open market operations to control the liquidity in the economy. However the conditions necessary

for full-blown inflation targeting achieved through adjustment of policy interest rates may not be present in some of these economies…"
In the advanced economies and some emerging market economies, financial systems are relatively well developed, deep, and diversified, which facilitates the conduct of monetary policy through open market operations. In many of the developing countries, however, although financial systems are developing rapidly, they remain small and not well diversified, hindering the ability of central banks to conduct open market operations. Indeed, in many countries, interbank markets are still underdeveloped, and, even though some central banks use policy rates, changes to these policy rates have only limited effect on other interest rates and on the economy more generally. Thus, the ambitions of developing countries to modernize their monetary policy frameworks have to proceed in parallel with further efforts to develop the market institutions necessary to conduct monetary policy in a conventional way.

8.8 Monetary Policy Statement (MPS) of Bangladesh Bank

Bangladesh Bank announces MPS twice a year – in January and July.

8.8.1 Why announcing the MPS in advance?

People's expectation about the future movement of the key macroeconomic variables has strong bearing on their actual movement. Future expectation not only influences the future outcome, but also the current situation. Therefore, the way the expectation about future is formed is critical for the policy makers who want predictable outcomes. The policy makers, especially the central bankers, intend to influence the formation of expectation of the people by supplying information on central bank's operations and future targets of various monetary variables. The communication strategy of the central bank must have the following two ingredients: i) Transparency, and ii) Credibility.

MPS of BB is done in a very transparent way. The issues on the credibility of the commitment of the central bank require further discussion. Do the people believe that Bangladesh Bank would be able to meet the targets they set in MPS? Do the people believe that Bangladesh Bank really can influence the inflation and other monetary variables such as private sector credit in such a way that it can impact the real economy? If not, what are the implications of it on the economy? These are the issues we need to discuss while evaluating the MPS.

8.8.2 Content of MPS

It has broadly two parts:

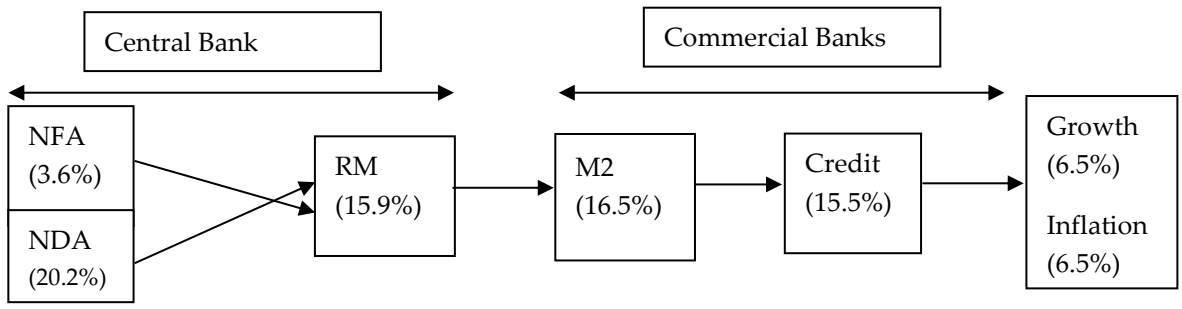
1. **Assessment of the current economic situation**

This part sets the tone of the monetary policy stance by elaborating the current macroeconomic situation. This part is very crucial because policy response depends on the right assessment of the economy. This is all about right diagnosis and finding out symptoms, if any.

2. **Targets for the six months (**January- June, 2015)

CPI Inflation: 6.5%
Growth of Real GDP: 6.5%-6.8%
Reserve money growth: 15.9%
Broad money (M2) growth: 16.5%

Private sector credit: 15.5%
Net foreign asset: 3.6%
Net domestic asset: 20.2%



The above diagram sums up the underlying transmission mechanism of monetary policy for the six months of the BB. Note that the central have some control over net foreign asset, domestic asset and the reserved money (RM). The following two variables of the transmission mechanism are the banking variables which are determined outside the control of the central bank, by complex interactions of supply of and demand for money and credit. In this case, the transmission mechanism relies on the credit channel - the increase of availability of credit through monetary expansion.

8.8.3 How to critically review MPS?

One can address the following questions for critically reviewing the MPS

1. Is the assessment of the current situation right?
2. Is the MPS the right response to current situation? What type of monetary policy- Contractionary or accommodative- is right?
3. How consistent is the monetary program? What is the rationale for choosing the target values?
4. How plausible is the transmission mechanism?

Wrong assessment may lead to wrong policy. Therefore, it is essential to have a comprehensive analysis of the current situation and the potential factors contributing it. Sometimes the government wants to paint a rosy picture of the macroeconomic affairs for political mileage and this may boomerang the economy if policy is crafted based on politically motivated analysis and rhetoric.

Analysis of current situation and future outlook helps policy maker choose the right policy. It is important to keep in mind that monetary policy can only impact the demand side of the economy. Therefore, the first diagnosis should be whether the observed change (e.g., increase in inflation) is a demand side problem or a supply side problem. If it is a supply side problem, monetary policy can't do anything. If it is a demand side problem, the challenge is how to stimulate the demand.

It is also important to understand the extent to which all the targets set for the variables in the monetary program/transmission are consistent. To what extent monetary policy can influence reserve money, given the fluctuations in remittance and export income? How effective are the

tools for sterilization? How stable is the relationship between reserve money and broad money? How stable is the money multiplier? Do we know the elasticity of increasing money supply with respect to broad money? To what extent central bank can influence the growth of credit to the private sector? How stable is the relationship between money and credit?

8.9 Some issues in monetary policy

a) Rules vs. discretion

This is one of the major debates concerning the implementation of monetary policy by the central bank of the country. Should the central bank follow a specific *rule* of money growth or interest rate (Tylor's rule for US economy)? Or, follow a *discretionary* pattern of policy that best responds to the current situation? (The *Taylor rule* is a monetary policy rule that shows how much the central bank should change the nominal interest rate in response to changes in inflation, output or other economic conditions.)

'Monetarist rule': Milton Friedman advocated for steady growth of money consistent with low inflation. Monetarists argued that the central bank should not fine tune the economy. But the major critic of such rule is that the central bank should respond to critical situations that may endanger the wellbeing of the economy if left to its own devices.

b) Time Inconsistency problem

Central bank may deviate from its commitment – what is optimal for the central bank today may not be optimal tomorrow. Thus it gives an incentive for the central bank to renege on its commitment and create the effect of a '*surprise*' in the short run. Thus when a discretionary central bank promises not to allow the inflation rate to rise above a preannounced rate, the fact that an inflation 'surprise' can help to boost employment and output in the short run may tempt the central bank into breaking its commitments. When the agents in the economy realize this, they will expect to see higher inflation in the future. This will result in a scenario of higher inflation with no real impact on the level of employment or output. If the central bank follows a rule based policy, then the time inconsistency problem can be avoided.

c) Long-run neutrality of money

It is widely accepted in the field of monetary economics that in the long run a change in the quantity of money in the economy will bring about a change in the general price level. But it will not impact the permanent changes in real variables such as real output or unemployment. Thus increasing the money supply will only lead to higher price levels but bring about no change in real output or employment.

d) Inflation – a monetary phenomenon

In the long run a central bank can only contribute to raising the growth potential of the economy by maintaining an environment of stable prices. It cannot enhance economic growth by expanding the money supply or keeping short-term interest rates at a level inconsistent with price stability. It can only influence the general level of prices. That is, inflation is a monetary phenomenon in the long run. Therefore it is important to remember what monetary policy can and cannot do:

- It cannot raise level of economic growth for more than a short time.

- It cannot lower unemployment below certain level ('natural rate') for more than a short time.
- But it can give us low rates of inflation!

e) Monetary policy and Labor market (Sticky Wage vs. Sticky Price)

In the context of economics, 'sticky' is used to define financial variables that are *resistant to change*. Thus when we say 'sticky price', this refers to the resistance of price to change in spite of changes in economic conditions such as costs if inputs and demand patterns that suggest that a different price is optimal for the situation. In the case of prices, the stickiness can also be one direction – 'sticky up' or 'sticky down'. When prices are sticky up, they can move up easily but will only move down with huge effort.

Wages are usually viewed as sticky down i.e. they are easy to increase but will not come down easily. This is part of an economic theory on unemployment that says that during high rates of unemployment, the wages of the workers that remain in employment will tend to stay the same or grow at a slower rate than before rather than falling down with the reduced labor demand (as would be normally expected). Unemployment thus is attributed to the inability of the wage to adjust itself to the existing labor demand conditions. (We will examine this and other theories of unemployment in greater detail in chapters later on)

With sticky wages, we have the following chain of transmission in the economy when there is an increase in the money supply:

The increased supply of money leads to rising price levels in the economy. The higher price means that the firms earn higher profits given that the wage rate has not adjusted in the short run. Given fixed nominal wages, the real wage of the workers has fallen and hence firms find it profitable to employ more workers. Thus with rising employment, the output of the firms and the economy also increases.

Expansionary monetary policy ➔ Price increases at a higher rate than wage (sticky wage) ➔ Real wage drops ➔ firms get incentives to employ more and hence produce more➔ Real impact on economy as output rises

Suggested readings for the advanced students and instructors

Friedman, Milton, 1968, "The Role of Monetary Policy", American Economic Review, Vol 58 (1)

Mishra, P., P. Monteil and A. Spillimbergo, 2010. "The Monetary Transmission in Low Income Countries", IMF Working Paper 10223.

Fischer, Stanley, 2015, Monetary Policy in the United States and in Developing Countries (http://www.federalreserve.gov/newsevents/speech/fischer20150630a.pdf)

The Deutsche Bundesbank, 2009. Monetary Policy over Fifty Years: Experiences and Lessons, Routledge

CHAPTER 9

Fiscal policy: Government Expenditure, Taxation and Deficit Financing

The government in a developing country plays an instrumental role in steering the economy to a higher growth path while taking care of the people who cannot take part in the growth process through redistributive measures (e.g., transfer, subsidy, etc.). Therefore, assisting the economy to achieve equitable growth through efficient domestic *resource mobilization* (tax and non-tax revenue), *spending* (budget) and financing the resource gap (*deficit financing*) is the most important task of the government. All these three actions are collectively termed as Fiscal Policy. The importance of the government in providing *public goods* and creating enabling environment for the private sector to grow has not been diminished over time.

In developing countries, fiscal tools are considered as a part of long run growth and redistribution strategies and therefore, critical elements for creating a prosperous and just society. The role of fiscal policy is much broader in developing countries than the developed ones where size of the government and its role are very limited. In the developed countries, the primary role of fiscal policy is to manage short run fluctuations of the economy. In the short run fiscal policy aims at smoothening out the short run fluctuations which have direct negative impact on the welfare of the citizen. That is, government spends more in the time of economic slump (fiscal stimulus) and cuts back its spending in the time of economic boom when the economy is heated in order to slow down the economy (and rein in inflation). Hence government spending exhibits *counter-cyclical* movement.

Can a developing country like Bangladesh maneuver the economy in the short run using fiscal tools? Problem is that we do not know anything about the short run fluctuations of the economic activities because of lack of high frequency data of GDP and its major components. Fiscal policy is argued to be more important in developing countries than the monetary policy as the former has strong implications on economic growth, poverty and distribution while the monetary policy is largely ineffective in influencing real economy in the long run. We have learned in previous chapters that transmission mechanism of monetary policy hardly works in the developing countries where financial markets are less developed.

9.1 Fiscal Policy

Fiscal Policy is the means by which a government adjusts its level of spending and tax rates to influence the economy and the welfare of the country. The government achieves so by adjusting its collection of revenues (tax and non-tax) and its expenditure on goods and services for the public. The roots of Fiscal Policy (FP) are founded on the works of the famous economist John Maynard Keynes, according to which, by increasing or decreasing revenue and expenditure levels, the government can influence the employment and output of the economy. By doing so it influences the *aggregate demand* and the level of activity in the economy. We will learn about the Keynesian fiscal policy and aggregate demand in Chapter 10 and 11. The use of Fiscal Policies as a tool of steering the economy in the right direction

gained prominence in the after math of the Great depression of the 1930s. Prior to that, the US economy had a very hands-off approach when it came to the setting of economic policies but this experience taught them that the govt. should have a larger role in the economy. It came again after the financial crisis in 2007 when the government of USA bailed out a number of large private financial institutions.

9.2 Tools of Fiscal Policy

The two main tools of Fiscal Policy are changes in the level and composition of **Taxes** (**T**) and **Expenditure** i.e. **Govt. spending** (**G**).

Taxation is a powerful instrument of FP in the hands of public authorities which can greatly effect changes in disposable income, consumption and investment in addition to generating revenues for the government. Taxes not only influence the amount of money that the government has available to spend on different economic sectors but also the amount of money that the individuals in the economy have to spend after paying taxes i.e. disposable income. Thus taxes determine both the level of public and private demand in the economy. For example, if the govt. wants to boost private consumptions, it can decrease the tax rates and thereby increase the amount of money in the hands of people. If individuals spend this extra money on goods and services, then the overall demand will rise and the economy will be boosted. Taxes can also be used to alter the consumption pattern of certain goods like tobacco and liquor – by imposing a high tax on such items, the govt. can reduce their consumption. Besides taxes, there are other non-tax sources of govt. revenue like fees and user charges.

Government spending is the other tool for the implementation of FP. By adjusting the level and choosing the sectors for the expenditure, the government can influence both the level of demand in the economy as well as the distribution of income of the individuals. Similar to the effect of tax cuts, if the govt. increases its spending, individuals receiving the money will increase their consumption and hence boost aggregate demand in the economy. This also allows the government to drive money towards certain sectors that need an economic boost. It allows for the provision of services like defense that benefit everyone in the country (a *public good*), build infrastructure which propels economic growth while subsidies in areas like research and development ensures that the growth is sustainable. Public expenditure also helps in maintaining a minimum standard of living for the residents of the country.

Government spending can be in the form of:

- **Current Spending** – which include expenditure on *essential goods and services* such as health, education, defense etc.
- **Capital Spending** – which consist of public investment in *infrastructure* such as roads, hospitals, schools etc.
- **Transfer Payments** – which are the redistribution of income from taxpayers to those requiring support, for example, unemployment or old age benefits. It also includes interest payments on government debt.

Box -1: The Keynesian view on Fiscal Policy: A heads-up

Suppose in a closed economy, where there is no trade with other countries, the demand for goods and services come from the consumers (C), businessmen (I) and government (G).

Therefore, we can write:

$$AD = C + I + G$$

where, AD is aggregate income, C is private consumption, I is private investment and G is govt. spending. Note that the consumption demand (C) and investment demand (I) depend on the level of tax (T) both consumers and investors have to pay.

The main assumption of Keynesian fiscal policy is that the resources of the economy is under-employed. That is the economy has unused capacity to produce more output. There are idle factors of production such as labor and capital in the economy. In such situation, the government can expand consumption and investment demand by spending more (G) or cutting taxing (T) of the consumers and investors. Thus if either G is increased or T is decreased, the resulting effect would be an increase in the value of aggregate demand. As the demand increases, producers will respond and increase their production. And this is possible since there is idle labor and capital in the economy. Stimulating economy through demand side stimulation is the core idea of Keynesian fiscal policy. Keynesian theory suggesting increased govt. expenditure and reduced taxes during periods of recession may result in high budgetary deficit. In theory, the resulting deficits built up in the periods of recession (from higher expenditure) and would be paid for by the surpluses made during periods of economic boom.

Budget Deficit/Surplus and Deficit Financing

Having looked at the different stances that Fiscal Policy can take, we next turn to the difference between the level of govt. expenditures and revenue earnings. If expenditures were to exceed the level of revenues, i.e. **G –T > 0**; then the govt. would run a *budget deficit* or alternatively if **G – T <0**; it would be a *budget surplus*. For the case of developing countries in which the govt. has to play a bigger role in the economy, budget deficits are more likely to arise. So for these economies, the financing of this deficit is another important part of overall fiscal management. The deficit can be financed through different sources which are categorized under the following:

- Borrowing from the banking system of the country
- Borrowing from the Central Bank
- Borrowing from Non-Bank public which include sale of govt. treasury bonds and bills as well as savings certificates sold to the public
- Economic assistance (grants and loans) from the Development Partners such as IMF and World Bank

9.3 The Fiscal Sector of Bangladesh

This section presents an overview of the fiscal sector of the economy of Bangladesh. The section is divided in the following manner: Section I presents the sources and trends in Revenue Earnings, Section II looks at the pattern of Public Expenditure while Section III sheds light on the financing of the budget deficit.

9.3.1 Revenue Earnings

Taxation is the primary source for the mobilization of revenue in our country. The rest of the revenue is collected from non-tax sources like fees, charges, tolls, etc.

9.3.1.1 Taxation

Taxes are one of the major sources of public revenue to meet a country's revenue and development expenditures. A tax (from the Latin *taxo*) is a *financial charge* or other *levy* imposed upon a taxpayer (an individual or legal entity) by a state (or the functional equivalent of a state) to fund various public expenditures.

From the viewpoint of economics, a tax is a non-penal, yet compulsory *transfer of resources* from the private to the public sector which is levied on the basis of some *predetermined* criteria but is without reference to the specific *benefits received*. Failure to pay taxes, evading payment or even resistance to taxation is usually punishable by law. Throughout history, taxes have been paid either in money or in its labor equivalent although in later periods the latter practice has been abolished.

9.3.1.2 Purpose of Taxes

The primary purpose of taxes is to raise revenue to fund government's spending. Resources collected through taxation have been used by states throughout history to carry out many functions. Tax revenues are used to fund public expenditures on infrastructure (roads, public transportation, legal systems, education, and health care systems), utilities (electricity, water, sewerage etc.), armed forces, scientific research and development, public works and finally, the operation of the government itself.

As we learnt before, when govt. expenditures exceed tax revenue, the government accumulates debt. A portion of taxes may be used to *service past debts*. Govt. also use taxes to fund welfare services for the public like old age benefits, pensions, unemployment benefits and social safety net programs like Food For Work. Taxes can also be used to modify patterns of consumption or employment within an economy, by making some classes of transactions more or less attractive compared to others.

Governments usually use different kinds and rates of taxes. This is done to distribute the *tax burden* among individuals or groups of the population involved in taxable activities, such as business in order to ensure equity in the society. Historically, the nobility were supported by taxes from the poor and working class whereas in modern times, the govt. supports the poor, elderly or the retired from the tax receipts collected from those are still working.

9.3.1.3 Types of Taxes

Taxes can be categorized according to the items that they are levied on. These include taxes on income, property tax, and taxes on goods and services which are further classified into different types. The major types of taxes which are used generally are described below.

Taxes on Income

a) **Income Tax** – tax which is levied by a govt. directly on financial income generated by all entities including individuals and businesses within its jurisdiction. Generally the tax is imposed on net profits from business, net gains, and other income. Usually a *progressive* income tax system (in which a higher income earner pays a higher tax rate compared to lower income earners) is employed.
b) **Corporate Tax** – a type of income tax that is imposed on the income, capital, net worth or other types of taxes that are imposed on corporations. The taxes are against profits earned by businesses during a given taxable period; they are generally applied to companies' operating earnings, after expenses have been deducted from revenues.

Property Tax

A property tax (or millage tax) is an *ad valorem tax* levied on the value of property (e.g., land, real estate, etc.) that the owner of the property is required to pay to the government. Property taxes are usually charged on a recurrent basis (e.g., yearly).

Taxes on Goods and Services

a) **Sales Tax** – a tax that is imposed by the govt. on the sale of goods and services. The tax is levied at the *point of sale*, collected by the seller of the item and then passed on to the government. Retail sales taxes are only charged to the end user of a good or service.
b) **Value Added Tax** (VAT) - A value added tax (VAT), also known as Goods and Services Tax (G.S.T), Single Business Tax, or Turnover Tax in some countries, applies the equivalent of a sales tax to every operation that creates value. Thus this tax is imposed only on the amount of *valued added* created at each level of transaction involved in the production of the final goods and services.

The following example illustrates the mechanism of VAT collection. Suppose that a baker purchases flour for his bakery. He will have to pay VAT on the purchase price of the flour, remitting the tax amount to the govt. The baker will then use the flour to make and sell breads at a higher price to the bread wholesaler. The baker will collect the VAT on the higher sale price but *only remit VAT on the portion of his own 'value addition'* (the price of the bread over the cost of flour). The wholesaler will in turn sell the bread to the retailer and charge VAT on the entire sale price but only remit VAT on the portion of wholesale markup (i.e. selling price minus purchase price), which is his value addition. The last VAT amount will be paid by the *final consumer* of the bread who cannot recover any of the previously paid amounts of VAT.

VAT is usually administrated by requiring the company to complete a VAT return, giving details of VAT it has been charged (referred to as *input tax*) and VAT it has charged to others (referred to as *output tax*). The *difference between output tax and input tax* is payable amount of VAT.

a) **Excises** - An excise duty is an *indirect tax* imposed upon goods during the process of their manufacture, production or distribution, and is usually proportionate to their quantity or value. Thus this is basically a tax on articles produced or manufactured in a country.
b) **Tariff** – also called Customs Duty is a type of tax on the import and export of goods by a country. An import or export tariff is a charge for the movement of goods through

a political border. Hence tariffs have the ability to discourage and impede free trade and they may be used by governments to protect domestic industries.

9.3.1.4 Descriptive labels used for Taxes

Having looked at the different types of taxes, we next look at some of the descriptive labels that are applied to the taxes.

Direct and Indirect Taxes

Taxes can be primarily classified into *Direct* and *Indirect Taxes*. For example, *Income tax* is "direct", while *sales tax* or *VAT* is "indirect". Direct taxes are based on simple *existence* or *ownership* while indirect taxes are imposed on *events, rights, privileges, and activities*. Thus for example, a tax on the sale of property would be considered an indirect tax, whereas the tax on simply owning the property itself would be a direct tax.

Ad Valorem and Specific Tax

An Ad Valorem tax is one where the *tax base* is the value of a good, service, or property. Sales taxes, tariffs, property taxes, and value added taxes (VAT) are different types of ad valorem tax. An ad valorem tax is typically imposed at the time of a transaction (sales tax or value added tax (VAT)) but it may be imposed on an annual basis (property tax).

Consumption tax - Consumption tax refers to any tax on non-investment spending, and can be implemented by means of a sales tax or consumer value added tax. The *tax base* for the implementation of such a tax is the money spent on consumption and the tax is usually of *indirect* type.

Proportional, Progressive, Regressive and Lump-Sum taxes

An important feature of tax systems is the percentage of the tax burden as it relates to income or consumption. The terms progressive, regressive, and proportional are used to describe the way the rate progresses from low to high, from high to low, or proportionally.

- A **progressive tax** is a tax imposed so that the effective tax rate increases as the amount to which the rate is applied increases.
- The opposite of a progressive tax is a **regressive tax**, where the effective tax rate decreases as the amount to which the rate is applied increases.
- In between is a **proportional tax**, where the effective tax rate is fixed, while the amount to which the rate is applied increases.
- A **lump-sum** tax is a tax that is a fixed amount, no matter the change in circumstance of the taxed entity. This in actuality is a regressive tax as those with lower income must use higher percentage of their income than those with higher income and therefore the effect of the tax reduces as a function of income.

Box 2 - Some terminologies related to taxation

- **Tax Base** – refers to the assessed value of a set of *assets, investments or income streams* that is subject to taxation, or the assessed value of a single asset that is subject to taxation. Thus anything on which a tax can be imposed has to have a tax base.

  The tax base may refer to that of an individual asset, such as the tax base of a house, or a pool of assets, such as the tax base of all houses in a city. Thus for example, the property tax base of a house is its value while the property tax base of a city is the collective value of all taxable real estate in the city.

- **Tax Burden** or **Tax Incidence** – refers to the division of the 'burden of tax payment' between *buyers* and *sellers*. The *incidence* is said to "fall" upon the group that ultimately bears the burden of, or ultimately has to pay, the tax. It does not depend on the point of tax collection but rather is related to the *price elasticity of supply and demand*. Elasticity refers to the percentage change in the quantity demanded (or supplied) of goods and services when their prices change by one percentage point. When *supply is more elastic than demand*, the tax incidence will fall on the buyers while if demand is more elastic than supply, the producers will bear the burden of the tax.

9.4 The Tax system in Bangladesh

Bangladesh inherited a system of taxation from its past British and Pakistani rulers. The system, however, developed on the basis of generally accepted canons and there had been efforts towards rationalizing the tax administration for optimizing revenue collection, reducing tax evasion and preventing revenue leakage through system loss.

Total taxes in Bangladesh are divided into direct and indirect taxes. Direct taxes in Bangladesh consist of taxes on income (income tax, corporation tax, agricultural income tax) and taxes on property (wealth tax, gift tax, estate duty, capital gains tax, urban property tax, house rent, land revenue, registration and non-judicial stamp).
The National Board of Revenue (NBR) is the apex tax authority of Bangladesh and in 2014-15 it collected around 96% of total taxes or 82% of total public revenues. The NBR portion of total taxes includes: customs duty, value added tax (VAT), supplementary duty (SD), excise duty, income tax, foreign travel tax, electricity duty, wealth tax (collected as a surcharge of income tax since fiscal year 1999-2000), turnover tax (TT), air ticket tax, advertisement tax, gift tax and miscellaneous insignificant taxes.

Other taxes (amounting to around 4% of total taxes or 3.7% of total revenues) are often referred to as 'non-NBR portion' of tax revenues. These taxes include:

- *narcotics duty* (collected by the Department of Narcotics Control, Ministry of Home Affairs),
- *land revenue* (administered by the Ministry of Land and collected at local Tahsil offices numbered on average, one in every two Union Parishads),
- *non-judicial stamp* (collected under the Ministry of Finance),
- *registration fee* (collected by the Registration Directorate of the Ministry of Law, Justice and Parliamentary Affairs) and
- *Motor vehicle tax* (collected under the Ministry of Communication).

Taxes imposed are usually in *progressive* rates and maximum collection is done *at source* under *withholding tax system* – a system that involves government requirement for the payer of an item of income to withhold or deduct tax from the payment, and pay that tax to the government (govt. use withholding tax as a means to combat tax evasion). In Bangladesh withholding taxes are usually termed as *tax deduction* and collected at source.

9.4.1 Income Tax

The Income tax system of Bangladesh follows a progressive rate of taxation. Hence the income tax is based on the ability of the taxpayer to pay. For this purpose, "The more a taxpayer earns the more s/he should pay"- is the basic principle of charging income tax. This system aims at ensuring equity and social justice. In Bangladesh, income tax for government employees is deemed paid by the employer i.e. by the Government.

Sources of Income subjected to tax payment

For the purpose of calculation of income and charging taxes, the various sources of incomes are classified under the following 7 categories:

- Salaries
- Interest on securities
- Income from house property
- Income from agriculture
- Income from business or profession
- Capital gains
- Income from other sources

Income Tax Slabs

The tables below presents the various tax slabs for the purpose of calculating income tax payments. For taxpayers *other than* female taxpayers, senior taxpayers of 65 years and above, retarded taxpayers and gazette war-wounded freedom fighter, income tax is payable according to the following tax slabs:

Range of Income (Tk.)	Tax Rate
First 2,20,000	Nil
Next 3,00,000	10%
Next 4,00,000	15%
Next 5,00,000	20%
30,00,000	25%
Rest Amount	30%

For *female taxpayers, senior taxpayers of age 65 years and above*, income tax payable according to the following slabs:

Range of Income (Tk.)	Tax Rate
First 2,75,000	Nil
Next 3,00,000	10%
Next 4,00,000	15%
Next 5,00,000	20%
30,00,000	25%
Rest Amount	30%

Threshold Incomes for paying tax

These income thresholds for the payment of Income Tax apply in the case of the following taxpayers:

Type of Taxpayer	Income Limit
Retarded Taxpayers	Tk. 3, 50,000
Gazette war wounded freedom fighters	Tk. 4, 00,000

Minimum Income Tax payable

The following is the minimum amount of income tax payable by the taxpayers living in different locations.

Type of Taxpayer	Minimum Tax payable
Individual living in City Corporation	Tk. 3000
Individual living in District headquarters	Tk. 2000
Individual living in any Other area	Tk. 1000
Non-resident Individual (other than NRB)	30%

Income Tax rate for Companies

The table below presents the various rates of taxation applicable in the case of the following businesses.

Type of Company	Tax Rate
Publicly Traded Company	27.5%
Non-Publicly Traded Company	35%
Bank, Insurance & Financial Company (Except merchant bank)	42.5%
Merchant bank	37.5%
Cigarette manufacturing company	45%
Publicly traded cigarette company	40%
Mobile Phone Operator Company	45%
Publicly traded mobile operator company	40%
Publicly traded company – more than 30% cash dividend	24.75%
Publicly traded company – less than 10% cash dividend	35%

Source: NBR

9.4.2 VAT

The VAT was introduced in Bangladesh in 1991 to replace Sales Tax. Over time, share of VAT in total tax revenue has increased steadily. The invoice method of VAT is applied in the case of manufacturers and the destination principle is used – exports are zero taxed while imports and domestic goods are subject to VAT. The tax is levied on *consumer goods* only leaving out *capital goods*. The tax base for VAT is the difference between the value of outputs and the value on which input tax has been paid. There are certain goods and services exempted from the payment of VAT and they mainly comprise of raw agricultural products and food stuffs and services like medical, education and transportation.

VAT Rates

The standard rate for VAT in the country is 15% but other than the standard rate, there are some truncated value (less than the standard rate) based preferential rates applicable on some services. At present the following preferential rates are applicable by Statutory Rules and Order - 1.5%, 2%, 3%, 4%, 4.5%, 5%, 5.5%, 6%, and 9%.

9.4.3 Supplementary Duty

Supplementary duty is a type of excise tax that is imposed by the tax regime in the country. This duty was imposed primarily to discourage the import of luxury goods and the consumption of socially undesirable goods such as tobacco and alcohol. It is also applied to a range of food items, building materials, cosmetics clothing, motor vehicles and durable household items.

The basic rate of Supplementary duty is 20% although in some cases it can go up to 350% with the lowest rate being 5%. This duty is imposed in addition to VAT and is included along with the cost of the goods when calculating VAT.

9.5 Revenue-GDP Ratio

The revenue to GDP ratio of a country is an indicator of the performance of revenue collection in the economy. The higher the ratio, the greater will be the income of the government from revenues relative to the size of income of the whole economy in a year i.e. the size of GDP. The figure below shows the trend in the ratios of Total Revenues to GDP (Rev-GDP), Tax revenues to GDP (Tax-GDP) and Non-Tax revenues to GDP (NonTax-GDP) over the period of 1973 to 2008. For each of the period under review, the average values of the respective ratios are used.

Over this period, the total revenue to GDP ratio has experienced positive growth along with the Tax-GDP ratio. This is not very surprising as Tax revenues made up the lion's share, accounting for almost 80% of total national revenue. The rest came from the Non-Tax sources and stayed almost constant within the range of 1.7 to 2.2 percent of GDP over the period. On the other hand, the revenue-GDP ratio grew throughout the period with the exception of 2001-05 when it fell slightly. Overall it grew by more 3 percentage points from 7.5% during 1973-80 to 10.8% during 2006-08.

9.6 Tax-GDP ratio

The Tax-GDP ratio is one of the recognized criteria for judging the fiscal health of a country. Tax and GDP are related through the macroeconomic nexus: the higher the GDP, the higher the income of the economy and the more taxes will its citizens be able to pay. Although over time, this ratio has improved for Bangladesh it is still very low compared to the levels in other countries. As mentioned earlier the Tax-GDP ratio followed similar trend to that of revenue-GDP ratio. It increased by 2.8 percentage points over the period from 5.8% during 1973-80 to 8.6% during 2006-08. The following diagram presents us with the more recent trend of revenue collection. From Fig 1 It can be seen that the positive trend in revenue mobilization has continued over the 2006-15 period with the ratio slightly declining in FY15 due to adverse political condition that affected revenue collection.

Fig 1: Total revenue collection (% of GDP) [GDP Base year 05-06]

Source: Various issues of Budget in Brief, Finance Division.

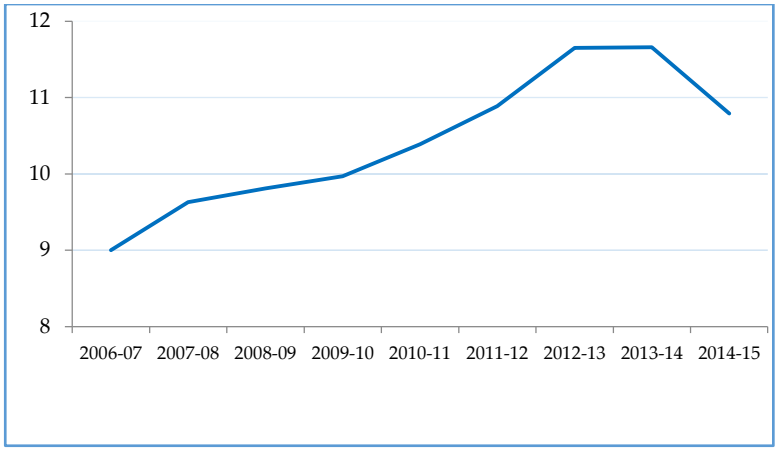
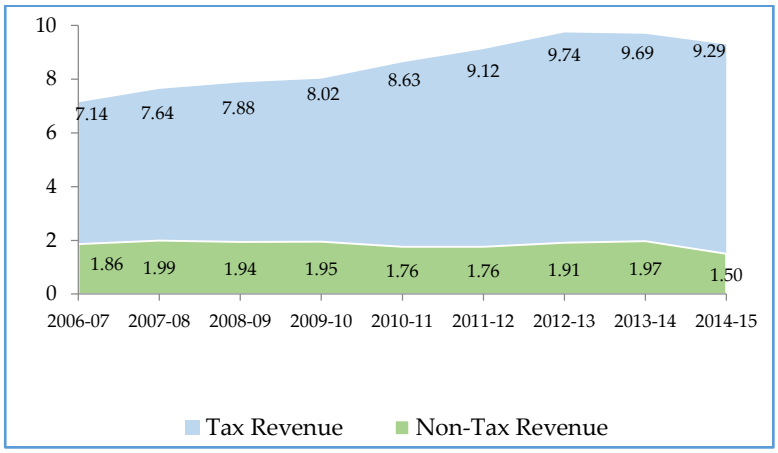


Figure 2 shows us the composition of tax and non-tax revenues collected over the same period. Tax revenue increased steadily from FY07 to FY13 but declined very slightly in the next years. On the other hand No-Tax revenue has remained below 2% of GDP along with displaying slight fluctuations.

Fig 2: Tax and Non-Tax Revenue (% of GDP)

Source: Various issues of Budget in Brief, Finance Division.



9.7 Tax Revenue

Table: Item-wise Revenue collection from different Tax sources (Crore Taka)

Item of Revenue Collection	2005-06	2007-08	2009-10	2011-12	2013-14	2014-15
Indirect Tax						
Import Duty	7825	9619	8997	13154	13576	15350
Export Duty	0	0	0	39	42	41
Excise Duty	161	214	347	660	822	960
VAT (Local & Import)	12358	17656	24468	35777	44543	49981
Supplementary Duty (Local & Import)	6229	7754	10796	16292	17983	21011
Turn Over Tax	6	5	5	3	5	5
Total Indirect Tax	**26580**	**35247**	**44614**	**65925**	**76971**	**87347**
Direct Tax						
Income Tax	7162	11595	17042	28262	43207	48525
Other taxes and duties	261	447	386	415	641	868
Total Direct Tax	**7423**	**12042**	**17428**	**28677**	**43849**	**49393**
Total Taxes	**34002**	**47289**	**62042**	**94602**	**120820**	**136740**

Source: National Board of Revenue (NBR)

The table above presents information on the collection of tax revenues by the Government from major sources. Tax revenue has been primarily divided into *Indirect* and *Direct tax* based on the source of collection. Both direct and indirect taxes are found to have increased over time which has resulted in growing tax revenue for the government.

In FY15, total taxes collected were in the tune of Tk. 136740 crore while it was only Tk. 34002 crore in FY06 (a fourfold increase over a span of 10 years). In case of Indirect taxes, VAT is the leading source of income for the govt. followed by Supplementary Duty while Income Taxes made up the lion's share of Direct taxes.

9.7.1 Direct and Indirect Taxes

Next we look at the change in the composition of the collected taxes between Direct and Indirect tax. The diagram below plots the share of Direct Taxes collected over the period of 1973 to 2015. It can be seen that the share of Direct taxes have enjoyed sustained increase throughout the entirety of the period, up from an average of 13.4% for the period of 1973-80 to an average of 33.4% of total collected taxes for 2011-15 period. Therefore the share of Indirect Taxes has declined equally for the period of time. This marks the clear trend of shift in tax composition: while Indirect taxes have declined in share, its place has been taken up by taxes from direct sources. But despite the increasing share of Direct taxes, Indirect Taxes still account for the majority of tax revenues. In 2014-15, around 64% of the tax revenue came from Indirect tax sources. The pie-chart in Fig 4 illustrates this point.

Fig 3: Share of Direct Tax in total taxes (average for period) (%)

Source: National Board of Revenue (NBR)

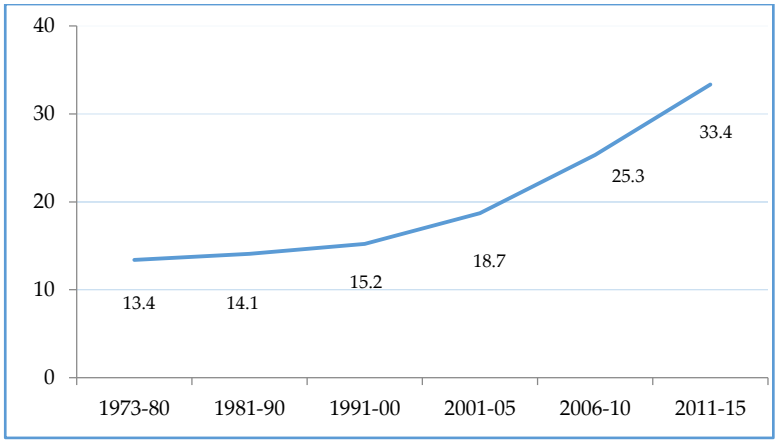
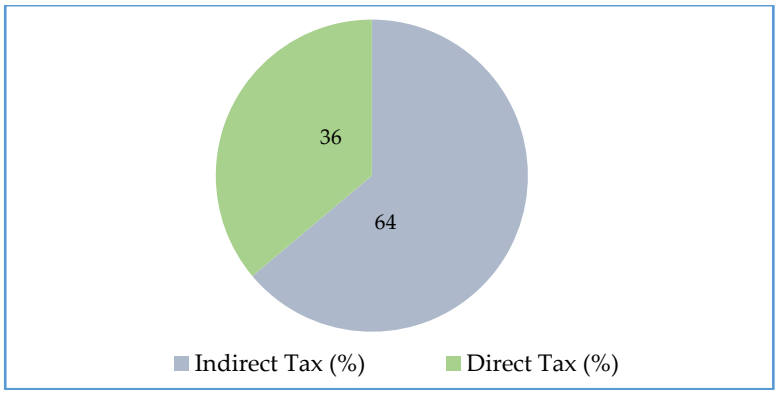


Fig 4: Share of Direct and Indirect Taxes – FY15

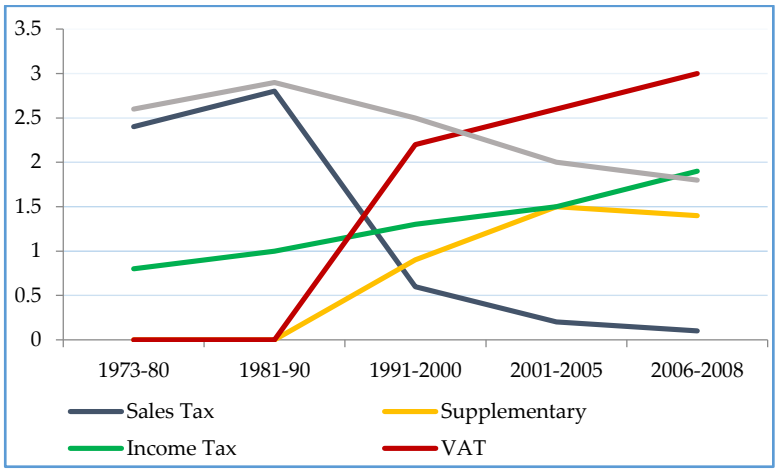
Source: National Board of Revenue (NBR)



9.7.2 Tax regime in BD: Evolution over time

Fig 5: Trends in Tax items as % of GDP (average for periods)

Source: National Board of Revenue (NBR)



The diagram above captures the changes in the composition of taxes among the different items over the period of 1973-2008. Though the figure is little outdated, several salient observations can be made:

- The openness of trade regime and reduction in tariffs has resulted in the steady decline of ***Customs Duty*** over time from 2.6% during 73-80 to 1.8% of GDP in 2006-08.
- In 1991, VAT was introduced to largely replace Sales Tax with the resulting decline in Sales Tax over the years and with VAT taking up its place. In 2006-08, VAT stood at 3% of GDP, the highest earner of govt. revenues while Sales Tax had reduced to a mere 0.1%.
- ***Supplementary Tax***, also introduced in 1991, saw its share increase from 0.9% to an average of around 1.4% during 2006-08.
- ***Income Tax*** has been on a path of steady improvement, coming up from 0.8% in 73-80 to 1.9% in 2006-08.

From these observations we can conclude that the tax structure, and hence the overall revenue structure of the country, has undergone through a structural shift over the years. While Sales Tax has been replaced by VAT and Customs Duty was reduced, Supplementary and Income Taxes have increased with the most growth enjoyed by VAT.

9.7.3 Tax Composition – Recent Trends

Next we look at the different composition of tax items and how their shares have changed during the recent years. The diagram below presents the major components of tax and their shares in total.

Over the span of last 10 years, it can be seen that *VAT (Local & Import)* has occupied the largest proportion with its share remaining fairly constant in the range of 36-39%. On the other hand, the share of *Income Tax* was only 21% in FY06 but it stood at 35% by FY15. In FY15 Income Tax as a single category generated the highest revenue but the bulk amount of VAT (local and import together) saw the largest share. Thus the share of Income Tax is now almost head to head with that of VAT, which was by far the highest earner in previous years.

As Income tax makes up the major portion of Direct taxes, this has resulted in the upward trend in direct tax collection. Both *Supplementary Duty* and *Import Duty* have seen their shares reduced over time, with Import Duty experiencing rapid decline. Its share in FY15 was only 11%, down from 23% in FY06. With the fraction of VAT remaining more or less constant in recent times, the declining shares of Supplementary and Import Duty has been picked up by the rising portion of Income taxes.

Fig 2 below presents a pie chart of the composition of tax revenues from different sources for FY15.

Fig 6: Change in the composition of major tax items

Source: NBR

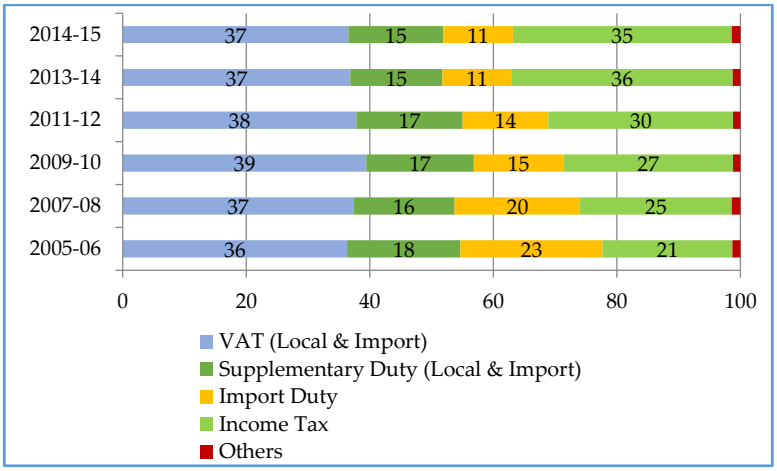
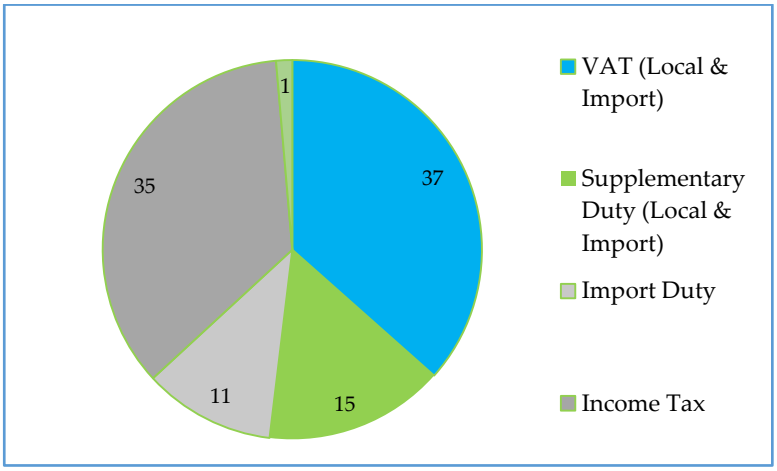


Fig 7: Share of major Tax items - FY15

Source: NBR

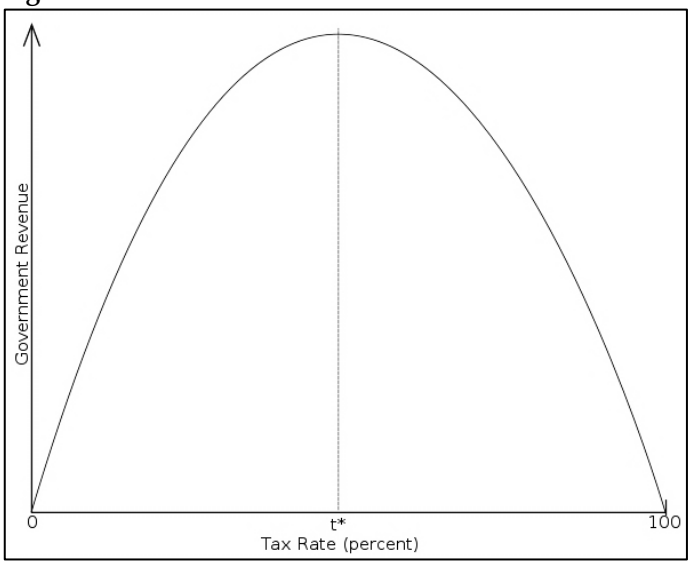


Box 3 – Laffer curve

The Laffer curve shows the relationship between the rate of taxation set by the government and the resulting level of revenue generation. The curve is named after the American economist Arthur Laffer. The Laffer puts forward the idea that no tax revenue will be collected at the extreme tax rates of 0% and 100% and that there exists at least one rate of tax which maximizes tax revenue.

In its most typical representation, the curve is drawn as one which starts at zero revenues with a zero rate of taxation, increases with higher rate of tax to reach a maximum but beyond which further increase in tax rate leads to declining revenues. The curve reaches the zero revenue mark again when 100% taxes are imposed. The diagram below shows the shape of the curve based on these assumptions.

Fig: The Laffer curve



Starting from a zero rate of taxation which leads to zero revenue collection, total tax revenue can be increased by increasing the tax rate. Revenues will continue to increase with higher taxes but after a certain tax rate, further increases in tax will lead to a decline in the amount of tax revenue generated. Thus the shape of the tax rate-revenue curve will be *inverted U-shaped* with a maximum at an intermediate point (t^* on the diagram) which is the revenue maximizing rate. Thus from the shape of the curve, it can be implied that increasing revenues beyond a certain point will be counterproductive from the viewpoint of increasing tax revenues.

The following is an intuitive explanation for the shape of the curve. According to Laffer, there are two interacting effects that determine the overall effect of tax rate on revenue. The first is the simple 'arithmetic effect' and the second is an 'economic effect'. The arithmetic effect assumes that revenue from taxation is given by simply multiplying the tax rate by the amount of revenue available for taxation i.e. the tax base. Thus at a rate of 0% taxes, the resulting revenue would be zero. The economic effect assumes that the tax rate will have an impact on the tax base itself – as the tax rate increases, the tax base will shrink. This is due to the fact that as the tax rate increases, the taxpayers will be discouraged to work harder (and earn more) as a larger portion of their earnings has to be paid in taxes. At the extreme rate of 100%, theoretically the govt. will be able to collect zero revenues because the taxpayers will change their behavior in response to the tax rate: either they will lose all the incentive to work (and earn) or they will seek out methods of avoiding paying taxes.

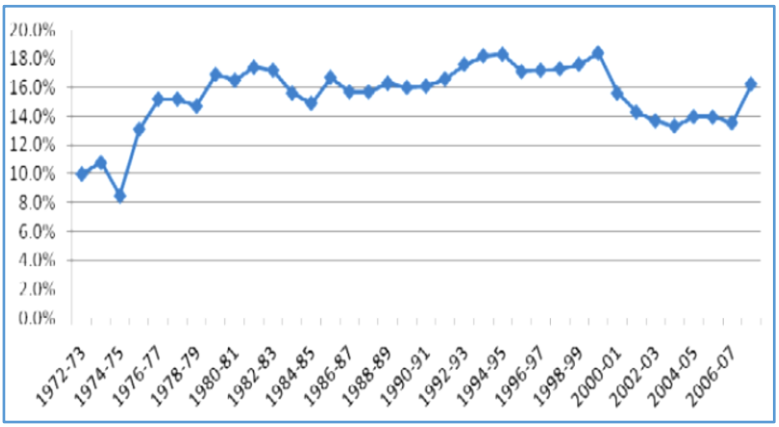
9.8 Public Expenditure

Having looked at the sources of revenue generation for the government, we now turn to its flipside: Government Expenditures. As mentioned earlier, public expenditure plays a crucial role in the economic wellbeing of the country and is a very important tool in the hands of public planners. In conjunction with taxes, public expenditures can be used to steer the

economy in the right direction when the situation calls for. For example, a stagnating economy can be reinvigorated by increasing the volume of govt. expenditure.

We begin our review with a look at the trend in Public expenditure over time. The figure below shows how public expenditure as percentage of GDP has changed over the years.

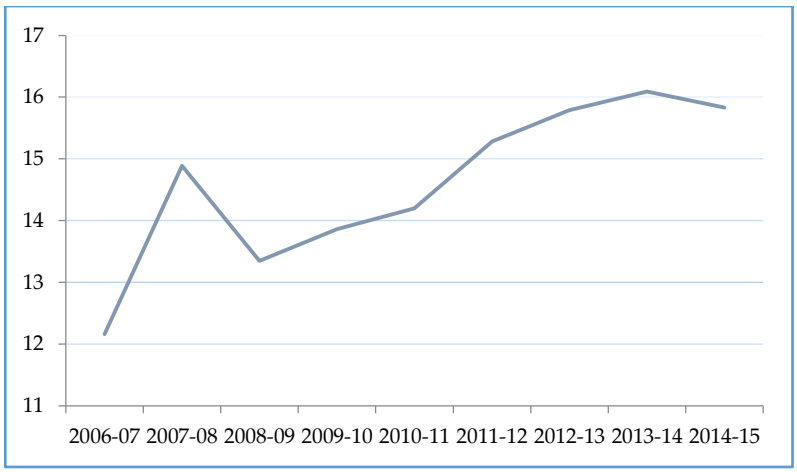
Fig 8: Trends in Public Expenditure (% of GDP)



The trend in total public expenditure of the country since its independence in 1971 has generally been positive. The expenditure to GDP ratio was around 10% in 1972-73 and experienced continued increase from 1975-76 onwards to grow at a steady pace until 1999-00 when it reached its maximum value of 18.4%. The growth in expenditures during the 90s was higher compared to the 80s. During the post-war periods, public expenditures supported rehabilitation of the country while it helped with sustaining economic growth in the latter periods. The ratio stared to decline from the years following 1999-00 and fell continuously to reach its lowest value of around 13% in 2003-04. However, by 2006-07 total public expenditure was back on its upward track.

Fig 9: Recent trends in Public Expenditure (% of GDP)

Note: GDP base year: 2005-06; Source: Finance Division, ERD.



The figure above shows the more recent scenario of public expenditure. A large hike can be observed in the expenditure-GDP ratio in 2007-08 (from around 12% to 15%) as the Government followed an expansionary fiscal policy to offset the adverse effects of the global economic crisis and to tackle the rising prices of fuel, fertilizers and food in international markets. The ratio came down in the next year and but has been on an increasing trend in the recent years, around 16% in FY15.

9.8.1 Development and Non-Development Expenditure

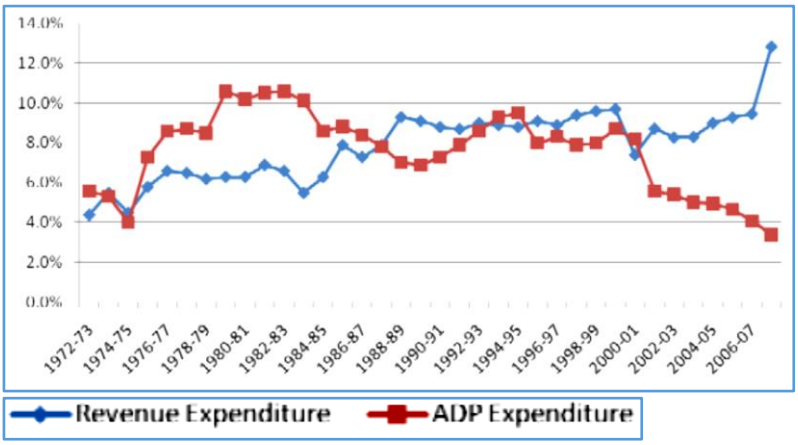
Next we turn to the composition of the public expenditure between its primary classification of:

1. **Annual Development Program** (ADP) - which comprises of the development expenditure of the government which is the investment part of government expenditure.
2. **Revenue Expenditure** – also known as Non-Development Expenditure which is the consumption part of government expenditure.

The figure below presents the long term trends in the patterns of ADP and revenue expenditure. Over the FY76 to FY87 period, ADP expenditure as percentage of GDP was higher than the share of revenue expenditure. But since then, the share of ADP expenditure has declined while revenue expenditures have increased with the result that ADP shares have trailed behind revenues for the major part of the period.

Beginning in 2001-02, the difference began to widen further due to both increases in revenue expenditure and falling ADP expenditure. By 2007-08, share of ADP had fallen to around 3.5% while revenues had climbed to above 12%. The increase in revenue expenditure since the early 90s can be attributed to increases in interest payments, pay and allowances and extended coverage of social safety net programs among other heads of public expenditure. Higher allocation for the maintenance of infrastructure and equipment, transfer of manpower into revenue setup after the completion of a large number of development projects were behind the higher rate of increase in pay and allowances, goods and services and acquisition of assets. Increased domestic borrowing by the government has also led to increased interest payments on domestic loans.

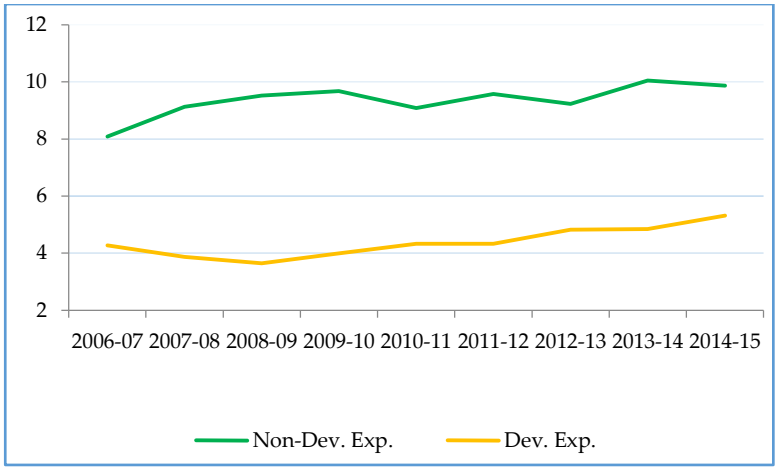
Fig 10: Trend of ADP and Revenue Expenditure (% of GDP)



The diagram below shows the recent trend in development and Non-development components of public expenditure. While development expenditure largely comprises of the ADP, it also includes some expenditures on Non-ADP. It can be seen that the trend in the expenditure components has continued in recent years with the share of revenue expenditure exceeding that of development expenditure. Development expenditure has hovered around 5% of GDP while revenue expenditure was closer to 10%.

Fig 11: Development and Non-Development Expenditure (% of GDP)

Source: Budget in Brief, Finance Division, M/O Finance.



9.8.2 Public Investment: Annual Development Program (ADP)

The Annual Development Programme or ADP is an organized list of projects in various sectors and allocation for them for a year out of a five-year plan period for implementing the development policies and programs of the government. The ADP for a certain year is prepared based on the year's development budget approved by the parliament.

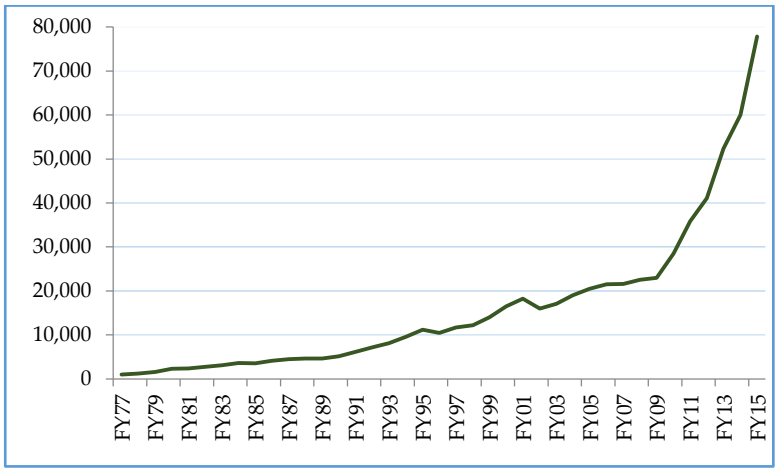
Trends in ADP allocation and utilization

The figure below presents the trend in ADP allocation in the country from FY77 onwards. The allocation for ADP was Tk. 1006 crore in FY77 while it stood at Tk. 77836 crore in FY15. It can be observed that the budgetary allocation for the implementation of ADP has experienced more or less constant growth over the years till the late 2010s, when it saw a markedly higher growth rate.

Fig 12: Trend in ADP allocation

Source: Bangladesh Economic Review

In Crore Taka



But just looking at the allocation figures will not give us the whole story on the state of ADP implementation. Therefore, we also need to look at the pattern of ADP expenditure over the years. The following diagram presents yearly ADP expenditure expressed as a percentage of total ADP allocation over the same time period.

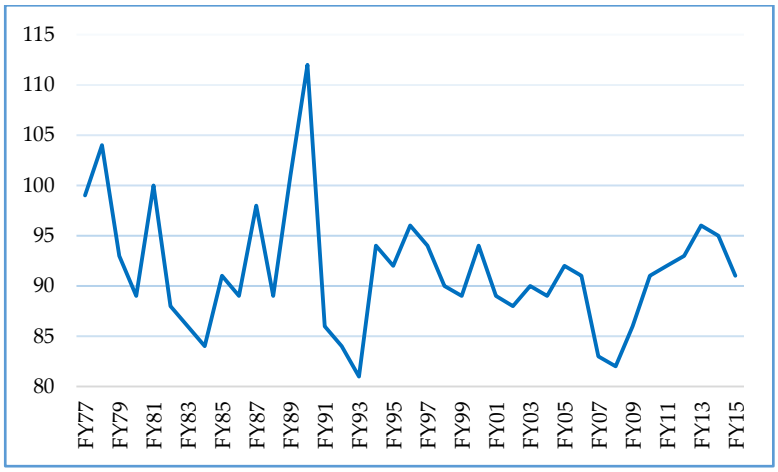
Over the span of 39 years, ADP implementation as a fraction of the allocation has generally stayed in the range of 85-95%. On only a few occasions have the implementation rate been

close to the full level of 100% (FY90 was an unusual year which saw 112% expenditure over the allocated amount). Thus although ADP allocation has been increasing, full utilization of the resources over the years is hard to achieve.

On an average, the ratio of ADP expenditure to allocation has been about 91% during the period and hence actual implementation lagged behind the budgeted allocation. The expenditure to allocation ratio showed greater volatility prior to the 90s, after which it became more stable. Although it dipped to 82% in FY08, it recovered to above 90% in recent years.

Fig 13: ADP Expenditure (% of ADP allocation)

Source: Bangladesh Economic Review



Project Aid in ADP

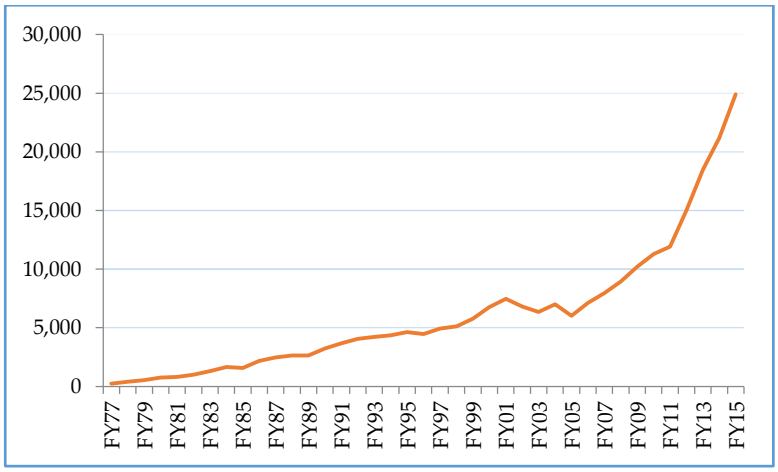
Project Aid (PA) refers to the external resources, both in terms of grants and loans, which are used for the financing of various projects in the country. Project Aid plays a crucial role in the implementation of ADP as a large number of the various projects financed through PA is part of the ADP. PA is also used to finance commodity imports that are related to the projects and hence this component of commodity import is excluded from *Commodity Aid*. Thus ADP allocation and expenditure discussion also includes information on Project Aid.

The figure below shows the trend in Project Aid allocation.

Fig 14: Trends in Project Aid Allocation

Source: Bangladesh Economic Review

In Crore Taka



During this period, PA Allocation followed a growth path similar to that of overall ADP Allocation. Up to the early 2000s, the growth in PA allocation was relatively constant but experienced slight fluctuations during the first half of the 2000s. From FY05 onwards, aid

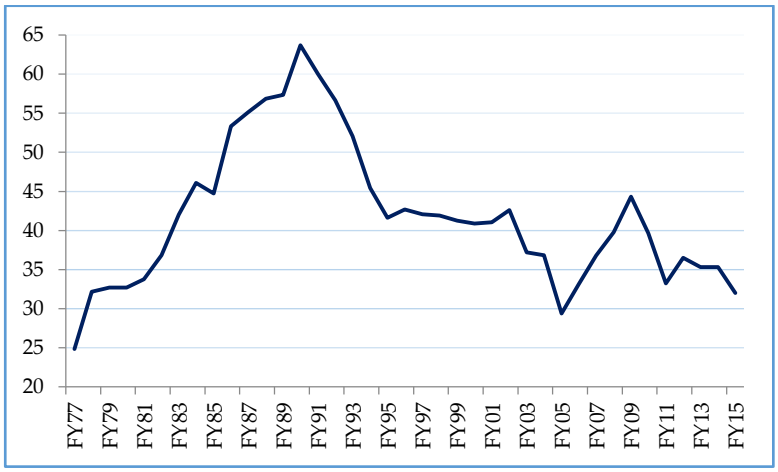
allocation increased and grew on a higher growth path. But the figures on the absolute amount of PA does not reveal much on the fluctuations experienced during the different economic regimes within this span of time. In order to have a closer look at the fluctuations over the years we next turn our attention to the allocation of Project Aid as a proportion of total ADP allocation for each year.

The figure below presents the proportion of PA allocation over total ADP allocation for each year. This figure is clearly more revealing of the fluctuations in Project Aid allocation. In FY77, PA constituted almost one fourth of total ADP allocation. Over the next years the proportion of PA in ADP increased significantly and the highest growth was observed during the 80s. PA made up about 33% of the ADP in FY80 while it reached its highest proportion of about 64% in FY90. But after that period, the proportion of PA in total ADP was downhill and it fell significantly over the first half of the 90s to reach about 42% by FY95.

The latter half of the 90s saw more constant proportion of project aid flows, averaging slightly above 40%. The first half of the 2000s saw another decline in the fraction of PA when it dipped to its lowest value in recent times (around 30% in FY05). The PA-ADP ratio improved during the second half of 2000s but since then has been on a declining trend along with exhibiting greater volatility.

Figure 15: PA in total ADP Allocation (%)

Source: Bangladesh Economic Review



Composition of ADP by Major Economic Sectors

We next look at the pattern of composition of development projects by the major economic sectors that it encompasses. The major sectors of economic activities for the development projects are broadly divided into **17** categories and the rest of the expenditure is captured under the *Block/Others* head. The table below shows the proportion of ADP expenditure each year that is allocated to each of the different sectors of the economy.

Table 1: Share of Sectors in Total ADP expenditure over time (%)

Sector	2006-07	2008-09	2010-11	2012-13	2014-15
Agriculture	5.9	6.3	6.3	5.4	5.5
Rural Development & Institutions (including FFW)	17.1	16.6	13.3	13.5	11.8
Water Resources	2.3	4.1	3.5	3.2	2.7

Industries	1.2	2.1	1.0	3.4	1.9
Power	13.9	11.7	18.8	17.7	11.6
Oil, Gas and Natural Resources	0.7	1.1	3.0	3.3	2.6
Transport	14.4	10.1	11.7	16.4	19.2
Communication	2.7	0.9	0.8	1.4	1.7
Physical Planning, Water Supply & Housing	6.9	11.5	9.3	8.6	11.7
Education & Religious Affairs	15.5	16.0	14.8	12.9	12.4
Sports & Culture	0.4	0.4	1.0	0.3	0.2
Health, Population & Family Welfare	10.0	10.7	8.7	7.0	5.8
Mass Media	0.1	0.1	0.3	0.1	0.1
Social Welfare, Women Affairs & Youth Dev.	0.8	1.0	0.8	0.8	0.5
Public Administration	1.7	2.4	2.5	1.8	1.6
Science & Technology	0.5	0.6	0.4	0.5	6.4
Labor & Employment	0.3	0.5	0.1	0.6	0.7
Block/Others	5.6	4.0	3.7	3.0	3.4
Total	100	100	100	100	100

Source: IMED, Ministry of Planning.

Over the period of FY07 to FY15, the share of Agriculture in total ADP expenditure has been constant at around 6%. Rural Development & Institutions saw its share decline sharply from 16.6% in FY07 to 11.8% in FY15 while both Industries and Water Resources had small improvements. Share of Power rose steeply in FY11 but since then has declined as the Government has reduced its reliance on private rental power plants. Education & Religious Affairs sector had its share decline over the period while Transport and Physical Planning both saw increasing shares with Transport getting 19.2% of ADP expenditure in FY15. Development expenditure on Communication has been low (under 2%) throughout the period and Oil, Gas and Natural Resources saw slight improvements in share. The sector comprising of Health, Population & Family Welfare had its share reduced from 10% to 5.8% during the period. Public Administration had its share decline slightly along with Social Welfare while Mass Media received more or less constant share of funds and the share of Sports & Culture was under one percent. Science & Technology saw its share skyrocket in recent years, coming up to 6.4% in FY15 from a meager 0.5% in FY13 while Labor & Employment improved slightly. The catchall variable of the expenditure allocation, Block, had its share reduced in recent times from 5.6% in FY07 to 3.4% in FY15.

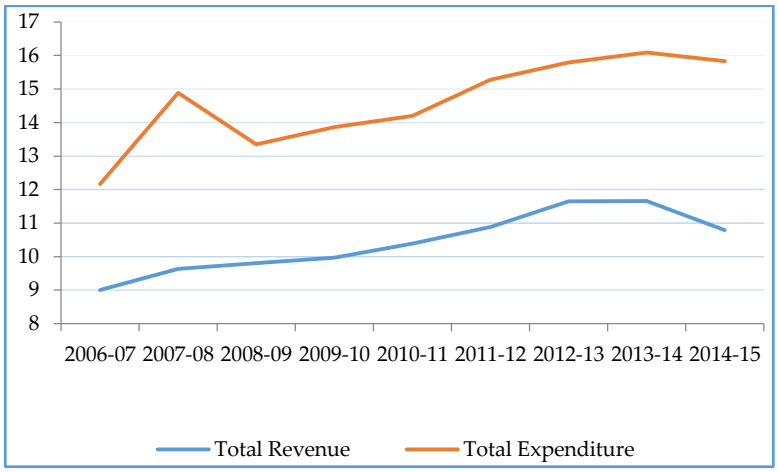
Thus overall, while some physical infrastructure sectors like Transport has seen increases in the share of development expenditure during the period, shares received by socio-economic sectors like Education and Health has been on a declining trend.

9.9 Budget Deficit and Financing

Having examined both the scenarios of revenue generation and its expenditure by the government on various sectors, we naturally next turn to the difference between the two: The Budget Deficit (or Surplus, although deficit is more common for our developing country, as we will learn below).

We begin this section with a look at the plot of government revenue and expenditure in recent years.

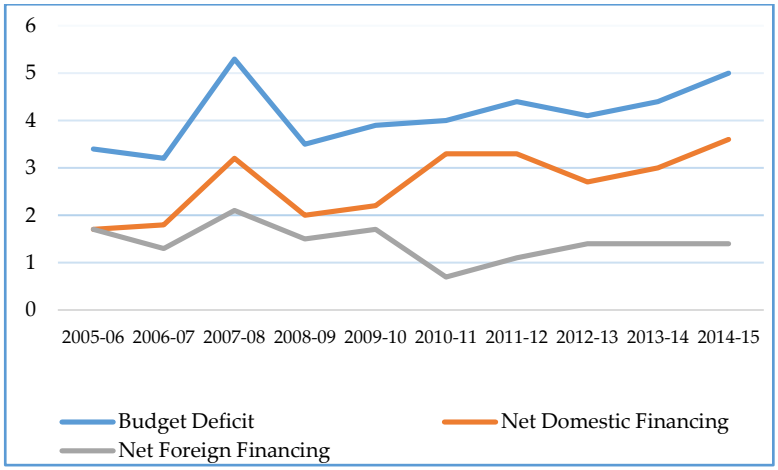
Fig 16: Total Revenue and Expenditure (% of GDP)



The figure above confirms that the country has been running a budget deficit over the period shown. So we next focus our attention to the financing of this deficit.

Fig 17: Budget Deficit and Financing - Domestic and Foreign sources (% of GDP)

Source: Finance Division, M/O Finance and BBS. (Various issues of the Budget in Brief)



The diagram above shows the trend in Budget deficit for the same time period along with its two mode of financing: Domestic Financing and Foreign Financing. The budget deficit data shown excludes the foreign grants received while the Net Foreign Financing data includes the foreign grants. Thus we have the following:
Overall Budget Deficit (excluding Foreign Grants) = Net Domestic Financing + Net Foreign Financing (including Grants)

Over the period under review, the budget deficit has remained below 5% of GDP (except in those years when the economy had been affected by natural calamities like the *Sidr* in 2007). But the more interesting change has occurred in the composition of the deficit financing.

Over time the financing from domestic sources have increased while foreign funded financing has fallen in share. In FY06, both domestic and foreign funding each accounted for about 1.3% of GDP (when the budget deficit was about 3.4%). Thus the funding came equally from the two sources. In FY15, foreign funding had declined to 1.4% while domestic sources accounted

for 3.6% in financing the deficit of about 5% of GDP. Hence the trend in deficit financing is apparent: foreign financing has declined while domestic financing has risen to fill the gap. The next section takes a more detailed look at the deficit financing from domestic and foreign sources.

9.9.1 Deficit Financing

As we saw earlier, the government finances its budget deficit from both domestic and foreign sources. In this section we look closer at the trend of financing from these sources. We start off with the sources of domestic financing.

Domestic Financing

Sources of domestic financing can be broadly divided into the following categories:

- borrowing from the ***Banking system*** of the country
- borrowing from the ***Non-Bank Public***

Financing from the Banking System is further divided into:

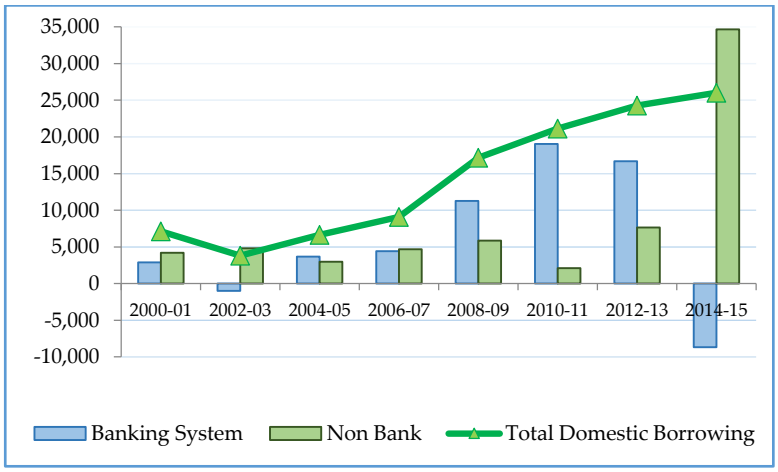
- borrowing from the ***Scheduled Banks***
- borrowing from the ***Central Bank*** of the country i.e. Bangladesh Bank

Thus the sources of bank financing include both public and private bank in addition to the Central Bank. On the other hand, ***Non-Bank*** financing includes the sale of savings certificates (NSD certificates) and other government bonds and bills of varying maturities.

The first diagram below shows the trend in domestic financing from Bank and Non-Bank sources while the second diagram sheds light on the composition of bank borrowing between Scheduled Banks and Central Bank.

Fig 18: Trend in Net Domestic Borrowing

Source: National Savings Directorate, Bangladesh Bank
Note: Figures in Crore Taka



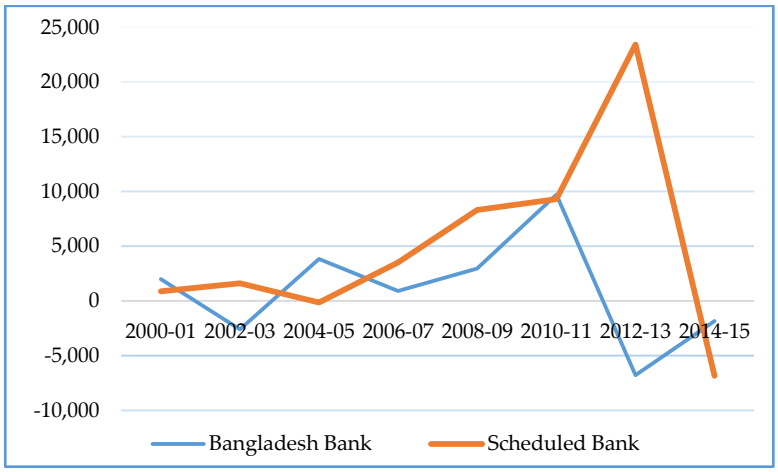
Over the period of FY01-15, total domestic borrowings have increased steadily with both its Bank and Non-Bank components generally increasing as well. But in recent years, the growth in Non-Bank borrowing has been greater than Bank borrowing. A sharp rise in Non-Bank borrowings can be observed in FY15 when net Bank borrowing was negative as the Government paid back more to the banking system (in principal and interest payments) than its actual borrowing. The total domestic borrowing (net) in FY15 stood at Tk.26018.9 crore

which was 1.7% of the GDP with the Government repaying Tk.8661 crore to the banking system while borrowing Tk.34,680 crore from Non-Bank sources.

Fig 19: Bank borrowing composition over time

Source: National Savings Directorate, Bangladesh Bank

Note: Figures in Crore Taka



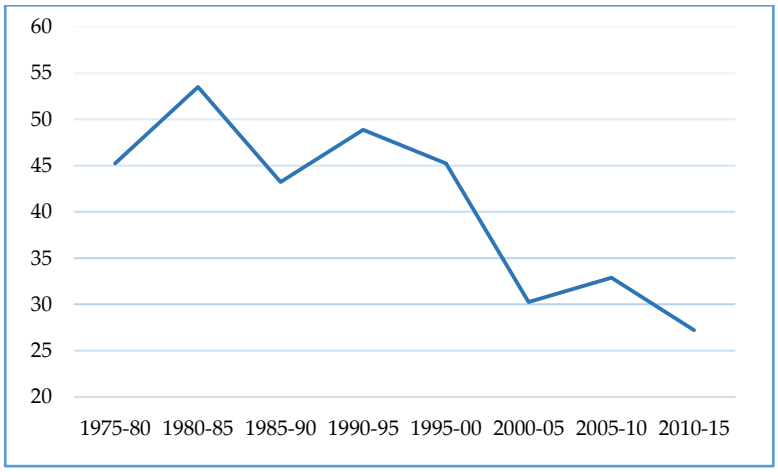
Over the same period of time, borrowings from both the central bank and scheduled banks had increased with scheduled bank borrowings being generally greater than central bank borrowing. In FY11, their shares were almost the same but diverged greatly in the next year with net Central Bank borrowing being negative and Scheduled Bank borrowings shooting up. But in FY15 both became negative, as overall net Banking system loan was negative for that year.

Foreign or External Financing

Besides Domestic financing, the Government also relies on financing from foreign or external sources for the funding of various projects and activities. But as we saw earlier, the share of foreign funds in financing the budget deficit has declined over time. At the same time, the composition of foreign funds has changed so that loans now make up the majority share of the funds compared to *Grants*. The figure below illustrates this point using the trend in share of grants in total Foreign Economic Assistance received over time.

Fig 20: Percentage of Grants in Foreign Economic Assistance (5-year average)

Source: ERD, Ministry of Finance



It can be seen that the share of grants in total Foreign Aid has gradually declined over time but with some fluctuations. Flow of grants increased during the 1980-85 period reaching its highest value of around 54% but dropped during the next five years. It picked up in the first

half of the 90s but witnessed its sharpest decline during 2000-05 when the period average reached around 30%. The share of grants improved slightly in the second half of the 2000s while the declining trend continued in recent years with an average of 27.2% for the 2010-15 period, the lowest value in the country's history.

Inflow of grants saw an improvement around 2007 when more grants came in to help with the rehabilitation work following the devastation caused by Sidr. More recently, in FY15, the share had come down to a low of around 18% - the flipside of the fact being that loans made up 82% of the foreign assistance. Hence almost four fifth of the total foreign economic assistance came in the form of loans, a dramatic reduction compared to the scenario a few decades earlier.

Foreign Debt

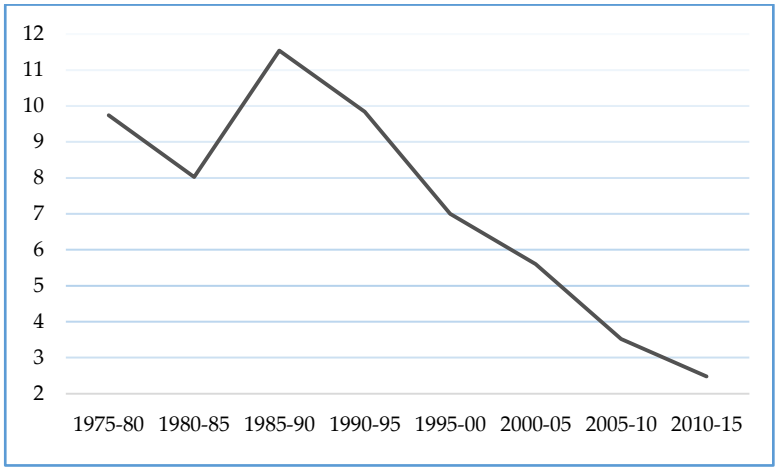
This section looks at the accumulation of foreign debt over time and discusses the trend and pattern in some related variables. Foreign Debt is the outstanding loan that a country owes another country or its foreign development partners.

Debt Service Liability (DSL)

Debt Service is the total amount of money that is required in a particular period to cover the *repayment* of interest and principal on existing debt. The figure below shows the trend in total DSL as a percentage of total foreign exchange (Forex) earnings for each year. Total Forex earnings have been defined to include commodity export earnings, workers' remittances and invisible receipts. For the period of 1975-80, DSL was a larger proportion of total foreign exchange earnings as our commodity and manpower exports were still in the initial stage. After declining slightly in the first half of the 80s, the ratio saw a large jump during the latter half, averaging around 11.5% for the period. But since then, DSL as a percentage of total forex earnings has been on a secularly declining trend throughout the rest of the period. Its average for the 2010-15 period was only 2.5%. This indeed reflects on the increasing trend of export earnings and remittance inflow that has largely offset the increase in DSL over time.

Fig 21: Total DSL as percentage of Total Forex Earnings

Source: ERD, Ministry of Finance



9.10 National Budget

This section provides an overview of national budgeting process of the country and discusses the budget in brief.

Budgeting is defined as the process of estimating revenue and expenses during a specific period of time. Thus a *government budget* is an annual financial statement showing item wise estimates of expected revenue and anticipated expenditure during a fiscal year. The government plans expenditure according to its objectives and then tries to raise resources to meet the proposed expenditure. Hence the budget is the most important information document of the government because government implements its plans and programs through the budget.

A national or government budget is a government document presenting the government's proposed revenues and spending for a financial year that is often passed by the legislature, approved by the President and presented by the Finance Minister to the nation. It is also known as the Annual Financial Statement of the country. In simple terms, it shows the estimates of the anticipated government revenues and expenditures for the ensuing (coming) fiscal year.

The primary objectives of the national budget can be summarized as follows:

- A means of allocating resources to achieve the objectives of the government
- A management tool for the purpose of national economic and fiscal planning
- A means of controlling and monitoring the use of funds to ensure that they meet stated objectives

Preparing the National Budget

The Finance Division (FD) of the Ministry of Finance (MoF) has overall responsibility for the preparation of the Revenue and Development budget. Within the FD, the Budget Wing has responsibility for collation and examination of Ministerial Revenue Budget submissions and for their summarization and passage through Parliament to final publication. The Development Wing is responsible for the Development Budget while the responsibility for preparation and review of the Five Year Plan (FYP) rests with the Planning Commission.

The Planning Commission is responsible for preparation of the Annual Development Programme (ADP) which after preparation is converted into the Development Budget by the Development Wing of the Ministry of Finance.

Following approval by the Parliament and promulgation of the legislature the spending ministries are notified of their allocations by the FD in a circular accompanied by the approved sections of the budget appropriate to them. This constitutes the formal approval for sanctioning authorities to issue sanctions orders authorizing the incurring of expenditure.

The Budget in Brief

This section presents the budget of the Government of Bangladesh for the fiscal year of 2014-15. The budget presents a consolidated version of the sources of revenue generation, heads of expenditure and the means of financing the deficit all together in one place. Hence it will be helpful to us to review all that we have learnt so far about the fiscal policy of the government in one place.

The first section of the budget is the Revenue and Foreign Grants section which is naturally the revenue or total earnings portion of the government for the fiscal year. Revenue includes

sub-categories of: Tax (from NBR and Non-NBR sources) and Non-Tax revenue. Adding in the foreign grants amount and we have the Total Revenue. The total projected revenue collection for FY15 is Tk. 169045 crore.

The next section is the expenditure outlay of the govt. for the fiscal year. The major portions of expenditure are Development and Non-Development. Non-Development expenditure includes: Revenue Expenditure (domestic and foreign interest payments), Capital Expenditure, net outlay for the Food Account operation and Loans & Advances (net). Development Expenditure includes funding Development programs from Non-Development Budget, Non-ADP projects, ADP projects and Non-ADP FFW and Transfers. The total expenditure for the fiscal amounted to Tk. 239668 crore.

Next we have the difference between the revenue and expenditure i.e. the Budget Deficit/Surplus. For FY15:

Budget Deficit/Surplus = Revenue – Expenditure
= Tk. (169045 – 239668) crore
= Tk. 70623 crore

Therefore, the amount of Tk. 70623 crore is the Budget Deficit (including grants) for FY15 which is 4.6% of the GDP of the country. With the presence of a deficit, the next section presents the Financing of this deficit from the various sources.

The major parts are Foreign and Domestic borrowing. The Net Foreign Borrowing for the fiscal is Tk. 15909 crore (Tk. 23872 crore in loans minus Tk. 7963 in loan repayment or amortization). Domestic Borrowing is carried out from Banking system and Non-Bank borrowing. Bank borrowing includes both Long Term and Short Term Debt while Non-Bank borrowing primarily consists of proceeds from the sales of National Savings Schemes by the National Savings Directorate (NSD). Total Domestic Borrowing for the year was projected at Tk. 54714 crore.

Thus, total borrowing by the government: Foreign + Domestic = Tk. (15909 + 54714) crore
= Tk. 70623 crore

Hence, the govt. plans to borrow exactly the amount of the deficit in its Expenditures over its Revenue collection for FY15.

Budget of Bangladesh: 2014-15

In Crore Taka

Revenue and Foreign Grants	
Revenues	**163371**
Tax Revenue	140676
NBR-Tax Revenue	135028
Non-NBR Tax Revenue	5648
Non-Tax Revenue	22695
Foreign Grants	**5674**
Total Revenue:	**169045**
Expenditure	
Non-Development Expenditure	**149399**

Non-Development **Revenue Expenditure**	127371
of which	
Domestic Interest	28187
Foreign Interest	1678
Non-Development **Capital Expenditure**	22028
Net Outlay for Food Account Operation	**157**
Loans & Advances (Net)	**9636**
Development Expenditure	**80476**
Development Programs financed from *Non-Development Budget*	786
Non-ADP Projects	3317
Annual Development Program (ADP)	75000
Non-ADP FFW and Transfer	1373
Total Expenditure:	**239668**
Budget Balance: Revenues - Expenditure	
Overall Deficit (including Grants):	**70623**
(In Percent of GDP):	4.6
Overall Deficit (Excluding Grants):	**76297**
(In Percent of GDP):	5.0
Financing	
Foreign Borrowing (Net)	**15909**
Foreign Borrowing	23872
Amortization (loan repayment)	-7963
Domestic Borrowing	**54714**
Borrowing from Banking System (Net)	**31714**
Long-Term Debt (Net)	22061
Short-Term Debt (Net)	9653
Non-Bank Borrowing (Net)	**23000**
National Saving Schemes (Net)	21000
Others	2000
Total - Financing	**70623**

Source: Budget in Brief, Finance Division.

CHAPTER 10
Keynesian Fiscal Policy

The recent global financial crisis that emerged during the 2007-08 period took the world economy on a major slowdown, and in looking for ways to mitigate its impact, it has spurred a renewed interest in the works of Keynes and his views on fiscal stimulus. Advocates of discretionary fiscal policy measures emphasize that increased government spending during periods of economic slowdown can help stimulate additional private expenditure, through the working of the *Keynesian multiplier*, and invigorate the receding economy.

Following the financial crisis that shook the entire global economy, in 2008 and early 2009, governments around the world announced a series of major fiscal stimulus packages. Resorting to discretionary fiscal policy on a scale not witnessed before, they hoped to expedite the recovery process from the recession. For example, the US Congress approved 787 billion dollars in additional spending, transfer payments and cuts in taxes with the 2009 American Recovery and Reinvestment Act. With similar motivation, the EU also undertook the European Economic Recovery Plan while individual governments announced stimulus packages in their own country. Even the government of Germany, which was initially criticized for not increasing expenditure sufficiently, eventually announced two 'Konjunkturpakete' (economic stimulus package) in a row.

From the above discussion it may appear that the application of Keynesian policies, and in general, the Keynesian theories of the economy may be restricted to only 'bad' times i.e. during periods of economic slowdown and recessions. But is Keynes only relevant during bad times? What about when an economy wants to grow faster during more 'normal' times through greater public investments e.g. in energy and infrastructure? Will Keynesian theories still be applicable then?

These are some of the questions that this chapter will try to answer. But first we need to acquire some basic understanding of Keynesian theories and how they depart from the Classical view of the economy.

10.1 A brief history of Keynes and the context (The Great Depression)

As students of Economics, we are all more or less familiar with the Great Depression, a worldwide slump in economic activity that began in most countries in 1929 and lasted till the late 1930s. Although the world economy had experienced many recessions, the Great Depression was by far the most severe, the longest and affected the largest number of people. This was certainly an issue that needed to be addressed from the viewpoint of economics. But economic theories before that time were unable to either explain this phenomenon or come up with sufficient policy solutions to reinvigorate the receding economies.

In trying to explain the causes of the Great Depression, the British economist John Maynard Keynes developed his own theories on the working of the economy at the aggregate or macro

level in his 1936 seminal book '*The General Theory of Employment, Interest and Money*'. Keynes's approach largely departed from the then dominant *aggregate supply* based Classical view, instead focusing on the *aggregate demand* (or its lack thereof in leading to recessions, as we will learn later). For this work and his other insights on macroeconomics, Keynes is widely considered to be one of the most influential economists of the 20th century and the founder of modern macroeconomics.

10.2 Main Concepts

10.2.1 The Classical view

The predominant view of the economy before the works of Keynes were the ***Classical theories***. Keynes described the economic thought of the followers of David Ricardo including John Stuart Mill, Alfred Marshall and Pigou as being traditional or orthodox principles and referred to them as '*classical economists*'.

According to the classical view, a state of *equilibrium* exists - there will not exist any *excess supply* of goods and services. This is because all that is produced will eventually be consumed once the *right price* for the goods are found. In the instance that there is excess supply of goods, it will only be *temporary*: the excess supply will cause the market price to decline leading to increased demand until all the goods are sold and equilibrium is reached once again. This is summarized in one of the classical views of the market, known as ***Say's Law***, which was one of the 'givens' of the time when Keynes came up with his own views. Put simply, Say's Law states that: Supply creates its own demand. That is once the supply of goods is determined, it will lead to the generation of its own demand.

Before Keynes, a situation in which the aggregate demand for goods and services did not meet up with supply (i.e. *excess supply*) was referred to as a *general glut* by the classical economists. Say further argued that such general glut of unsold goods cannot exist for long in a perfectly competitive market as the market is self-adjusting and will automatically correct for the excess supply by driving down the price.

From the above argument, it can be seen that the Classics believed in a *laissez-faire* or a free market economy, with the belief that supply and demand forces were sufficient to always clear the market. They also held the view that govt. intervention can disrupt the market equilibrium and lead to over or under production. Therefore, following the free market doctrine, they advocated the view of a perfectly competitive economy with minimal government intervention.

As the classical theories only supported the existence of temporary fluctuations in output (and income), they were unable to either explain the prolonged periods in which the income level of the economy was below normal levels (and falling further) or show the way out of the Great Depression in the 1930s.

10.2.2 The Keynesian View

The Classical theories could only postulate that the sharp fall in output during the Great Depression was a temporary occurrence. Keynes approached the workings of the economy not from the supply side (unlike the Classics) but rather from the demand side. He argued that it is demand that induces supply and that the level of aggregate demand determines the level of output in the economy. This is in direct contrast to the views of the Classics and is the key insight on which the Keynesian understanding of economic fluctuations is built.

When producers produce too much output and cannot sell them in the market, there is an excess supply of goods i.e. more than what people would like to buy. The classical view holds that the excess supply would drive down prices and hence demand would increase in response and the excess supply would be taken care of. But during periods of economic slumps, although prices may have been driven very low, demand is not found to respond as predicted by the classical view and mop up the excess supply. Thus the *self-correcting* mechanism of the market does not work in such circumstances.

According to Keynes the total or *aggregate demand* in the economy can be broken down into demand by households (consumption), business (investment), government and the rest of the world. The aggregate demand is the most important driving force in the economy in that it determines the level of output that will be produced. Any increase in demand has to come from one of these four components. In the short run, Keynes assumed that the capital equipment, population, technical knowledge and labor efficiency is constant and hence the productive capacity of the economy is also fixed in the short run. Thus the supply of goods and services will then be determined by the level of aggregate demand.

Keynes argued that this is what happens during recessions; *aggregate demand falls below the level of productive capacity* of the economy which in turn leads to lower output of goods and services. The series of events that take place during an economic downturn are interrelated with one factor affecting the next in the cycle. The following example illustrates one such likely chain of events:

- Due to low current income (and uncertainty about future income), consumer confidence will be dampened and they will reduce consumption and withhold purchases of assets like cars and houses.
- Experiencing reduced sales, firms will cut back on their production and may even shutdown some of their plants and postpone *new* investments in machinery and equipment.
- This will result in laying off some workers and unemployment will increase.
- The unemployed households will find that their incomes have further declined and so their consumption will be reduced by another round
- The reduction in consumer expenditure will reduce the sales of firms' output in the second round
- In this way, the process will continue with falling income and expenditure at each step until a new equilibrium is reached with low output levels and high unemployment

The way out

From Keynes's explanation, it becomes clear that the economy may continue to perish in a ***new low output equilibrium*** following the onset of a recession. Keynes regarded recessions to be the most serious of all economic problems. But what is the way out of such dismal scenario? From his views on the causes of recessions, Keynes came up with some economic policy prescriptions, which laid the foundation for modern macroeconomics and policy analysis. In this section we briefly discuss the solutions provided by Keynes while we will take them up in greater detail in later sections of the chapter.

We have already seen how reduction in consumption and investment expenditures lead to lower aggregate demand during recessions. Keynes thus argues that in order to take the economy back to its normal level of output, aggregate demand has to be raised. This is where the role of government comes in. When both consumption and investment demands are low, the economy can be stimulated by increasing government expenditure or cutting taxes or both.

Government spending and tax cuts can boost the economy to get out of recession

The basic idea is that increasing government expenditure and cutting taxes will both result in more income in the hands of the public. This will increase consumption spending, thereby increasing sales and production, and firms will be induced to invest more in order to expand production capabilities. In this way both consumption and investment demand will increase, boosting the aggregate demand and output of the economy. Thus the economy will move out of the clutches of recession. At the same time, Keynes also developed the concept of the **multiplier** which shows that an increase in any component of aggregate demand has a 'multiplier effect' on national income and output (we will learn more on this topic in later sections). This provides additional support for the use of govt. expenditure and tax cuts during recessions to boost aggregate demand.

Government expenditure and taxation policies are the fiscal policies of the government. On the other hand, Keynes also argued for the lowering of market interest rates during recessions. The basic idea is that lower interest rates will stimulate investment expenditure leading to not only increased production of goods and services but at the same time improve the production capacity of the economy in the long run. Additionally, lower interest rates also facilitate in increasing consumption expenditure. Changing interest rate to achieve desirable economic outcomes is part of the monetary policy. Keynes thus supported the use of both monetary and fiscal policies in the fight against recession, but he pointed out that an expansionary fiscal policy would be more effective than monetary policy during a recession (we will discuss the uses of different polices in Chapter 11).

Classical theories have traditionally advocated the use of *balanced government budget* i.e. in which the size of govt. expenditure is equal to the size of collected revenue and shunned deficit financing (when expenditure is greater than revenue). But Keynes took the opposite view and challenged the then conventional wisdom that budget deficit is always bad. According to Keynes, the appropriate fiscal policy during recession is to have government spend more than its income, thus running budget deficits (in order to spur aggregate demand). And on the other hand, during economic boom, Keynes suggested increased

taxation and reduced expenditure to reduce inflationary pressures and 'cool down' the economy.

Keynes therefore recommended the use of counter-cyclical policies (we will look into the use of the policies in the Chapter 11). Although Keynes strongly supported increased govt. expenditures during recessions, he emphasized on the distinction between public investment (the Annual Development Program in Bangladesh is part of this) which he wants to be chosen on a cost-benefit basis, from current expenditure (the revenue budget), which should not be financed from deficit spending. The national budget of Bangladesh follows this view unfailingly.

Summarizing the concepts presented so far, we have the following. Keynes departed from the Classical theories which believed that a perfectly competitive free market economy (without government intervention) will 'self-correct' itself to restore equilibrium. Instead he called for an active government role which can use fiscal and monetary policies to 'nudge' the economy whenever it starts to go in the 'wrong' direction.

Critique of the Keynesian view

So far we have learnt that the *Keynesian multiplier* works by increasing consumption and investment demand which in turn induces increased investment and production and thus leads to increased aggregate demand.

But what if upon observing increased government expenditure (unaccompanied by a simultaneous rise in taxes of similar size) during a period, consumers anticipate that the deficit financing in this period will have to be paid off by them in the future through an increased tax burden. Will they still respond by increasing their consumption (following the increased govt. expenditure) or will they save more in order to pay off the increased future tax burden? If the latter is more likely to occur, then consumption spending will not increase by the degree suggested by the Keynesian view and so the size of the multiplier will be smaller (due to the larger *marginal propensity to save*). Thus if consumers can anticipate increased future tax burden, the multiplier effect will be smaller and the efficacy of expansionary fiscal policy to boost output and income will be reduced.

10.2.3 Ricardian Equivalence

The Ricardian Equivalence is a proposition that holds that consumers are sufficiently forward looking and so can take into account the *govt. budget constraint* when making their consumption decisions. Therefore, they are able to evaluate that a deficit spending by the govt. today will lead to payment of higher taxes in the future. Thus the method of financing the deficit, either taxing consumption today or in the future, does not affect the consumption decision in the present and so aggregate demand remains unchanged. If aggregate demand does not increase in response to increased govt. expenditure or reduced taxes, then the Keynesian multiplier effect will not work. This equivalency of 'taxing today or taxing later' is the ***Ricardian Equivalence*** and it is used as an argument against expenditure increases or tax cuts aimed at boosting aggregate demand.

In financing current expenditure, governments have two options at hand: they can either increase taxes or borrow (issuing bonds). Given the fact that bonds are loans which will have to be eventually repaid, most likely through increasing taxes in the future, the choice of financing simply becomes 'tax now or tax later'. The Ricardian Equivalence shows that both options will have similar effect on current period's consumption and hence on aggregate demand. Thus the effect of borrowing through taxes now would be the same as if the government had chosen to impose tax in the current period.

The English economist David Ricardo was the first to propose of this possibility in the early 19th century; but he was not fully convinced of its empirical relevance. Antonio De Viti De Marco elaborated on Ricardian equivalence in the 1890s while Robert J. Barro further inquired into the phenomenon in the 1970s, in an attempt to give the proposition a firm theoretical foundation.

Criticism of Ricardian Equivalence

One of the key assumptions of Ricardian Equivalence is that consumers are 'sufficiently' forward looking and thus can recognize the equivalency of financing deficits through bonds or taxes. But the consumers are more likely to be ***myopic*** i.e. nearsighted and hence incapable of assessing the intertemporal consequences of bond financing vs. tax financing. Moreover, there is a limitation to cognitive ability of the people to acquire, store and process information regarding financial market. Hence increasing expenditures and cutting taxes would be useful tools for boosting aggregate demand.

10.2.4 Building blocks of the Keynesian model

The Keynesian view of aggregate demand (AD) is based on the following idea. An increase in government spending or a cut in tax gets multiplied and lead to an increased demand for consumption goods in the economy. That is, if the government spends an additional Taka, it increases household demand (through consumption) by more than one Taka. The same argument goes for a tax cut, as a Taka 1 tax cut increases the disposable income of the consumers and also has a similar multiplied effect on aggregate demand (and output). But the impact on aggregate demand in the latter case is smaller than that of a same sized increase in government spending.

Marginal propensity to consume (mpc)

The marginal propensity to consume (mpc) is a concept that refers to the amount of extra spending or expenditure out of an additional Taka of income. Put simply, it shows what fraction of the additional amount of income is devoted to consumption. Thus for example, if income increases by Tk. 100 and consumption expenditure increases in response by Tk. 80, the marginal propensity to consume is 0.8 (80/100). The flip side to this concept is the marginal propensity to save or mps, the fraction of additional income that is saved. In our example, the mps is thus equal to 0.2 (100-80/100).

The concept of mpc can be further explained with the help of the *consumption function* (recall: what is a function?). Consumption function is the mathematical relationship which shows how consumption is related with income. The Keynesian consumption function is usually written in the form below:

$$\mathbf{C} = a + b.\mathbf{Y}$$

Where, C is the total amount of Consumption, 'a' is the autonomous level of consumption, 'b' is the marginal propensity to consume (mpc) and Y is the level of income.

Thus, in the simple Keynesian consumption function, we have that consumption depends on two things: 'a' the autonomous level of consumption and 'b' – the fraction of income that is devoted to consumption. The first part or the autonomous part of consumption can be viewed as the minimum or the subsistence level of consumption, below the level which consumption cannot fall. Notice that even when income (Y) is zero, the amount of consumption is given by 'a' and we assume that the individual can either consume part of his previous savings (by dissaving) or take out loans in order to maintain this minimum level of consumption. Thus this amount of consumption is assumed to be always ensured.

On the other hand, the second component of consumption is directly proportional to the level of income of the individual Y, where the constant b maintains that a fixed proportion of income is always devoted to consumption. In summary, consumption is assumed to depend on both the level of income as well as other factors that are captured in the autonomous element.

We also said that it is disposable income [recall from chapter 2] rather than just income that determines the level of consumption. Disposable income is defined as the amount of income that an individual is left with after paying for various types of taxes to the government and thus it makes more sense to use it in determining the amount of consumption. Hence we use the following notation to denote disposable income: YD = Y – T. We will return to this topic later on in our discussion.

Given the above relationship, we have that the change in consumption given a change in income will be given by:
$\Delta C = b.\Delta Y$ ➔ $\Delta C/\Delta Y = b$

Where the second part follows from rearranging the first and "$\boldsymbol{\Delta C/\Delta Y}$" implies how much consumption expenditure changes due to a one unit change in income. But recall that we have defined the mpc to be exactly this and thus:

⇨ b = mpc

This is one of the key insights on which the Keynesian understanding of Aggregate Demand is based on.

One of the most important and simplifying assumptions of the Keynesian model is that prices are assumed to be constant and that the firms are willing to supply any amount demanded at the given level of prices.

Example: In 2015 the size of Personal Disposable Income in Bangladesh was Tk. 52321.01, while Consumer Spending was Tk. 11760.15 and Personal Savings was Tk. 3375.80.

From the above figures, does it mean that the marginal propensity to consume is obtained by dividing Consumer Spending by Disposable Income i.e. (*11760 ÷ 52321*)?

The answer, as many of you might have guessed, is No. Dividing Consumer Spending by Disposable Income gives us the *average propensity to consume* (apc), and *not* the marginal propensity (mpc). The average propensity to consume is simply found by dividing the consumption equation throughout by Y, which gives us:

$C/Y = a/Y + (b.\ Y)/Y$

⇨ $C/Y = a/Y + b$

On the other hand, the mpc is the *first derivative* of the Consumption function with respect to Income.

10.3 Components of Aggregate Demand

10.3.1 Consumption

Let us consider the *consumption function* once again which shows the relationship between the income of a household and its consumption expenditure. Earlier, we encountered the most basic version of a consumption function which *linearly* relates consumption to income in the following way: $C = a + bY$. What we can say about the size of the mpc (b)? What are the factors that determine the size? In order to shed light on this issue, we discuss permanent income and life cycle hypothesis very briefly.

Permanent Income and Life Cycle Hypothesis

The solution to this problem was forwarded by both Milton Friedman and the team of Franco Modigliani and Richard Brumberg in the late 1950s. Friedman's theory is known as the *Permanent Income Theory of Consumption* while the view of Modigliani and Brumberg has come to be known as the *Life Cycle Theory of Consumption*. Although the two theories differ in their approach and exposition of the underlying ideas, the basic outcome of both is very much similar.

Both theories argue that the consumption decision of households is not just dependent on current disposable income but also on the household's expected future income stream. This is due to the fact that the tendency of people is to smooth consumption over their lifetime (in order to maintain a certain level of standard of living) instead of going through periods of uneven consumption. That is, a certain level of consumption each day is preferred to a pattern of feasting one day while starving on the next, which is clearly a more realistic view of human behavior.

As an illustration of the above idea, consider the following example. Suppose that two typical persons A and B both receive windfall gains. But the gain in income for person A is a fixed amount of Tk. 1000 for this month only while person B is to receive Tk. 1000 for each of the next 12 months. How would the consumption of the two persons increase in *this month* in response to the increase in income?

The consumption increase of person A will be much lower than that of person B, though the increase in income in this month are same. This is because consumption of this month depends on his lifetime income, not only on the income of this month. In the case of Person A, his average future income has increased relatively little (Tk. 1000 increase in the next month only)

while for person B the increase is much larger (Tk. 1000 each month for the next year). As the increase in income for person A is only temporary while person B's income increases for quite a while into the future, we have that the permanent or life-time income of person B increases by more than that of person A. This is the view that is presented in both the Permanent and Life Cycle Hypothesis of consumption

But how do the theories help us in our search for the size of the mpc? The theories imply that the mpc out of a given increase in income will depend on whether it is perceived to be an increase in permanent income or just transitory income. Increase in permanent income will result in a larger mpc (which is closer to the size of the apc) compared to an increase in transitory income (as people will smooth their consumption over time). Therefore, the mpc of an income increase that is perceived to be permanent will be greater than that for one which is seen as only temporary.

Now that we know the difference between permanent and transitory income, we can use these concepts to take another look at the effect of increases in govt. expenditure and cuts in taxes. Let us look at tax cuts first. If the tax cut is viewed as temporary, the increase in disposable income will be treated as transitory and the resulting increase in consumption will be smaller. Therefore, the size of the mpc will also be smaller. One reason that tax cuts may be seen by the public as leading to only a temporary increase in income is that people can anticipate that their future tax burden will rise as a result of this deficit spending in the current period. If they have the ability to fully anticipate the payment of future taxes, they may react by not increasing current consumption at all as the tax cut leaves permanent income unchanged.

The same reaction may also occur to increases in govt. expenditure that is unaccompanied by an increase in taxes of similar size. In this case, households may treat the increased income as temporary if they believe that the deficit spending has to be financed by them through increased taxes in the future. Therefore both the impact on consumption and the size of mpc will be reduced. In conclusion, we have that the size of mpc for a given increase in income depends on whether the increase is perceived by the people as permanent or transitory with transitory changes leading to smaller values of the mpc and this has strong implications for the effectiveness of the fiscal policies.

10.3.2 Government Spending Multiplier

We next turn to one of the most important tools of the Keynesian view of Aggregate Demand, the Government Spending Multiplier.

To start off this concept, consider the example of the Padma Bridge. The total budget for this bridge is about 29,000 crore Taka and the bridge is expected to be completed by 2019 and furthermore it is also expected to raise the national income and growth of the country as it will enhance the productive capabilities by adding to the physical infrastructure of the country.

It will definitely raise the national output by at least Taka 29,000 crore taka in the year of completion. But, according to the *Keynesian multiplier effect*, the total effect will be much higher. Suppose that a large part of the expenditure goes to the payment of salaries of the engineers

and workers involved in the construction of the bridge. So, their income will increase and they will spend *some part* (determined by the size of the mpc) of the additional income on the consumption of goods and services. This sets off a chain reaction where a fraction of the additional income of the sellers of goods and services will be spent on other goods and services in the economy. Therefore, the demand for other goods and services will also increase and in this process it will boost up the overall or aggregate demand in the economy. The producers will respond to this increased demand by increasing their production and hence the output of the economy will expand.

One assumption of the Keynesian model is that producers can supply whatever amount the market demands. This is a crucial assumption as it ensures that the suppliers of goods and services can respond according to market demand and provide the necessary amount. In other words, there exists excess production capacity in the economy. But if this were not the case, then the increase in demand would not bring forth higher levels of output and further expansions in income and consumption.

Deriving the multiplier

Now let us formalize the above discussion with the aid of a simple example.

Suppose the government spends Taka 1 to purchase good G from the person Y. Let the marginal propensity to consume (mpc) be 'm'. That is, out of Taka 1, Mr. Y buys some goods from Mr. Z for Taka m and he saves the rest, equal to Taka (1-m). Consequently, the income of Mr. Z increases by Taka m. For the sake of simplicity, let us assume that the mpc of Mr. Z is also m. Therefore, Mr. Z will spend m × m = m-squared (m^2). This process will continue. If we add all the additional income generated out of the Taka 1 increase by the government, we get:

$1+ m + m^2 + m^3 + \ldots\ldots\ldots$ infinity = 1/ (1-m)

The table below shows the effect following the change in govt. expenditure by Taka 1 and the resulting changes in income at each stage.

Table 1: The government expenditure multiplier

	Expenditure	Change in Income
The govt. spends	Tk. 1	Tk. 1
Mr. Y spends	Tk. m×1	Tk. m×1
Mr. Z spends	Tk. m×m×1	Tk. m×m×1
Mr. A spends	Tk. m×m×m×1	Tk. m×m×m×1
This goes on….	….	….
Adding all these up	$1 + m + m^2 + m^3 +\ldots$	$1 + m + m^2 + m^3 +\ldots$

Using the fact that the sum of a series of the form $1 + a + a^2 + a^3 +\ldots\ldots$infinity is given by the formula: 1/ (1 – a); we arrive at the result stated above:

$1 + mpc + mpc^2 + mpc^3 + \ldots.$ infinity = 1/ (1 – mpc) ; where, m = mpc

Hence the total increase in income following Tk. X increase in government expenditure is not just equal to Tk. X but is in fact a multiple of it, with the multiplier being 1/ (1 – mpc). This clearly shows how the increase in govt. expenditure has a multiplier effect on income. This

multiplier effect is called the public or government spending multiplier and shows the impact of a Taka 1 increase in govt. spending.

Numerical example: Suppose that the MPC is 0.8. Therefore, the multiplier is 1/ (1-0.8), that is, 5. It means if the government spends Taka 1, it will raise output by Taka 5.
Now we are equipped with concepts and tools to show how multiplier effects work using the National Income identity to determine the national income. Let us take a simple economy with only household and government sector. In this case, we have:
Y = C + G = (a + b. Y) + G, where the first part is obtained from the consumption function

- ⇨ Y – b. Y = a + G
- ⇨ Y (1-b) = a + G
- ⇨ Y = a/(1-b) + G/(1-b)

From the above equation we have the following expression for the change in the variables:

- ⇨ $\Delta Y = \Delta G/(1-b)$,

Where we used the fact that the term a/ (1 – b) is a constant and hence cancels out when differencing is done.

- ⇨ $\Delta Y = \Delta G\,.multiplier$, where the term 1/ (1 – b) is the multiplier.

This shows that if G increases by Taka 1, output (Y) increases by Taka 5 (when 0.8 is the marginal propensity to consume). As the size of the mpc changes, so does the multiplier – the larger the mpc, the greater is the impact of the multiplier on income for a given increase in government spending.

10.3.3 The Tax Cut Multiplier

Just as an increase in government expenditure can boost the level of aggregate demand, so can a cut in the tax rate. While govt. expenditure acts to directly affect the level of AD, tax cuts on the other hand work indirectly by increasing the disposable income of the public. This leads to increased consumption which in turn boosts AD through the multiplier effect.

Let us now take a closer look at the effects of a cut in the tax rate. Assume that the govt. decides to reduce the tax amount by Taka 1. Therefore, disposable income also increases by Taka 1. The increased disposable income will raise the consumption demand of the public. And similar to the case of govt. spending, consumption in the first round will increase by the amount of the mpc - m. In the second stage, it'll increase by m^2 and so on like this. Thus we get the same series of increases in consumption as we obtained earlier, with the only difference that in this case there is no initial increase in govt. spending.

Therefore, adding up the increases in consumption at each stage following the tax cut, we obtain the following series:
Total change in income = $m + m^2 + m^3 + \ldots$ Infinity

Notice how it is the same series as the one we saw earlier, except for the initial Tk. 1 increase in govt. spending. Keeping in mind a tax cut is actually a negative change in taxes, and given that the summation of the former series equaled 1/ (1 – MPC), then this series should be summed up the same expression minus 1 i.e. [1/ (1 – MPC)] – 1, to account for the absent govt. spending in this case.

Simplifying the terms in the above expression we obtain:

$$\frac{1}{1-m} - 1 = \frac{1-1+m}{1-m} = \frac{m}{1-m}$$

And the change in income following a change in the tax amount is:

$$\Delta Y = \frac{m}{1-m} \times -\Delta T$$

Thus the tax cut multiplier can also be written as: mpc / (1 – mpc). Notice how it differs from the govt. spending multiplier: 1 / (1 – mpc); in particular, the tax cut multiplier is always smaller than the govt. spending multiplier. This is because it does not have the initial increase in govt. expenditure that is present in case of the latter. Thus the tax cut multiplier has a lower ability of boosting aggregate demand compared to govt. spending multiplier.

Let us consider a numerical example. Assume as before that the mpc is equal to 0.8. Therefore, we have:
Tax cut multiplier = 0.8/ (1- 0.8) = 4
Govt. spending multiplier = 1/ (1-0.8) = 5

This shows that the tax cut multiplier is less than the govt. spending multiplier for the same size of mpc. But what will happen if the govt. decides to simultaneously increase expenditures to boost the economy but finances it through raising the tax rate (ΔG=ΔT). As the increase in taxes exactly offset the increase in govt. expenditure, the net effect of this action on disposable income will be zero and hence there will be no change in the national income. This can be verified in the following way: subtract the tax cut multiplier from the govt. *spending multiplier*, which gives us exactly 1. This is the *balanced budget multiplier* and is always equal *to* 1 (as taxes equal expenditures).

10.3.4 Investment

Having looked at consumption and government expenditure, we next turn to the other major component of aggregate demand in the economy – investment. Just as we saw that an increase in govt. spending has a multiplied effect on income, so does an increase in investment. Hence there is also an *investment multiplier*. The reason behind this is simple and similar to that for the govt. spending multiplier.

Increases in investment raise the income of those who get paid through the investment undertaking. This increased income leads to increased consumption demand which in turn, given the mpc, increases the income of yet others and the process goes on. In the previous section we saw that the total increase in income from a given change in govt. spending was given by: 1/ (1 – mpc), and this is also the size of the investment multiplier.
In the simple Keynesian framework, investment is assumed to be autonomous i.e. independent of changes in income while consumption is treated as a function of income (as C = a + b.Y) and the equilibrium level of income is: Y = C + I + G.
Thus the change in income Y is given by:
$\Delta Y = \Delta C + \Delta I$, (holding the govt. spending component fixed)
Now, consumption will change only when income changes, thus: $\Delta C = b\Delta Y$
Using the above to substitute for ΔY, we have:
$\Delta Y = b\Delta Y + \Delta I$

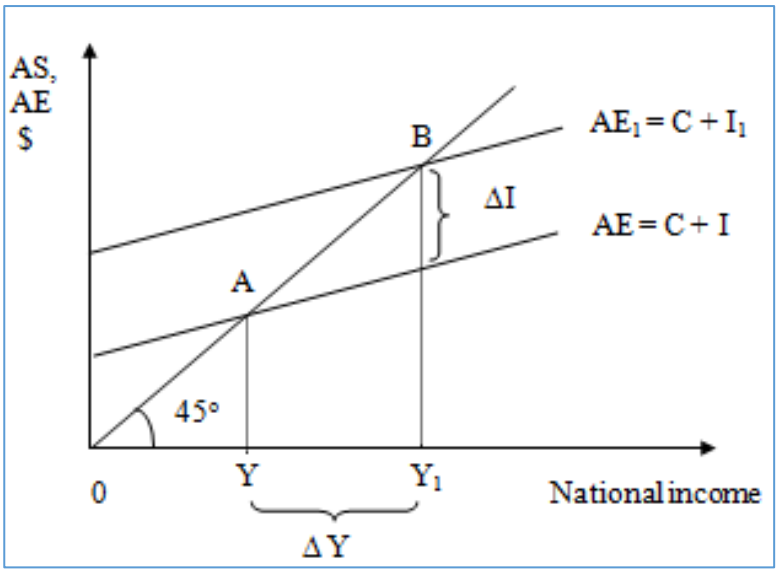
⇨ $\Delta Y - b\Delta Y = \Delta I$
⇨ $\Delta Y(1-b) = \Delta I$
⇨ $\Delta Y = \frac{1}{1-b}\Delta I$
⇨ $\frac{\Delta Y}{\Delta I} = \frac{1}{1-b}$

Therefore, $\frac{1}{1-mpc}$ is the multiplier for investment, and it is the same as that for govt. spending. The multiplier shows by how much income will change when the level of autonomous investment changes by a given amount. As before, the size of the multiplier depends on the size of mpc – the larger the mpc, the greater will be the multiplier.

The multiplier in pictures – The Keynesian Cross

The level of national income or output (Y) is determined at the equilibrium between aggregate demand and aggregate supply. Thus with the aid of a diagram that plots expenditure on one axis and income or output (GDP) on the other, we can diagrammatically show the effect of the multiplier. This diagram is also called the Keynesian cross.

Fig 2: The multiplier effect using Keynesian Cross



In the diagram above, national income or output (Y) is plotted on the horizontal axis while expenditure (AE) or equivalently, aggregate demand (AD) is plotted on the vertical axis. The 45-degree line shows all the points where the equality of income and expenditure holds i.e. along this line the actual expenditure in the economy is equal to the planned expenditure.
The actual expenditure is shown by the AE lines where for simplicity, total expenditure is assumed to equal consumption and investment expenditures only, ignoring government spending. Thus actual expenditure (AE) is equal to:
AE = C + I = AD at equilibrium
Substituting the value of C, we have:

⇨ AD = (a +I) + **b**. Y

At equilibrium, the aggregate expenditure in the economy must equal the aggregate demand (AD). Recall that consumption is treated as a function of income in the model while investment is assumed to be autonomously determined. This leads to the fact that the slope of the AE lines, and thus that of AD, is equal to b – the marginal propensity to consume. On

the other hand, changes in autonomous components like 'a' and 'I' will change the intercept of the line and hence shift the line.

The economy is at equilibrium at the point at which the AE line crosses the 45-degree line i.e. when the aggregate demand in the economy equals the total output produced (using the definition of equilibrium in our model) and so planned expenditure is exactly equal to total production. Thus at points like A and B on the diagram, the economy is at equilibrium.
To see why the economy is at equilibrium at these points, consider point A, at which the level of output is Y. If output were less than Y, then the aggregate demand (given by the AE line) would exceed the level of output produced (given by the 45-degree line). In this case, firms would have an incentive to increase production until the new level of output matched the demand. On the other hand, if output exceeded Y, then firms would cut back on their production until output had been reduced to the level of aggregate demand. Only when the level of output is Y, will the aggregate demand equal production and the economy will be in equilibrium.

Assume that the initial equilibrium of the economy occurs at point A, when the actual expenditure line is AE, given the initial levels of consumption and investment expenditures. An increase in the autonomous level of investment, from I to I_1, causes the actual expenditure line to shift upwards by ΔI ($=I_1 - I$) to its new position AE_1. Thus aggregate demand also shifts upwards by the same level. At the new equilibrium the level of income is given by Y_1, up from its initial value of Y. Thus while the increase in investment (ΔI) shifts the actual expenditure line upwards by the same amount, notice how the change in income (ΔY) is greater than the increase in investment (as shown on the diagram). This is due to the multiplier effect on income of an autonomous increase in investment.

10.4 The equilibrium level of output

As we saw before, the equilibrium condition in the economy is characterized by the equality of aggregate demand (AD) and output produced (Y). Thus at equilibrium, we have:
AD = Y

- ⇨ $a + I + b.\ Y^E = Y^E$ (putting in the value of AD)
- ⇨ $Y^E\ (1 - b) = a + I$ (collecting like terms)
- ⇨ $Y^E = \frac{1}{1-b} \times (a + I)$

Which can also be written as, $Y = \frac{1}{1-b} \times A$ where we have used A to denote the summation of all autonomous expenditure components in our equation for equilibrium output. From this expression, the following is clear: the equilibrium level of income will be higher the larger the value of the b (mpc) and A (autonomous expenditure level). Additionally, any change in the autonomous components of expenditure will lead to a change in the level of income.

10.4.1 Aggregate demand and output: General case

The essence of the Keynesian model is that aggregate demand determines the level of output when the economy has excess capacity and is able to produce whatever the demand is. Recall that Keynes was trying to explain the Great Depression when he came up with his model of national income. During periods of recession the economy is characterized by low levels of aggregate demand while there are unused production capacities. In such situations the output

level is not constrained by production capabilities, but rather determined by the existing demand conditions. Hence in the Keynesian model, national output or GDP is viewed as being determined by the level of aggregate demand and not limited by supply conditions.

So far we have assumed a simple economy with households, businesses and government. Now we expand our model by incorporating the external sector and treating it as another component of autonomous demand. The demand for output in our model now comes from the household sector (consumption), business sector (investment), government (both consumption and investment) and the rest of the world (net export of goods and services).

Therefore, the aggregate demand (AD) in the economy is given by:

$$AD = C + I + G + X$$

The aggregate supply (AS) is the total output produced, therefore we have:

$$AS = GDP$$

Equilibrium level of output in the economy is determined by the equality of demand and supply. Therefore, we have:

$$AD = AS$$

or, $GDP = C + I + G + X$ (using the definition of AS and AD)

The right hand side of the above equation is from the national income accounting identity ($Y = C + I + G + X$) and in the present context it also shows how the GDP of the economy is determined: *GDP is* the summation of the different components of aggregate demand. Thus GDP in the Keynesian model is viewed as being demand determined.
Next, using the consumption function ($C = a + b.Y$), we have:

$$GDP = a + b.Y + I + G + X$$

Let us define disposable income as $Y = GDP - T$, where T stands for tax payments, and plugging it in our equation, we have:

$$GDP = a + b\,(GDP - T) + I + G + X$$
$$\Rightarrow GDP = a + b.\,GDP - b.T + I + G + X$$
$$\Rightarrow GDP\,(1 - b) = a - b.T + I + G + X$$
$$\Rightarrow GDP = (a - b.T + I + G + X)/\,(1 - b)$$

The above equation can also be expressed as:

$$GDP = \frac{1}{1-b} \times (a + I + G + X) - \frac{b}{1-b} \times T$$

Letting A denotes the summation of all autonomous demand components (a, I, G and X) in the model, we can simplify the equation as:

$$GDP = \frac{1}{1-b} \times A - \frac{b}{1-b} \times T$$

Recall that this is what we had derived earlier, but separately, in the case of the govt. expenditure multiplier and the tax cut multiplier. A change in any of the autonomous demand component will have an effect on income (GDP) through the multiplier 1/ (1 – mpc), while a change in taxes will change income by a multiple of mpc/ (1 – mpc).

The following example illustrates how a change in demand leads to a change in the level of GDP. Take the case of remittance, the money sent back home by nationals working in foreign countries. If the country experiences an increase in the inflow of remittance, for example due to higher demand for workers abroad, it will lead to an increase in the disposable income of the remittance recipients. This increased income will induce the recipient households to increase their consumption expenditure which will in turn increase the income of the producers of goods and services in the economy. Part of the increased income of the producers will also be spent on goods and services and the process will continue with increasing consumption and income at each stage. It does not actually matter how the income is spent, all that is needed for the multiplier process to work is that the increased income finds its way into the hands of the public. But note that the consumption of imported goods will not add to the multiplier process as the money will be paid out to foreigners.

10.5 Should we take Keynesian model literally?

So far we have looked into the basics of the Keynesian model and its emphasis on the use of discretionary fiscal policy to boost the economy out of recessions. But it is important to bear in mind that this model was developed by Keynes to explain the causes and show the way out of the Great Depression.

One can argue that if taken literally, this model implies that an economy has the ability to attain an unlimited level of income simply through employing increased government spending. But as we all know, there is no such thing as a free lunch! What may appear to be a free lunch will most certainly have a hidden catch! But what is the catch in this case? The catch is the assumption that the economy is able to supply as much goods and services as determined by the aggregate demand. In other words, it assumes that the supply is *infinitely elastic* and so can respond to whatever the prevailing demand condition are.

As developed by Keynes, the model analyzed the conditions in the economy when it was going through a deep recession and so it is more appropriate for such conditions. As we learnt earlier, during recessions the aggregate demand falls below the productive capacity of the economy. This provides the right time and opportunity for the use of increased govt. expenditure and tax cuts to stimulate the economy through inducing consumption and investment expenditures. But is this scenario comparable to more normal times? Can the mechanism of stimulating aggregate demand to bring forth increased output and employment still be valid then?

To answer this question, we first need to assess the prevailing condition of the economy. Is the economy already operating at close to full employment and output levels? If that the case, then increasing govt. expenditures and cutting taxes may be not able to push the economy much further towards higher income levels. Additionally, using such policies under these conditions may only add to inflationary pressures, which is not at all desirable. But what if there is a large portion of productive capacity in the economy that is unutilized due to insufficient aggregate demand? Expansionary fiscal policies can then be used to stimulate demand conditions and make use of the unemployed resources. Therefore the answer to the above question will depend on the existing state of condition of the economy.

10.5.1 To what extent it is applicable for a developing country like Bangladesh?

We have already seen that the effectiveness of Keynesian policies in raising national income largely hinges on the ability of the economy to increase supply in response to increased demand. In order for expansionary fiscal policies to work through the Keynesian multiplier effect, the economy must have sufficient productive capacity to meet the increase in aggregate demand.

The economy of Bangladesh is characterized by having excess capacity in terms of involuntary unemployment, unused productive capacity in the industries as well as idle money in the banks. Therefore, all signs indicate towards that even in the short run, the productive capacity of the economy can be expanded to meet demand. Hence the use of expansionary fiscal policy to induce private consumption and investment is more likely to be effective under these settings. However, the government has to be vigilant about the quality of government expenditure as well as the debt sustainability of public spending.

We also take this opportunity to discuss about the Keynesian and Classical views on the causes of unemployment which draw on the ideas we have learnt so far.

10.6 Keynesian and Classical ideas: Theory of Employment

Unemployment is an issue of grave importance that regularly makes to the headlines of newspapers. It is of such great importance to the economy and the society at large because it directly affects the welfare of the people. The wellbeing of the public largely hinges on the ability of the economy to provide income in the hands of its residents through ensuring employment.

We begin our discussion on the views of the causes of unemployment by first looking at the different types of unemployment.

10.6.1 Types of Unemployment

a) **Structural Unemployment** – are caused due to structural changes that take place over time in an economy. This renders skills previously possessed by workers obsolete in the face of significant modernization and changes in production processes. Thus the workers who are not able to acquire new job skills are left out of employment.

b) **Frictional Unemployment** – This type of unemployment is caused by *frictions* in the operations of the labor market. The friction arises from the *imperfect mobility* of workers to switch from one job to another instantaneously.

   In any growing economy, jobs opportunities in certain sectors will be declining while those in others will be expanding. This leads to some temporary unemployment as workers leave one job in search of another and as they do not have perfect information on available jobs including the new set of skills that new jobs may require, it takes a while for them to find employment. The unemployment that they go through in the meanwhile is referred to as frictional unemployment and it is temporary.

Frictional unemployment will exist in any economy on a certain level as, although there exist vacant job positions, they cannot be filled immediately as prospective job seekers may not be 'at the right place at the right time'.

c) **Cyclical Unemployment** – we have already encountered this form of unemployment in our discussion of the Keynesian explanation of recessions. During economic downturns, when the aggregate demand in the economy is low, businesses cannot sell their output and in response the demand for labor goes down. This results in a majority of the employed workers being laid off, some only being partially employed while new entrants struggle to find jobs. This may lead to widespread unemployment which is the result of demand deficit associated with the downswing of the business cycle. As this form of unemployment follows the movement of the business cycle, they are termed as cyclical or Keynesian unemployment.

d) **Seasonal Unemployment** – this form of unemployment arises due to the **seasonal** nature of certain types of business activity that include agriculture, agro processing and tourism among others. These industries experience increased demand for their output during the peak seasons while the lean seasons see business activities greatly reduced. Therefore, the demand for labor also follow similar pattern in these industries leading to seasonal unemployment in the lean periods.

e) **Disguised Unemployment** – In addition to the types of unemployment discussed above, which can be directly observed, there is another form of unemployment which is less direct or disguised. This form of unemployment is the most widespread in developing countries that are predominantly agrarian.

In agricultural work, the output is usually shared among family members with each receiving an amount corresponding to the average productivity of the family members. But under these circumstances, there may be individuals who have marginal productivities that are very low or almost close to zero. As employment opportunities outside of agriculture are limited, these workers are trapped in jobs with low productivity. This is the idea behind disguised unemployment: the workers are unemployed as their marginal productivities are close to zero and it is disguised as they share in the family output and hence appear to be employed.

10.6.2 Classical vs. Keynesian views on Unemployment

As we have already seen, the Classical view of the economy is that it is self-regulating and will smooth out any creases in its operations over time. This view also extends to the case of unemployment. The Classical economists argue that there cannot exist long term involuntary unemployment in the economy. Any unemployment will be in the form of temporary unemployment due to frictions in the operation of the labor market (i.e. *frictional unemployment*). When labor demand is low from reduced demand for output, the lower demand will drive down prices which will increase output demand and labor demand will be raised again. Thus the unemployment in the process will be temporary only. The self-correcting feature of the free market economy will ensure that the markets including labor market will clear and so there cannot be long term unemployment.

According to the Classics, the unemployment observed in real life is the result of either govt. intervention or the action of forces in the market that do not allow it to clear. These include labor unions, minimum wage laws, taxes and other forms of govt. regulation that do not allow the market equilibrium to be reached. Therefore, the Classical economists conclude that the free and perfectly competitive markets without govt. intervention will take care of unemployment when left to its own devices.

But on the other hand, we have also seen that Keynes departed from the free market doctrine and advocated for an active government that can use policies at its disposal to fine tune the economy. In explaining the causes of recessions, Keynes linked unemployment due to the reduction in aggregate demand. Thus *cyclical unemployment* was more prone to occur in his view. At the same time, when recessions continue, demand and employment will spiral down further (due to the multiplier working in reverse) and therefore long term unemployment becomes more likely to occur.

The way out, as suggested by Keynes, is in the use of discretionary govt. policies to stimulate aggregate demand and in the process boost employment. Thus the role of govt. is inherent in the Keynesian solution to reducing unemployment.

CHAPTER 11

Aggregate Demand and Aggregate Supply: Tools for Policy Analysis

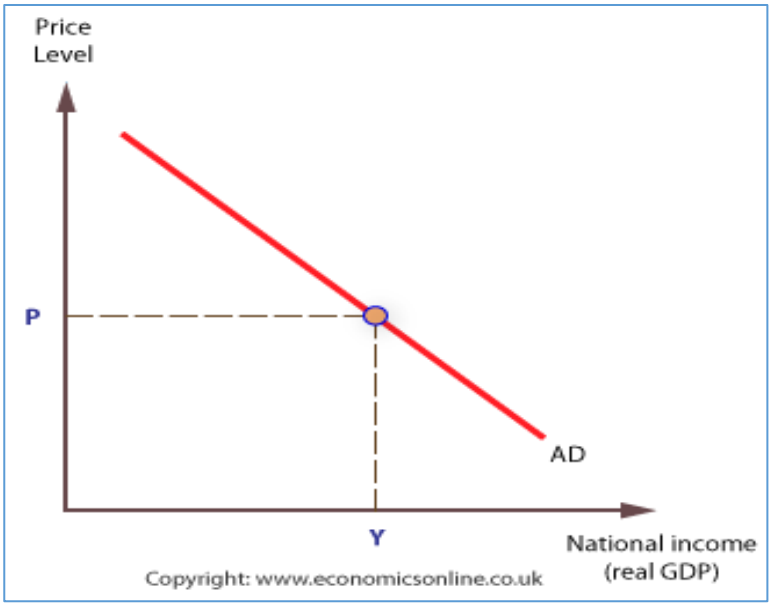
In the last chapter we introduced the model of Keynesian aggregate demand which was used to show how the multiplier effect works – how changes in autonomous components of spending increase income by an amount exceeding the original change in spending. However, note that this AD was not drawn against price – it does not show the relationship between price and quantity demanded which is the basic idea behind any demand relationship. In this chapter we look again at the concept of Aggregate Demand (AD) but in relation with the price level.

11.1 Aggregate Demand

The aggregate demand is the aggregation of all demands for goods and services from the household sector, business sector, government and the rest of the world. It shows the relationship between the output demanded of the economy and the price level. In plotting the aggregate demand, the actual production or GDP of the economy is shown on the horizontal axis while the vertical axis plots the price level of the economy.

It is very important to note that the price level is not the price of a single good or service but it is the general price level of all goods and services in the economy. Recall the concept of GDP Deflator, which captures the price level of the economy. The following figure plots the aggregate demand curve.

Figure: Aggregate Demand



We can see that the AD curve is downward sloping just like in the case of the demand curve for an individual product. But the reason why the AD is downward sloping is very much different from that of an individual product's demand curve. There are three major factors that drive the inverse relationship between the price level and output demanded.

- Wealth effect
- Saving effect
- Foreign exchange

The first is the ***wealth effect***. The aggregate demand curve is drawn under the assumption that the government holds the money supply constant. The supply of money can be thought of as representing the economy's wealth at any point of time. As the price level increases, the wealth of the economy, as measured by the supply of money, decreases in value because the purchasing power of money falls. As consumers now become relatively poorer, they reduce their purchases of all goods and services. On the other hand, as the price level falls, the purchasing power of money increases. The consumers are now relatively wealthier and hence can purchase more goods and services than before. The wealth effect, therefore, provides one explanation for the inverse relationship between the price level and real GDP that is reflected in the downward-sloping AD curve.

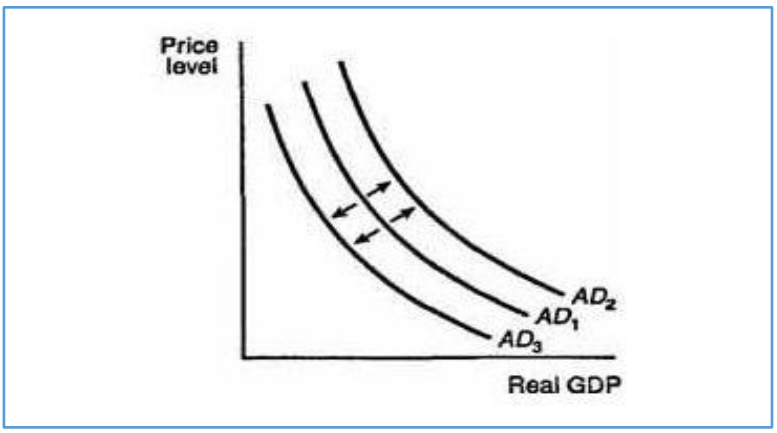
The second explanation is the ***interest rate effect***. As the price level of the economy increases, households and firms require more money to carry out their transactions. But the supply of money in the economy is fixed. The increase in the money demand against a fixed supply causes the price of money, the *interest rate*, to rise. As the interest rate increases, spending (e.g., investment expenditure) that is sensitive to the interest rate will decline. Thus, the interest rate effect provides another explanation for the inverse relationship between the price level and the demand for aggregate output.

The third explanation is the ***net exports effect***. As the domestic price level increases, foreign goods become relatively cheaper and so the demand for *imports* increases. But at the same time, the rise in the domestic price level also means that domestic goods are now relatively more expensive to foreign buyers and so the demand for *exports* decreases. When exports decrease and imports increase, the effect on *net exports* (exports - imports) is a reduction. Because net exports are a component of the AD, the real GDP also declines.

11.2 Changes in Aggregate Demand

Changes in aggregate demand are graphically represented by shifts of the aggregate demand schedule. The figure below shows the two ways in which the aggregate demand curve can shift.

Fig: Shifts in Aggregate Demand



A shift to the ***right*** of the aggregate demand curve from AD 1 to AD 2, shows that at the same price levels the quantity of real GDP demanded has *increased*. Similarly, a leftward shift of the aggregate demand curve, from AD 1 to AD 3, shows that at the same price levels the quantity demanded of real GDP has *decreased*. Note that, changes in aggregate demand are not caused by changes in the price level. Instead they are the result of changes in the demand for any of the components of real GDP: consumption demand (C), investment expenditure (I), government expenditure (G) or net exports demand (NX).

Now consider these examples. Suppose consumers were to decrease their spending on all goods and services, say due to a recession. Then, the aggregate demand curve would shift to the left as a result of the reduced consumption expenditure. Suppose interest rates were to fall so that investors increased their investment spending; the aggregate demand curve would shift to the right. If the government were to cut spending to reduce a budget deficit, the aggregate demand curve would shift to the left. If the incomes of foreigners were to increase, enabling them to demand more domestically produced goods, net exports would increase, and aggregate demand would shift to the right. These are just a few examples of how the aggregate demand curve may shift.

11.3 Aggregate Supply Curve

The aggregate supply curve shows the quantity of real GDP (output) that is supplied in the economy at different price levels. The reasoning behind the construction of the aggregate supply curve differs from the reasoning used to construct the supply curves for individual goods and services. The supply curve for an individual good or service is drawn under the assumption that input prices are fixed. Therefore, when the price of a given good X increases, sellers per unit costs of providing good X do not change, and so sellers are willing to supply more of good X. This gives rise to the upward slope of the supply curve for good X.

The aggregate supply curve on the other hand, is defined in terms of the *price level*. Increases in the price level will increase the price that producers can get for their products and thus bring about more output. But an increase in the price level will also have a second effect: it will eventually lead to increases in input prices as well, which, all things held constant, will cause producers to cut back on production. So, there is some uncertainty as to whether the economy will supply more real GDP as the price level rises. In order to address this issue, it has become customary to distinguish between *two* types of aggregate supply curves, the *short-run aggregate supply curve* and the *long-run aggregate supply curve*.

In the previous chapter, we learnt the differences between the Keynesian and Classical view of the economy. Based on the assumptions of each view, we will now see that they translate into two different shapes of the aggregate supply curve. In particular the Keynesian view best describes the economy in the short run and while the Classical view is better suited to explain the long run.

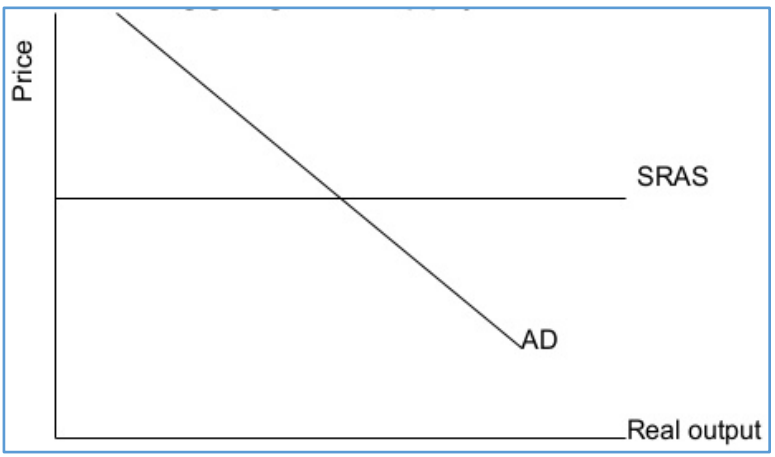
11.3.1 Keynesian Supply curve

The short-run aggregate supply (SRAS) curve is considered a valid description of the supply schedule of the economy *only* in the short-run. The short-run is described as the period when input prices remain constant.

Input prices are the prices paid to the providers of input goods and services (also called factors of production). These input prices include the wages paid to workers, the interest paid to the providers of capital, the rent paid to landowners, and the prices paid to suppliers of intermediate goods. When the price level of final goods rises, the cost of living increases for those who provide input goods and services. Once these input providers realize that the cost of living has increased, they will increase the prices that they charge for their input goods and services in proportion to the increase in the price level for final goods.

The main assumption underlying the SRAS curve is that input providers *do not* or *cannot* take account of the increase in the general price level right away so that it takes some time – referred to as the *short-run* – for input prices to fully reflect changes in the price level for final goods. For example, workers often negotiate multi-year contracts with their employers. These contracts usually include a certain allowance for an increase in the price level, called a cost of living adjustment. This adjustment however, is based on expectations of the future price level that may turn out to be wrong. Suppose, for example, that workers *underestimate* the increase in the price level that occurs during the multi-year contract. Depending on the terms of the contract, the workers may not have the opportunity to correct their mistaken estimates of inflation until the contract expires. In this case, their wage increases will lag behind the increases in the price level for some time. This is described as wages being ***sticky*** in the short run.

Figure: Keynesian Supply Curve



The Keynesian view further extends on the concept of sticky wages to say that prices are also sticky in the short run. That is prices do not respond to demand conditions in the short run. Thus, the Keynesian aggregate supply curve is ***horizontal***, indicating that firms will supply whatever amount of good is demanded at the existing price level. The idea underlying the Keynesian aggregate supply curve is that because there is unemployment, firms can obtain as much labor as they want at the current wage. Their average costs of production therefore are assumed not to change as their output levels change. They are accordingly willing to supply

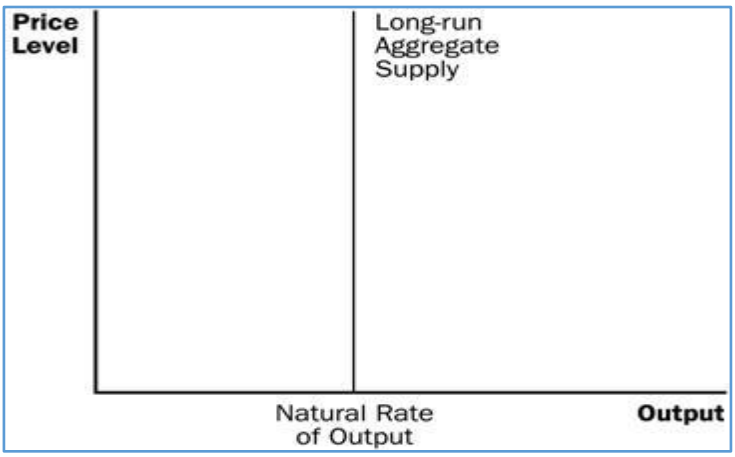
as much as is demanded at the existing price level. As a result, the aggregate supply curve is quite flat in the short run. This is depicted in the figure above.

The key idea here is that in the short run the price level is unaffected by the levels of GDP and so the SRAS is horizontal or perfectly flat in the short run.

11.3.2 Classical Supply curve

The long-run aggregate supply (LRAS) curve describes the economy's supply schedule in the long-run. The long-run is defined as the period when input prices have completely adjusted to changes in the price level of final goods. In the long-run, the increase in prices that sellers receive for their final goods is completely offset by the proportional increase in the prices that sellers pay for inputs. The result is that the quantity of real GDP supplied by all sellers in the economy is independent of changes in the price level. These conditions best describe the economy in the long run and thus the classical aggregate supply curve is a vertical line, reflecting the fact that the long run aggregate supply is not affected by changes in the price level. The figure below shows the classical long run aggregate supply curve.

Fig: Classical Supply Curve



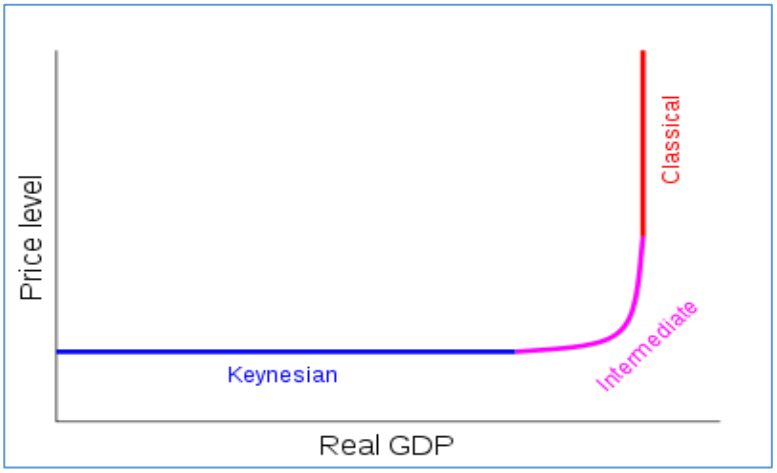
Notice that the LRAS curve is *vertical* at the point labeled as the **natural rate of output**. The classical supply curve is based on the assumption that the labor market is in equilibrium with *full* employment of the labor force. Therefore, the natural level of output or real GDP is defined as the level of real GDP that arises when the economy is fully employing all of its available resources. This level of output corresponding to full employment of the labor force is also referred to as the *potential GDP*.

11.3.3 More realistic supply curve

So far we have seen that the underlying assumptions of the Keynesian and Classical views give rise to two different shapes of the aggregate supply curve. The Keynesian view best describes the economy in the short run when prices are sticky and hence do not respond much to changes in demand. Thus the aggregate supply curve is *horizontal* in the short run. On the other hand, in the long run, the supply of output is determined by the productive capacity of the economy and hence the long run aggregate supply curve is *vertical* at the potential level of output.

Putting the two together allows us to have a more realistic shape of the aggregate supply curve that can be used to describe the economy both in the short and the long run. This is shown in the figure below.

Figure: A more realistic supply curve

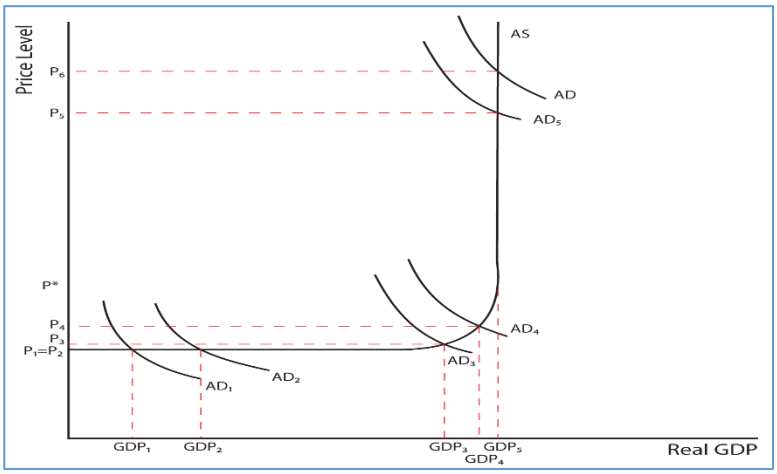


The diagram shows the Keynesian and the Classical segments of the aggregate supply curve as well as the *intermediate* range in which the short run transitions into the long run. In the short run, the curve is horizontal which slowly slopes upwards over time until it becomes vertical at the long run potential level of output. That the supply curve is upward sloping in the intermediate range reflects the positive relationship that exists between the price level and real GDP during the intermediate period of time. Thus integrating the Keynesian and Classical models gives us the more realistic shape of an upward sloping aggregate supply curve.

11.4 Policy experiments with AD and AS curves

In this section we will use the tools of AD and AS we have learnt so far to look at the possible effects of various policy changes in the economy. Recall that the govt. has two types of polices at its disposal: changes in the level of govt. expenditure and taxes i.e. fiscal policy and changes in the supply of money in the economy i.e. monetary policy. We will now look at how changes in these policies affect the equilibrium in the economy. The diagram below shows how changes in aggregate demand at different points on the aggregate supply curve affects the economy.

Fig: Changes in Aggregate Demand



An increase in the money supply

Increasing the money supply in the economy has the effect of shifting the aggregate demand (AD) curve upwards to the right. In the short run, prices are sticky and so do not respond to the demand change. Hence the price level remains unchanged while production of output expands in the short run (AD_1 to AD_2). Over time, the increase in output leads to an increase in the price of inputs for the firms. This causes the price of products to increase and the price level in the economy increases. Now further increases in demand will raise both output and the price level (AD_3 to AD_4). In the long run, when the economy is operating at full capacity, increases in demand will only raise the price level but no increase in output will be forthcoming (AD_5 to AD_6).

A decrease in the money supply

A decrease in the money supply causes the AD curve to shift downwards to the left. In the short run, output will fall while the price level remains unchanged (AD_2 to AD_1). Overtime, when prices can adjust, the further decrease in price level will reduce both output and the price level (AD_4 to AD_3). In the long run, a contraction in demand will only lower the price level with the level of output fixed at the natural level (AD_6 to AD_5).

An increase in the level of govt. expenditure

Increasing expenditures or decreasing taxes by the govt. has the effect of increasing the aggregate demand and pushing the AD curve outwards to the right. This has the same effect on the economy as increasing the money supply.

CHAPTER 12
International Economy

The world has become more globalized in recent times through the exchange of views, thoughts and ideas, goods, services and capital. As countries become more integrated with the global economy, at both private and public levels, the movement and interactions of macroeconomic variables have become more complicated. On the private level, individuals and firms interact with the rest of the world in the international product, labor and capital markets, for example, export and import of product and services (product market), flow of financial and capital investment (capital market), and foreign employment and remittance (labor market). At the government level, international interactions on economic front for a developing country like Bangladesh mostly take the forms of receiving foreign loans, grants and aids from different countries and donor organizations like the World Bank, IMF, ADB and JICA.

Trade - be it domestic or international, has the characteristic that it allows individuals to consume outside their own production capacities. Recall the system of barter, in which goods are exchanged for one another. This lets individuals consume goods and services that they themselves did not produce, making those involved in the trade better off. The same is true for international trade, which allows economies to consume output beyond their own capacity. An example will help to illustrate this concept. Suppose there are two countries, A and B. For simplicity, assume that country A can only produce rice while country B only produces potatoes. When the countries engage in international trade, they each now have the ability to consume both rice and potato, a situation that would not have been possible without trade.

There are several theories that highlight the gains to economies from opening up to international trade. The theory of **absolute advantage** is the most basic of such theories and is the starting point for discussions on trade theories. Let's make the following assumptions:

- ⇨ There are 2 countries: Country A & Country B
- ⇨ There are two goods: Good X & Good Y

Assume further that Country A can produce Good X at a lower cost than Country B while similarly country B enjoys a cost advantage in Good Y relative to Country A. The absolute advantage theory states that:

- ➢ *Country A* should produce and export *Good X* to Country B, and
- ➢ *Country B* should produce and export *Good Y* to Country A

More generally, the theory posits that countries should produce and export those goods on which they enjoy an absolute advantage i.e. the ability to produce the good at a lower cost per unit than the production cost of the good in other countries. Hence the theory forwards that, it would be optimal if each country produce and export the goods in which they enjoy this type of cost advantage while importing the other goods from the other trading countries.

The improvement on the absolute advantage view of trade came in the form of the classical theory of **comparative advantage** developed by David Ricardo. This theory states that rather than comparing costs of production in *absolute* terms, what should be compared is the *opportunity cost* of producing a good compared to another across the countries. Thus, countries should produce and export those goods and services that are relatively cheaper to produce i.e. have a lower opportunity cost of production in the country while import the other goods and services from the trading countries.

The **Heckscher-Ohlin** or **HO** theorem builds on the theory of comparative advantage to explain patterns of trade based on the endowment of factors of production across the trading countries. In its basic form, the theory states that countries will produce and export those goods that employ intensively the abundant factors of production while import the goods that use the scarce factors intensively. The following example will help to illustrate this trade pattern.

Suppose that, there are only two factors of production, say labor (L) and capital (K), and two countries A and B. Country A is rich (or abundant) in capital while Country B is abundant in labor. Assume further that there are only two goods that are produced in the countries: good X and good Y. Good X uses relatively more capital than labor (in either country). Thus, good X is more capital intensive than good Y while good Y is more labor intensive than good X.
Given the above scenario, the HO theorem states that:

- Country A (K-abundant) will produce and export good X (K-intensive) to country B while Country B (L-abundant) will produce and export good Y (L-intensive) to country A.

The theory thus establishes the pattern of production and trade between countries based on their factor endowments.

12.1 Openness of an Economy

The 'openness' of an economy is reflected in its level of transactions with the rest of the world. The more a country is free from *barriers to trade* and the larger the volume of its exports and imports relative to its national income (GDP), the more 'open' is the country. Thus openness is measured by the sum of exports and imports as a ratio of GDP.

As almost all countries have some form of barriers to trade imposed by their governments, no economy in the world is totally open or closed. All governments exercise some degree of regulation in the movement of goods, capital and labor in and out of their country. Therefore, the level of openness of an economy determines a government's ability to freely pursue economic policies of their choice and the degree to which the economy is exposed to international economic shocks. The more a country is engaged in international trade, the more likely it is to be affected by shocks that originate outside its borders. For example, a country like BD which is largely dependent on the inflow of remittance for its source of foreign exchange earnings is very much vulnerable to fluctuations in the economic activities of the remittance sending countries.

The **Openness Index** is an economic metric that calculates the ratio of a country's total volume of trade (i.e. exports plus imports) to its Gross Domestic Product (GDP). That is,

$$\textbf{\textit{Openness Index}} = \frac{Export + Import}{GDP}$$

Therefore, the higher the volume of trade relative to the size of the GDP of the country, the more open is the economy.

12.2 Exchange Rate, how it is determined?

Exchange rate is the price of one currency in terms of another. It is usually expressed as the domestic price of foreign currency. The most quoted exchange rate for Bangladesh is the exchange rate between Taka and the US Dollar (USD/BDT). It is generally quoted as the amount of Taka required to buy 1 USD. It can also be quoted the other way around – in terms of USD per Taka.

Bangladesh Bank quotes the exchange rates of the dealer banks for USD. The dealer banks set the exchange rates based on supply of and demand for USD in the inter-bank markets. Bangladesh Bank reports exchange rates for other currencies based on New York and Dhaka's closing exchange rate. This is known as *cross rates*. There are two types of rates that are quoted – buying and selling - from the point of view of the seller. If you go to a bank or any money exchange house to buy USD, it is the 'selling price' of USD that you would buy your dollars at. Obviously, selling price is higher than buying price and the margin is their profit.

It is important to get used to the convention of the quotation of exchange rate. If you look at the exchange rate between the U.S. dollar (USD) and the Bangladeshi Taka, the exchange rate will be quoted like this:

USD/BDT = 78.4

The currency to the left of the slash is the *base currency* and the currency on the right is the *quoted currency*. Note that this is just a notation; the slash does not signify division. The base currency (in this case, the U.S. dollar) is always equal to one unit (in this case, US $1), and the quoted currency (in this case, Taka) is what one unit of the base currency is in terms of the quoted currency. That is, USD 1 can buy 78.4 BDT. Therefore, similarly we have:

BDT/USD= 0.0127

It means 1 Taka can buy 0.0127 US dollars. This is the uniqueness of the exchange rate: it can be quoted either way.

12.2.1 Appreciation and Depreciation of Exchange Rates

The terms appreciation and depreciation are used in the *floating system* of exchange rates, which we will discuss later on in the chapter. Appreciation refers to the increase in value of a given currency with respect to a base currency. Thus if the Taka appreciates against the USD, it means that the Taka is now more valuable compared to USD. Hence the price of Taka, in terms of USD, will increase in the foreign exchange market.

Say for example, there is an increase in the demand of USD right before the Eid vacation as many people are going abroad for vacation. Hence the demand for USD will go up for a given

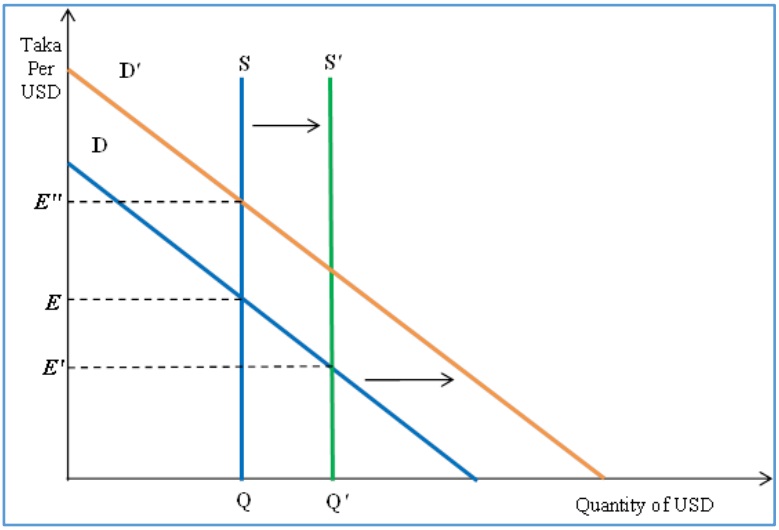
amount of Taka. Given that the supply of the USD in the market is fixed at a given point of time, it will result in USD to appreciate. Thus, if initially 1 USD could buy Tk. 78, now that same USD can buy only Tk. 80. In this case, the USD is said to appreciate against Taka.
When the USD appreciates against the Taka, the flipside is that the Taka is said to depreciate against the USD. This is simply the fact that the Taka has now lost its value relative to USD. Therefore, 1 Taka now can buy fewer numbers of USD than before.

12.2.2 How is the exchange rate determined?

Ideally, like any other commodity, it is determined by market forces - supply of and demand for the currency. When supply increases of a particular currency (relative to another), the currency loses its value against the other. This is referred to as depreciation of the currency in question. For example, if inflow of foreign remittances (USD) increases in Bangladesh, USD will depreciate against BDT. That is, USD becomes cheaper and 1 BDT will buy grater amount of US dollars. Generally, the central bank intervenes in the foreign exchange market to neutralize the impact of over and under supply of dollars to stabilize fluctuations in the exchange rate. This act is called **sterilization**. We will discuss this issue in detail towards the end of this chapter.

Similarly, when there is a dearth of USD, USD becomes dearer and one BDT will buy fewer number of USD. This is the appreciation of USD relative to BDT.

Fig 1: Supply and Demand curves for USD in Bangladesh



The price of USD is expressed in terms of BDT, which is the nominal exchange rate ($E_{\$/BDT}$). You can think of the USD as a commodity whose price is quoted in BDT during buying and selling. The supply curve is the vertical line showing that supply is fixed at a given point of time and the amount of supply is independent of the exchange rate. This is the **S** curve in the Figure 1. The demand curve **D** is a downward sloping curve, implying that for an exchange rate ($E_{\$/BDT}$) increase, when one Taka can buy fewer number of USD, we will demand less USD in Bangladesh. Similarly, when the exchange rate ($E_{\$/BDT}$) drops, BDT 1 can buy more USD, people in Bangladesh will buy more USD and the quantity demanded will be higher.

Now let's put both the supply and demand curves together. The intersection point of the two curves shows the equilibrium exchange rate and the equilibrium amount of USD held by the

residents of Bangladesh. In the figure, the initial equilibrium amount of USD is **Q** while the exchange rate is Taka ***E*** per USD.

Now suppose, there is a huge *inflow* of USD in the country. What will happen to the supply curve? It will shift rightward and the exchange rate ($E_{\$/BDT}$) will fall. For a given supply of BDT, the amount of USD increases in the market and so its price will fall. Recall that the price of USD is simply the number of Takas it can buy. So when the price of USD falls, it can buy fewer numbers of Takas and from our previous discussion we know that the USD depreciates against Taka. It is represented by the **S'** curve and the new equilibrium exchange rate is Taka ***E'*** per USD and quantity of USD is **Q'**.

Now suppose, for a given amount of supply of USD, its demand has increased. With increased demand, its price will also increase and hence each USD will be able to buy more number of Takas. The demand curve will shift upwards and in the figure this is represented by the new demand curve **D'**. The new equilibrium exchange rate becomes **E''**, which is higher than the original one. Thus USD appreciates against BDT. The reverse chain of events will take place when demand for USD decreases – the USD depreciates.

12.2.3 Law of One Price and the Purchasing Power Parity

Exchange Rate determination: An Example

Let's consider two primitive economies – A and B – where there was no money. Both the economies were barter economies and foreign trade was also conducted on barter basis. On one fine morning, both of them invented money. Currency of country A is named Alpha and Currency of country B is Beta. Now, they face a new problem: how to determine the exchange rate between these two currencies – how to trade Alpha for Beta and Beta for Alpha. Suppose both the economies produce the same quality rice. Price of one kilogram of rice in Country A is P^A_{rice} Alpha and price of one kilogram of rice in Country B is P^B_{rice} Beta. Since the product is same, the price should also be the same. Hence, one fundamental way to determine the exchange rate between Alpha and Beta is to equate the price of the same good. That is,

$$\boldsymbol{P^A_{rice}\ \text{Alpha} = P^B_{rice}\ \text{Beta}}$$

This is the core idea of the law of one price and how it provides a simple framework to understand the determination of exchange rates. Suppose the price of rice in country A, P^A_{rice} = 2 Alpha and price of rice in country B, P^B_{rice} = 3 Beta. Therefore, equating the prices again,

2 Alpha = 3 Beta ➔ 1 Alpha = 1.5 Beta

Using our convention, Alpha/Beta = 1.5

The law of one price states that the same good should be priced same everywhere, accounting for the transportation cost. What will happen if the price of rice increases in country A? Country B will export rice to country A to exploit the price differences and take advantage of the arbitrage opportunity. This will push the rice price down to previous level in country A, and in the process, the previous exchange rate will be restored.

The same concept can be extended to the case of multiple goods. Instead of using the price of a single good, we need to use the price of a basket of goods. In this case, for example, the cost

of the market basket in Bangladesh in Taka should be same as the cost of the basket in India, after converting Indian Rupee (INR) to Taka. That is,

Cost of the market basket in Bangladesh = $E^{ppp}_{INR/BDT}$ **× Cost of the market basket in India**

This equivalency of the cost of the *same* market basket across countries is called the **Purchasing Power Parity** (PPP).

If a certain basket of goods cost BDT 1000 in Bangladesh and INR 750 in India, the theory of PPP states that,

$$E^{ppp}_{INR/BDT} = 1000/750 = 4/3 \text{ Taka.}$$

That is, if PPP holds, 1 INR = 1.33 Taka. This is called the **PPP exchange rate**.

There are some situations in which the law of one price will not hold. The first is that if there is substantial transportation costs involved e.g. due to long distance transported, the differences in price will also be high and the equality of prices will not hold. Secondly, if the nature of the good is such that it is not tradable, then the law of one price will not hold as well. Third, if there are barriers to trade present which impede free trade, then due to tariffs and other restrictions, the prices will not be the same across countries.

The PPP is a very useful tool not only for exchange rate determination, but also for cross-country comparison of macroeconomic variables. You might have noticed that PPP adjusted GDP and per capita GDP are often used when comparing the living standard of countries. But how is this PPP adjusted GDP calculated?

Suppose you identify a basket of goods you usually purchase and it costs you BDT 2600. Now you go to USA and buy the same basket of goods and it costs you USD 100 in USA. Now we can calculate the purchasing power exchange rate as:

Cost of the market basket in Bangladesh $= E^{ppp}_{USD/BDT}$ × Cost of the market basket in USA

⇨ $2600 = E^{ppp}_{USD/BDT} \times 100$

⇨ $E^{ppp}_{USD/BDT} = 26$

This is also known as the **PPP Conversion Factor**. It is the amount of local currency required to buy the same amount of goods and services in the local market as one USD would buy in USA. Thus, BDT 26 can buy in Bangladesh what 1 USD will buy in USA.

The following example will help to illustrate the point further. Suppose that a shirt costs $1 in the USA while the same shirt costs Tk. 26 in BD. Thus, the PPP adjusted exchange rate will be Tk. 26 for $ 1.

Now we assume for the sake of simplicity that the basket constitutes the GDP of Bangladesh. Then we have:

PPP adjusted GDP in USD $= \frac{GDP}{PPP\ CF} = \frac{2600}{26} = 100$ USD

And, **Nominal GDP** in USD $= \frac{GDP}{Ex.Rate} = \frac{2600}{78} = 33.33$ USD

[Using market ex. rate USD/BDT = 78 Taka]

How do the two figures compare? It can be seen that the PPP adjusted GDP is three times larger than nominal GDP in US dollars. In fact, the PPP Conversion Factor was **27.05** in 2014 when it was last estimated for Bangladesh!

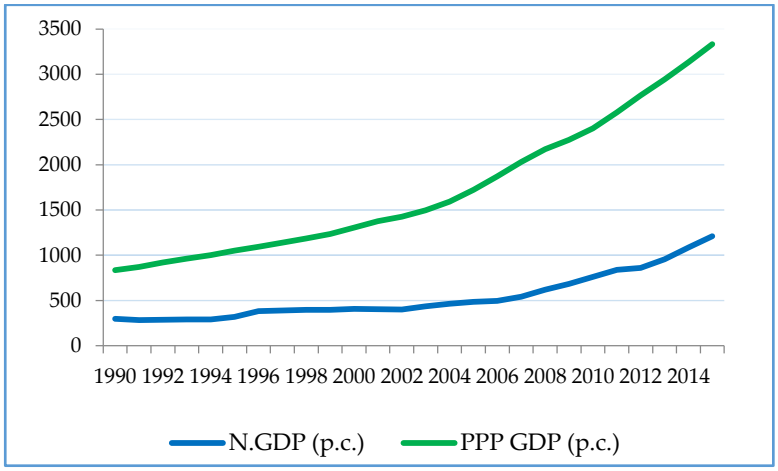
12.3 PPP GDP and Nominal GDP

The PPP adjustment to GDP thus converts the Nominal GDP figure into a number that is more easily comparable across countries with different currencies. GDP adjusted for PPP takes into account the relative costs of local goods and services produced in a country valued at prices of the foreign currency (USD). Thus, it not only factors in the exchange rate but also the inflation rates of each country. Additionally, the PPP GDP reflects the purchasing power of a citizen in one country compared to a citizen of another.

Let us now look at the actual figures of Nominal and PPP adjusted GDP for our country.

Fig 2: Nominal and PPP adjusted GDP per capita for Bangladesh (in US $)

Source: WB data



The figure above plots both the nominal and PPP adjusted GDP *per capita* for Bangladesh over the period of 1990-2015. As can be seen, nominal GDP has experienced growth over the period and so has the PPP adjusted GDP. But what is noticeable is that the PPP adjusted GDP is higher than the nominal value and that the gap between the two has widened over the course of time.

PPP adjusted GDP is higher than nominal GDP because, after adjusting for the domestic purchasing power of the Taka, the value of the GDP of Bangladesh increases significantly. This is due to the fact that the price level of goods and services in Bangladesh is lower than that in the USA (as the USD is the base currency on which PPP is calculated). Thus the same amount of Taka can buy more of the same goods and services in BD compared to USA. Therefore, after accounting for the purchasing power of Taka, the value of GDP of Bangladesh increases relative to its nominal value (which is not adjusted for the purchasing power of the local currency). And so while in nominal terms, the per capita GDP of BD is much lower than that of USA, the gap between the two narrows down by a large degree when accounting for the differences in the purchasing power of the currencies.

As we saw above, the gap between nominal and PPP GDP has increased over the period as the PPP value has experienced higher growth in recent years. As PPP reflects the purchasing

power of Taka relative to the USD, this means that the purchasing power of Taka has increased more than that of the USD during the period. Thus, while the growth in nominal GDP has been lower, the PPP GDP saw much higher growth thanks to the higher relative purchasing power of the Taka.

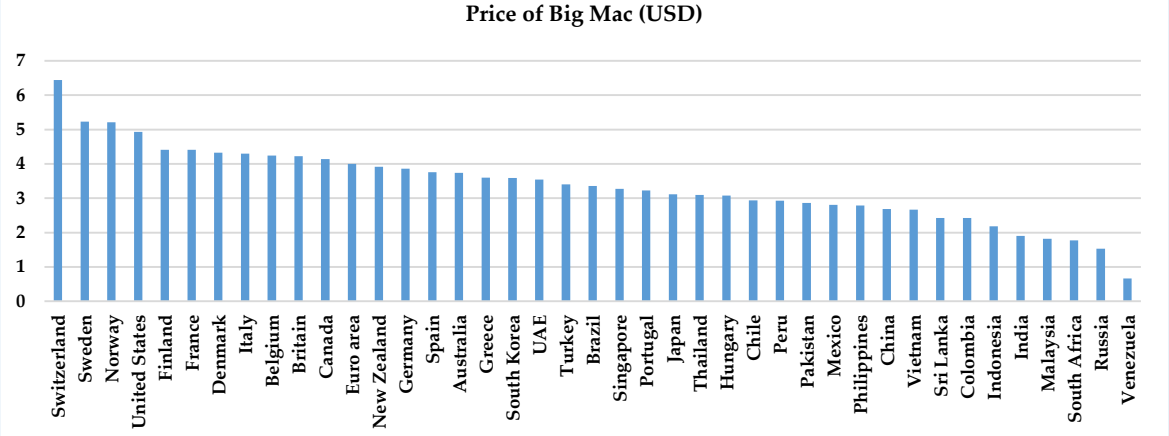
Box 1: The Big Mac Index

The Economist magazine in 1986 introduced a novel idea of calculating PPP using a single product – the Big Mac burger which uses the same recipe across the world. The fast food chain *McDonald's* sells the burger – **Big Mac** – in its all stores of 48 countries. It gives some idea about the 'correct' level of exchange rate between two countries and also about the cost of living. It was devised as a lighthearted tool which "seeks to make exchange-rate theory a bit more digestible''.

For an example, The index (Figure 2) shows that the average price of a Big Mac in USA in January 2016 was USD 4.93 and in China it was only USD 2.68 at the market exchange rates. The Big Mac index says that the Chinese currency Yuan was *undervalued* by 46% [= (4.93–2.68)/4.93 × 100%] in January 2016 against USD. In India, the price of Big Mac was USD 1.9 and the Indian currency Rupee was undervalued by 61.4% in January 2016.

The law of one price or PPP says that the price of Big Mac should be same in all countries, in its crude sense. In fact, the insight it captures is much broader - PPP sheds light on the 'long run equilibrium'. That is, over time the exchange rate between two countries should move towards a rate at which the cost of the market basket would be equalized and this is the PPP exchange rate.
The current difference in prices reflects the difference in cost of production in different countries. The burger would be cheaper in developing countries than the developed countries. As the economies develop, these differences in cost of production would narrow and market exchange rate will move towards the PPP exchange rate.

Figure 3: Price of Big Mac burger in some selected countries



Data source: http://www.economist.com/content/big-mac-index

12.4 Foreign Exchange Market of Bangladesh

The foreign exchange market of the country is no longer confined to the city of Dhaka but has been extended to other important cities like Sylhet, Chittagong and Khulna. All the scheduled banks of the country are allowed to deal in foreign exchange and the Bangladesh Bank fixes

the *open position limit* for the banks under which they are to operate in the interbank foreign exchange market.

The actors in the foreign exchange market of Bangladesh are the Bangladesh Bank, authorized dealers and customers. The Bangladesh bank is the regulator of the market but it does not operate directly and instead regularly keeps eye on the market and intervenes, if necessary, through the commercial banks.

The authorized dealers are the only resident entities in the foreign exchange market that can transact and hold foreign currencies both at home and abroad. Bangladesh Bank only permits scheduled banks to be authorized dealers. The amount of foreign currencies that the dealers can hold are subjected to open position limits prescribed by the Bangladesh Bank which itself engages in the purchase and sale of foreign currencies from the dealers on spot basis. Along with the authorized dealers, there are registered money changers who can buy foreign currencies from tourists and sell them to outgoing Bangladeshi travelers as per entitlement. Their excess holdings beyond the permitted balance limit are required to be retained with the authorized dealers.

In the event of speculation on an appreciation of the value, an authorized dealer may buy more foreign currencies than it needs, but at the end of the day it must maintain its limit by selling the excess currencies either in the inter-bank market or to customers. Authorized dealers maintain clearing accounts with the Bangladesh Bank in dollar, pound sterling, mark and yen to settle their mutual claims. If any excess foreign exchange holdings exist after these transactions, it is obligatory for them to sell it to the Bangladesh Bank. In case of shortfall of the limit, authorized dealers have to cover it either through purchase from the market or from the Bangladesh Bank.

12.5 Nominal vs. Real Exchange Rate and Real Effective Exchange Rate (REER)

Real exchange rate is the nominal exchange rate adjusted for respective country's price level. Why do we need to adjust for price? Suppose you want to make a trip to USA for a month and check their exchange rate which is 78 Taka per USD. Now you want to prepare a budget for yourself - how much money you would need to carry with you to meet the expenses of a month in USA? In order to do so, you also need to know the purchasing power of dollar in USA. That is, the cost of living in USA. So, it is not the nominal but the real value of the exchange rate that you are interested in. Similarly, an US citizen, who wants to travel to Bangladesh, also wants to know the purchasing power of USD in Bangladesh, after converting into Taka.

The conventional notation often confuses us when we use it in the mathematics because of the presence of 'slash'. Let's denote the nominal exchange rate - the cost of 1 USD in Taka as $E_{\$/BDT}$ and the cost of 1 Taka in USD as$E_{BDT/\$} = \frac{1}{E_{\$/BDT}}$. We define real exchange rate as:

$$\boldsymbol{Real}\ E_{\$/BDT} = E_{\$/BDT} \times (\boldsymbol{CPI^{US}/CPI^{BD}})$$

The real exchange rate is the ratio of prices in two countries expressed in one currency. We use the Consumer Price Index (CPI) to represent the general price level of the countries. In this case, real exchange rate is the ratio of USA's price to Bangladesh's price, expressed in BDT.

This can also be interpreted in the terms of cost of living, expressed in the other currency - USD.

$$\textbf{Real}\, E_{\$/BDT} = \frac{\boldsymbol{CPI^{US}}}{\frac{\boldsymbol{CPI^{BD}}}{E_{\$/BDT}}} = \frac{\boldsymbol{CPI^{US}}}{\boldsymbol{CPI^{BD}} \times E_{BDT/\$}}$$

Let's consider the denominator first. It is the cost of the market basket of the consumer in Bangladesh (CPI^{BD}), converted into USD by multiplying with the nominal exchange rate ($E_{BDT/\$}$). On the other hand, the numerator is the cost of the market basket in USA, which is already in USD. Therefore, the real exchange rate can also be expressed as the ratio of the cost of the market basket of the consumers of USA (the numerator) to that of Bangladesh (the denominator), expressed in the same currency (USD).

Recall that the Nominal Exchange Rate is the cost of 1 USD in Taka. From the nominal rate, we get the real rate:

$$Real\ Ex.Rate = Nominal\ Ex.Rate \times \frac{Price\ level\ in\ USA}{Price\ level\ in\ BD}$$

The above expression makes it clear how the real rate facilitates the comparison of price levels in the two countries by expressing them in the same currency. The real exchange rate is dimensionless as the currency units in the numerator and denominator cancels each other out.

Example - Calculating the Real Exchange Rate

Suppose that you are provided with the following information for 2015 and asked to calculate the Real Exchange Rate. How would you proceed?

- ✓ USD-Taka exchange rate: USD/Taka = 77.95
- ✓ CPI of USA = 108.70
- ✓ CPI of BD = 143.66

Answer: To find the real exchange rate, we proceed as follows.

Using the nominal exchange rate of USD/BDT = 77.95, we have:

⇨ CPI of USA in terms of Taka = 77.95 × 108.70 = 8473.165

Therefore,

$$\text{Real Exchange Rate } (\textbf{Real E}_{\$/BDT}) = \frac{\text{Price Level of USA (in Taka)}}{\text{Price Level of BD (in Taka)}} = \frac{8473.165}{143.66} = 58.98$$

In our example, using the nominal exchange rate of Tk. 77.95 per USD, we find that the real exchange rate is 58.98. Therefore although the nominal exchange rate is higher, once we account for the difference in the price levels of USA and BD, the real terms of exchange of USD for BDT becomes smaller.

12.5.1 What does the Real Exchange Rate indicate?

Now that we have seen how the real exchange rate is calculated, we revisit its meaning. The real rate tells us how many times more or less goods and services can be purchased abroad (after converting to the foreign currency) than in the domestic country for a given amount. Therefore, while the nominal exchange rate tells us how many Takas it takes to buy 1$, the real rate tells us what can be bought with the 1$ in USA compared to BD.

Take for example, an identical shirt which is sold in both USA and Bangladesh. If the Real $E_{\$/BDT}$ is 1, then this shirt will cost the same in the two countries, when the price is expressed in a common currency. Suppose that the $E_{\$/BDT}$ is equal to 80, then Real $E_{\$/BDT}$ would equal 1 if the shirt costs exactly $ 1 in USA and Tk. 80 in BD. This is because:

$$\textbf{Real } E_{\$/BDT} = \frac{80 \times 1}{80} = 1$$

This means that the price of the shirt is the same in both countries once the prices have been expressed in the same currency. Put differently, there is no parity in the price of the shirt between the two countries. In a more general sense, $1 can buy the same amount of goods and services in BD as can Tk. 80 in the USA (off course, after conversion). Hence, in our one product example, the purchasing power parity of the dollar and Taka is the same.

Continuing with our example, suppose that the price of the shirt now increases to $ 1.5 in USA while its price in BD remains the same. If the Nominal $E_{\$/BDT}$ does not change, we have:

$$\textbf{Real } E_{\$/BDT} = \frac{80 \times 1.5}{80} = 1.5$$

Now the real exchange rate is greater than 1. What does it imply?

First of all, notice that the shirt now costs 50% more in USA than in BD. In our simple one product example, the real rate changes in the same way as the price of the shirt and so it also increases by 50% (to 1.5 from 1). Therefore when the real exchange rate is greater than 1, $1 can buy a larger amount of goods and services in BD than Tk. 80 can in the USA.

Additionally, as the shirt costs 50% more in USA compared to BD, it indicates that the USD is 50% ***overvalued*** relative to the Taka. Thus, although the nominal exchange rate has not changed, Real USD/BDT Exchange Rate has increased due to prices increasing more in USA than in BD.

When the real rate is *not* equal to 1, there should be arbitrage opportunities as the same good can be purchased in the low price country (BD) and sold to the high price country (USA) for a profit. But in the real world several factors like transportation costs, trade barriers and consumption preferences gets in the way of making a straight price comparison and so reduce scope for such arbitrage opportunities.

12.5.2 Appreciation and Depreciation of Real Exchange Rate

Earlier in the chapter we learnt that when the Taka appreciates relative to USD, the price of Taka in terms of USD increases. This is the appreciation of the nominal exchange rate. We now turn to the issue of appreciation and depreciation of the real exchange rate.

We know that the real exchange rate is given by:

$$\textbf{Real } E_{\$/BDT} = Nominal\ E_{\$/BDT} \times \frac{Price\ level\ in\ USA}{Price\ level\ in\ BD}$$

Following our definition, an appreciation of a given currency (Taka) relative to a base currency (USD) implies that the value of the currency has increased compared to the base. From the real exchange rate equation, it should be clear that the real rate can appreciate due to two reasons. The first is from an appreciation of the *nominal rate* and the second is due to a *reduction* in the USA-BD price ratio. Thus, if the price level in BD increases relative to the US price level, the real USD/BDT exchange rate will appreciate even if there is no change in the nominal exchange rate.

When the real exchange rate (Real $E_{\$/BDT}$) appreciates, it indicates that the foreign price (in Taka) of a bundle of goods and services has fallen relative to the domestic price. Therefore, the price of US imports in BD decreases while the price of exports of BD to USA increases in USA. Hence, when Real $E_{\$/BDT}$ appreciates, the real value of the US dollar depreciates and the purchasing power of dollar falls in relative terms.

On the other hand, when the price level in USA rises relative to the price level in BD, the real exchange rate depreciates. This means that goods and services in USA have become dearer relative to goods and services in BD. Now one Taka can buy fewer numbers of goods and services in USA (after converting to USD) than in BD. The higher US price level compared to BD means that the purchasing power of Taka falls in relative terms and so the Taka depreciates.

Note that in calculating the real exchange rate, we need to make use of the price levels of the two countries. If the basket of goods in the two countries were the *same*, then things would have been easier for us. But in practice they are not and so we usually need to use some broad measure of the price level such as GDP deflator.

12.5.3 Real Effective Exchange Rate (REER)

Before discussing REER, let us first look at the definition of Nominal Effective Exchange Rate (NEER). NEER is a measure of the value of the domestic currency against a weighted average of several foreign currencies. The foreign currencies usually form a basket or an index against which the domestic currency is valued. The weights are determined by the relative trade balance of the domestic country against each country in the index. It is expressed as an index number and thus shows the extent by which the exchange rate of the domestic currency changed relative to exchange rates of its trading countries compared to a base year.

Put simply, NEER compares the exchange rate of a given currency not just with another individual currency but with a basket of currencies. The currencies in the basket are those of the major trading partners of the country and are weighed by the relative shares of the trading partners in the total trade of the country. This is also referred to as saying that the exchange rates in the index are trade-weighted.

For example, to calculate the NEER for Bangladesh, we weight the nominal exchange rate of Taka against the currencies of the major trading partners of Bangladesh by their respective share in Bangladesh's total trade and then sum up the weighted exchange rates.

NEER differs from nominal exchange rate as it compares the given currency with a basket of currencies instead of just a single one. It therefore indicates how well the currency is doing in relation to a group of currencies. By using real exchange rates in place of the nominal ones, the NEER is converted into the Real Effective Exchange Rate or REER. The REER is therefore the NEER divided by a price deflator or index of costs and hence takes into account the changing purchasing power of different currencies.

An increase in the REER for a country implies that its exports have become more expensive while imports have become cheaper and so the trade competitiveness of the country declines. As the currencies in the basket are those of the major trading partners of a country, REER can be used to evaluate the trade capability and current export/import situation of the country. REER also reflect changes in international price or cost competitiveness.

12.5.4 PPP Exchange Rate and the Real Exchange Rate

Both PPP exchange rate and real exchange rate take into account the price level or the cost of living of the relevant countries. When the value of the real exchange rate is equal to 1, both are the same.

$$\boldsymbol{Real}\ E_{\$/BDT} = E_{\$/BDT} \times \left(\frac{CPI^{US}}{CPI^{BD}}\right) = \mathbf{1}$$

From which we have:

$$\boldsymbol{CPI^{BD} = E^{ppp}_{\$/BDT} \times CPI^{US}}$$

As described above, it means both Bangladesh and USA enjoy the same price level and cost of living. Now suppose the real exchange rate changes and becomes greater than 1. It implies that goods and services in USA have become more expensive than in Bangladesh. What is its implication on the competitiveness in the international market? If the real exchange rate Real $E_{\$/BDT}$ appreciates, we need more BDT to buy one USD. Therefore, goods and services of USA become dearer for the people of Bangladesh. Similarly, if the real exchange rate depreciates, goods and services of USA become cheaper. It is important to keep in mind how changes in real exchange rate change the competitiveness of the countries.

12.5.5 Fluctuation of exchange rates in Bangladesh: Nominal vs. Real

In a floating exchange rate regime, where the exchange rate is determined by supply and demand forces in the market, the exchange rate is likely to experience some fluctuations as it adjusts to changing market forces. But fluctuations of large magnitudes (in either way) can be detrimental to the macroeconomic health of the country. Too much exchange rate volatility thus creates uncertainty in the economy and is undesirable.

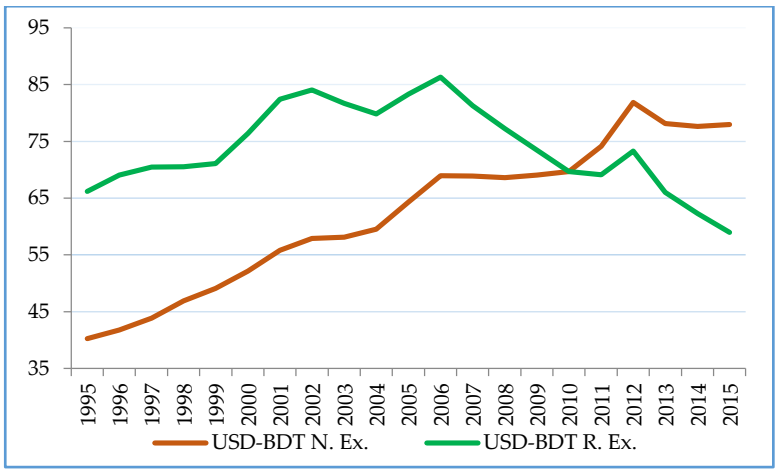
The figure below (Figure 2) shows the trend in the nominal and real USD-BDT exchange rates over the period of 1995 to 2015. It can be seen that while the real exchange rate was higher than the nominal rate during the first half of the period under review, the real rate began to

steadily decline (i.e. appreciate) from 2006 onwards. Until 2002, the nominal rate was declining at a fairly steady pace and the real rate roughly followed the same trend. Between 2002 and 2004, while the nominal rate depreciated slightly, the real rate appreciated. The nominal rate saw a sharp depreciation of 15.67% between 2004 and 2006 and the real rate responded similarly, reaching a peak of 86.32 in 2006. From this point onwards, the real rate followed a generally declining trend.

Between 2006 and 2010, while the nominal rate was fairly stable, the real rate declined sharply. The Taka experienced another spell of sharp depreciation by about 17.8% against the USD during 2011 and 2012 and the real rate responded with a slight depreciation as well. From 2012 onwards, the Taka appreciated a little against USD in nominal terms and remained fairly stable for the rest of the period. The real rate on the other hand declined sharply (i.e. appreciated) over the same period.

Figure 4: Trends in Nominal and Real USD-BDT Exchange Rate (Tk.) (Base: 2010=100)

Source: WB Data



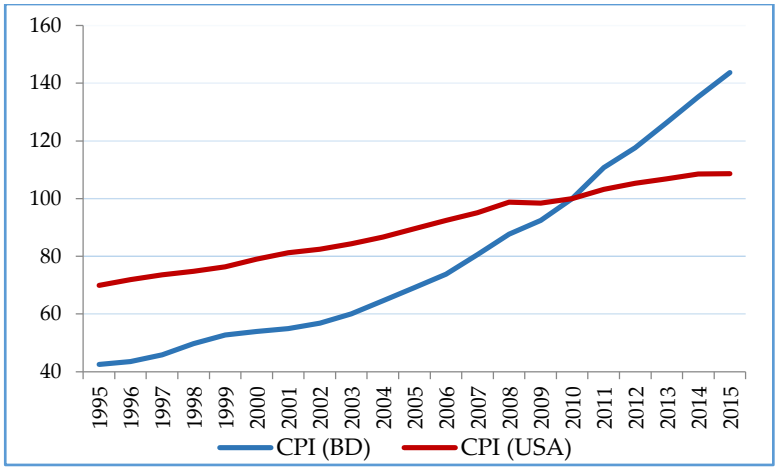
Next, we also plot the trend in the price levels of the two countries (as measured by CPI) for the same time period (Figure 3) to see how they relate to movements in the real exchange rate. It can be seen that, while the price level of USA has grown at a steady pace throughout the period under review, the Bangladesh price level started to increase at a greater pace from the early years of the 2000s. The indices coincide in 2010, which is the base year in our data, while the relatively greater growth of the Bangladesh price level continued in the mid-2010s.
Getting back to the issue on our hands, we can use the trend in the price levels to explain the observed pattern in the USD-BDT real exchange rate. Recall, the real exchange rate equation is:

$$\text{Real } E_{\$/BDT} = \text{Nominal } E_{\$/BDT} \times \frac{\text{Price level in USA}}{\text{Price level in BD}}$$

The real rate will increase as long as the nominal rate is increasing or the USA-BD price ratio is increasing or both. Therefore, even during the periods when we observe that the nominal rate is fairly stable, the real rate declines due to the relatively higher growth of Bangladesh price level compared to USA. So, we find that the trend in the real rate can be attributed to movements in the nominal rate as well as the relative growth of Bangladesh price level compared to USA.

Figure 5: Trends in CPI of Bangladesh and USA (Base: 2010=100)

Source: WB Data



12.6 Exchange Rate Regimes

An exchange rate regime refers to the system that a country's monetary authority (which in the case of most countries is the central bank) adopts in order to establish the exchange rate of its own currency in terms of the currency of other countries. Each country is free to choose the exchange rate regime that it believes is optimal given the country's mix of monetary and fiscal policies. The main distinctions made among the different types of regime is usually that between the fixed and the flexible system of exchange rates. most of the other types are in between these two polar cases. Determining the best exchange rate policy for a country is not a simple task as much will be at stake. The economy will be greatly affected by the exchange rate regime that it follows. We will discuss the different regimes and how they affect the economy in detail in the next section but first we briefly review the evolution of exchange rate systems over time.

Chronology of Exchange Rate regimes

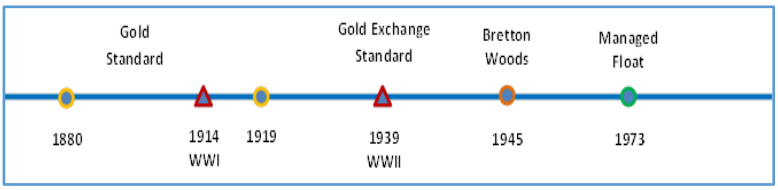
1880-1914 - Specie: **Gold Standard** (bimetallism, silver); currency unions, currency boards; floats

1919-1945 - **Gold Exchange Standard**; floats; managed floats; currency unions (arrangements); pure floats; managed floats.

1946-1971- Bretton Woods adjustable peg; floats (Canada); Dual/Multiple exchange rates

1973-Now - **Free Float**; managed float, adjustable pegs, crawling pegs, basket pegs, target zones or bands; fixed exchange rates, currency unions, currency boards.

Fig 6: Timeline for the different exchange rate regimes



Gold Standard

Under the gold standard, the participating countries would fix the price of their currency to a specific amount of gold. Since the values of the countries' currencies were fixed, the exchange rate between two countries was fixed as well. In this arrangement, the money could be freely converted into gold. USA adopted the gold standard in 1834 and fixed the price of gold at

USD 20.67 per ounce and this price lasted until 1933. Britain fixed the price at GBP 4.27 per ounce. Therefore, the exchange rate between USD and GBP became GBP/USD = 4.867 (i.e. $ 4.867 per pound). The period from 1880 to 1914 is known as the period of **classical gold standard**. The main reason for adopting the gold standard was to bring order in the world financial system as it was supposed to bring stability in price and exchange rates. The role of central bank was very minimal in this monetary system.

This system worked through the automatic adjustment of the balance of payment (we will discuss this term in detail later on in this chapter) in a process known as the **price-specie-flow** mechanism. The following explains how the process worked. For example, suppose an innovation brought about significant technological changes in USA and as a result, the economy experienced higher growth. But since the money supply, which is determined by the fixed supply of gold, is also fixed in the short run, too little money would chase too much goods. It will result in a drop in the price level (i.e. deflation) of the goods of USA. Therefore, the goods of USA will become cheaper relative to the goods of other countries and hence the demand for US goods will increase and as a result, USA's export to the rest of the world will increase. This will lead to an increase in the inflow of gold (specie) to the USA and therefore, the money supply and price level would increase. So, the price level will rise in USA while it will decline in the other exporting countries until the prices are equalized across the countries (and there will be no new flow of gold into or out of the USA).

Gold Exchange Standard

During World War I, when the countries participating in the war resorted to methods of financing that were inflationary in nature, the gold standard broke down. But it was reestablished briefly during the period of 1925 to 1931 as the **Gold Exchange Standard**. Under this new standard, countries could hold reserves in gold or US dollars or GB pounds, except for the USA and the UK, which could only hold reserves in gold. But this type of exchange standard was only short lived and broke down in 1931 when Britain departed from the gold standard due to huge outflows of gold and capital. Finally in 1933, President Franklin D. Roosevelt of the USA nationalized all gold owned privately by citizens and invalidated contracts in which payments were specified in gold.

Bretton Woods

The next step in modification of the gold standard came in the form of the **Bretton Woods** system. Between 1946 and 1971, countries operated under this system of exchange rate. Under this system, countries would settle their international payments in terms of US dollars while the US government promised to redeem its currency (held by other central banks) for gold at a fixed rate of $35 per ounce. But when the USA began to experience persistent deficits in its balance of payments, the gold reserves of USA began to steadily decline. This reduced the confidence in the ability of the USA to redeem its currency in gold and hence the confidence in the system began to decline. Finally on 15th August, 1971, President Richard M. Nixon announced that the USA would no longer convert currency for gold. This was the final stage of the gold standard before it was entirely abandoned.

12.7 Different Exchange Rate Regimes

Now, let's define the two broad categories of exchange rate regimes, though there are finer differences in each category.

12.7.1 Fixed Exchange Rate

The **fixed** exchange rate, also referred to as **pegged** exchanged rate, is an exchange rate regime in which the currency of a country is fixed to another county's currency, a basket of currencies or some other measure of value, such as gold. Under this regime, the monetary authority of the country sets the exchange rate and commits itself to maintaining this rate through the purchase and sale of the domestic currency at this price. This is achieved through the central bank intervening in the foreign exchange market and through changing interest rates. Therefore, both the gold standard and the Bretton Woods system are examples of this type of regime. In the case of the former, the value of most currencies was denominated in terms of gold while in the latter the currencies were paired to the US dollar.

How is the fixed rate maintained?
After the monetary authority of the country determines the exchange rate and fixes it at this value, it is now the duty of the central bank of the country to maintain the exchange rate at this level. The central bank does so by buying and selling the domestic currency in the foreign exchange market at the predetermined price. The following explains how this process works. Suppose that the pressure is on the exchange rate to appreciate, say due to increased exports demand. The central bank will then sell the domestic currency in the market in exchange for foreign currencies. Thus the supply of domestic currency will increase (expansionary monetary policy) while that of foreign currencies will simultaneously decrease. This will result in the price of the domestic currency (in terms of foreign currencies) to fall and in the process the appreciating pressure on the domestic currency would be reduced until the fixed rate of exchange is restored. When the central bank responds to currency appreciation in this way, it is termed as a *devaluation* of the domestic currency.

The opposite will happen if the domestic currency is experiencing depreciating pressures e.g. due to increased imports demand – the central bank will then buy the domestic currency from the market in exchange for foreign currencies. In the process, the supply of domestic currency in the market will be reduced (contractionary monetary policy) while that of foreign currencies will be increased. Therefore, the price of domestic currency (in terms of foreign currencies) will increase and the depreciating pressure on the domestic currency would be reduced until the fixed exchange rate is restored. When the central bank responds in this way to depreciating pressures, it is termed as a *revaluation* of the domestic currency.

In this way, the central bank of the country can keep the value of the domestic currency at a fixed level relative to foreign currencies and hence maintain the **fixed exchange rate**.

Monetary policy, Exchange rate policy and Sterilization
But what happens to the ability of the central bank to control the money supply when the country is under a fixed exchange rate regime? Recall that the money supply is the amount of *domestic currency* in the hands of the public. When the central bank adjusts the money supply

in order to maintain the fixed exchange rate, can it any longer pursue a monetary policy that is independent of its exchange rate policy?

Here is an example to illustrate the situation. Suppose that the central bank wants to reduce the money supply in the economy in order to bring down inflation. But if the country is under a fixed exchange rate regime, this would mean that the domestic currency would *appreciate* as a result of the lower supply of domestic currency in the market (for a given supply of foreign currencies). Under such circumstances, the central bank cannot change the money supply without affecting the exchange rate (or change the exchange rate without affecting the money supply). Therefore, under a fixed exchange rate regime, the central bank loses its ability to pursue monetary policies which are independent of its exchange rate policies. This is one of the main disadvantages of this type of exchange rate system.

On the other hand, say when the central bank sells domestic currency in the market with the purpose of devaluating the domestic currency, the supply of the currency increases in the economy and it can lead to inflation. But in this situation, the government has a tool in its hands which can reverse the increased supply of domestic currency. The govt. can now issue bonds (denominated in the domestic currency) and sell them to the public and in the process mop up the excess supply of currency in circulation. This can be an effective method to reduce the excess money supply while also ensuring that the fixed exchange rate is maintained. This action by the central bank is referred to as **sterilization** as the central bank can effectively 'sterilize' the inflationary effects of the increased money supply through the sale of government bonds.

12.7.2 Flexible Exchange Rate (Clean and Dirty)

Now we turn to the other major type of exchange rate regime – the **flexible exchange rate** system. Under this system, the exchange rate is determined by the global supply and demand of currencies. Therefore the exchange rate in this system is simply the price of foreign currency set by the market depending on supply and demand conditions. Hence, while the exchange rate is more prone to fluctuations under this regime (as it is not pegged or controlled by the central bank), it will more accurately reflect underlying demand and supply conditions in the foreign exchange market. Here is how this exchange rate works. Suppose that the demand for the domestic currency increases. This increased demand, for a given supply of the domestic currency will tend to increase its price relative to foreign currencies. Hence, the domestic currency would appreciate. Similarly, the opposite will take place when the demand for the foreign currency increases. The price of foreign currency in terms of domestic currency will increase and the domestic currency will depreciate. Thus, the market forces of supply and demand are what determine the price (i.e. the exchange rate) of the currency.

Within this definition of the flexible exchange rate system, there are two types of regimes. On one hand there is the pure floating regime (also referred to as clean float) in which the pure form of flexible exchange rate is adopted with absolutely no purchase or sell of currency by the government. Thus the exchange rate is allowed to be entirely determined by market forces with no interventions by the government. On the other hand, we have the managed floating regime (also referred to as dirty float) in which the flexible exchange rate is subjected to at least some extent of official intervention. Thus, while this exchange rate is also set by the

market, the government intervenes from time to time to prevent excessive appreciation or depreciation of the domestic currency. This is done in order to act as a 'buffer' against economic shocks and soften their impact on the domestic economy. Therefore, we can say that the managed float is in between a fixed and a floating exchange rate regime. Most developed countries employ the flexible exchange rate regime with some form of government intervention from time to time. The Canadian dollar most closely resembles the system of 'pure floating' regime while the exchange rate regimes of UK and Japan are 'managed' to a greater extent.

Having looked at the two polar types of exchange rate regimes, we now briefly discuss the other system of exchange rates that are also used by different countries.

12.7.3 Other classifications of Exchange Rate Regimes

- **Crawling Peg** – This system of exchange rate has two main characteristics. First, the par value of the currency is fixed but it is revised from time to time due to changes in market factors such as inflation. Second, there is a band of rates within which the exchange rate is allowed to fluctuate. These characteristics of this exchange rate allow for the progressive devaluation of the domestic currency (as opposed to sudden devaluations) and hence create a more favorable situation for the economy in face of currency devaluation. Hence this system of exchange rate is most commonly adopted by 'weak' currencies, such as by some Latin American countries against the US dollar.

- **Target Zone** – This is an exchange rate arrangement in which certain countries commit to maintain the exchange rate of their currency within a specific margin or band. The margin can be set relative to another currency or a basket of currencies. The spread of the margin can vary and depending on this spread, there are two types of target zone arrangements. In the strong version, the margin for fluctuation is within 1% or less of the fixed value and it is infrequently revised. In the weak version, the exchange rate can fluctuate more than 1% around the fixed rate. Target zone arrangements are in between fixed and flexible exchange rate systems and as such they offer relatively stable exchange rates while allowing some fluctuations due to changing market conditions.

- **Currency Board** – This is an exchange rate regime which is based on the full convertibility of the local currency into a reserve currency (the anchor currency) at a fixed exchange rate and full coverage of the money supply (domestic currency) by foreign currency reserves. Thus the domestic currency is pegged to the foreign currency and foreign currency reserves equivalent to the full value of the domestic currency is held. But in this type of arrangement, as the country cannot print any new money, it loses its control over its monetary policy. Additionally, the central bank can no longer act as the lender of last resort. And so while the benefits of this regime include low inflation and better economic credibility, there exists almost no monetary independence. Examples of this type of arrangement include the Bulgarian Lev against the Euro and the Hong Kong dollar against the US dollar.

- **No separate legal tender** - Under this exchange rate regime, a country uses the currency of another country and thus entirely gives up the ability to use monetary policies. Thus the country does not have a separate legal tender (i.e. officially issued currency) in this regime and therefore there exists no way for controlling the domestic money supply (as the currency is controlled by the central bank of another country). The most common example of a regime with no separate legal tender is a formal dollarization in which a country adopts the US dollar as its currency. Examples of such countries include Ecuador, Panama and El Salvador. The main reason behind why a country would choose such an exchange rate arrangement is that it wants to completely surrender its control over its monetary policy. Therefore, this regime is adopted by those governments that are considered to be unreliable and have an ineffective monetary policy (i.e. other countries do not have faith in the monetary system of the country). And so they substitute their own currency for the currency of another country which is considered to be stable and have an effective monetary policy.

- **Monetary Union** – also known as **currency union** is a type of exchange rate regime in which two or more countries use the same currency. There can also be a special case of a monetary union with more than one currency but in which the currencies have a fixed exchange rate with each other. The best example of a current monetary union is that of Europe where 19 countries share a common currency – the **Euro**. In a monetary union there is exchange rate stability and full financial integration is enjoyed by the member countries but it comes at the cost of losing monetary independence. There is a common central bank that carries out the necessary monetary policies to ensure the correct functioning of the union and works independently of the central banks of the member countries. The benefits of a monetary union thus include the total absence of exchange rate fluctuations among the member countries, higher monetary stability and inflation control in the union by the common central bank. Its disadvantages include losing monetary policy independence and difficulties in ensuring full mobility of capital.

12.7.4 What regime do we follow? Managed floating?

Initially, Bangladesh used to follow the fixed exchange rate regime in which the Bangladesh Bank bought and sold foreign currencies in the market to maintain a fixed value of the Taka. But in order to enhance the external competitiveness of the Taka and help make the economy more resilient in the face of economic shocks, the country formally abandoned this regime in favor of a market based exchange rate system from May 31 of 2003. Under the new system, the exchange rate is determined by the market forces of supply and demand but the central bank can intervene in the market from time to time to ensure that the rate of appreciation and depreciation of the Taka are within allowable limits. From our review of different exchange rate regimes, we can clearly see that this regime falls under the managed exchange rate system or dirty float. Thus, while the exchange rate is primarily determined by the market, the central bank can 'nudge' the market to go in the 'right' direction through the buying or selling of foreign currency reserves.

Both sterilized and non-sterilized interventions in the foreign exchange market of the country can be seen to be carried out by the Bangladesh Bank. When the central bank purchases foreign currencies from the market, it leads to an increase in the Net Foreign Asset (NFA) and the reserve money (RM) also increases by the same amount. This is a non-sterilized intervention by the central bank. On the other hand, when the expansionary effects of the accumulated reserve can be neutralized by reducing the domestic holding component of the monetary base i.e. the Net Domestic Asset (NDA), this is referred to as a sterilized intervention. In other words, sterilization refers to the actions of the central bank which offset an increase in Net Foreign Asset (NFA) (e.g. reserves) by either changing its holding of Net Domestic Asset (NDA) (e.g. through selling govt. bonds) or adjusting its reserves in some other way. Recall the definitions of NFA and NDA from Chapter 7.

In recent times Bangladesh saw increased inflow of foreign currencies which has effect on the foreign exchange market of the country. If the inflow of foreign currency continues, its supply will continue to rise (relative to a fixed supply of the domestic currency) and as a result, the Taka will appreciate. This will hurt the competitiveness of Bangladeshi exports (as the price of exports will increase) and so the Bangladesh Bank intervenes in the market to mop up the excess supply of foreign currencies. As an example, in FY2013, the Bangladesh Bank bought a record amount of USD 4539 million from the foreign exchange market in order to prevent the Taka from appreciating. In the process, the foreign currency reserve will build up (and so will the Net Foreign Asset of the Bangladesh Bank), but at the same time, an equal amount of local currency will also be introduced in the market. Hence, in order to keep the money supply in the targeted level, the holding of Net Domestic Asset will need to be reduced.

12.8 Balance of Payments (BOP)

A country records all its transactions with the rest of the world, both private and public. This accounting exercise or the ledger is known as the **Balance of Payments** (or the Balance of International Payments). It keeps track of the flow of money coming in and going out of the country during a given period of time (usually a year). This is a double-entry book keeping system which records inflow and outflow of foreign currencies. An item is *debited* when money flows out of the country and receives a *negative* sign in the BOP. On the other hand, when money flows in from the rest of the world, the transaction is included as a credit in BOP (and gets a positive sign). For example, when Bangladesh exports RMG to USA, the value of export is entered as a credit with a positive sign in Bangladesh's BOP. When a Bangladeshi firm invests in India (e.g., Pran group), this is debited in BOP as money flows out of the country. However, repatriation of profit from the investment back to Bangladesh is credited in BOP.

All the transactions of BOP are divided into two broad accounts:

- **Current Account**
- **Capital Account**

The **current account** records net flow of goods, services and unilateral transfers (also known as current transfers). The **capital account** records public and private investment and lending. The sum of current account and capital account may lead to a deficit or a surplus which has to be financed through changing official reserve assets. Official reserve assets typically include

gold, convertible foreign currencies, reserve position at the International Monetary Fund (IMF), and Special Drawing Rights (SDRs). Therefore, we can write:

Current Account (CA) + Capital Account (KA) = Change in Official Reserve Asset

The following section discusses the different components of the BOP in detail.

Table 1 – Parts of a Balance of Payment

I. **Current Account**

A. *Merchandise*
1. Exports (+)
2. Imports (-)

B. *Services*
1. Travel and Transportation (net)
2. Investment Income (net)

Balance of goods and services = A + B

C. *Unilateral Transfers* (or Current Transfers)
1. Government Grants (excluding military)
2. Remittances and Pensions

Balance on current account = A + B + C

II. **Capital Account**

D. Long-term capital movements or flows
E. Short-term capital movements or flows

Official reserve transactions balance = A + B + C + D + E

III. **Financing** (deficit or surplus) method

12.8.1 Current Account

We begin with our discussion of the Current Account. The Current Account (CA) shows the difference between the savings and investments of a country. The main parts of a current account are:

- The Balance of Trade (NX)
- Net Income from abroad (NY)
- Net Current Transfers (NCT)

The Balance of Trade (or Net Exports, NX) is simply the sum of total exports of goods and services by the country minus its imports of goods and services. Hence the balance of trade can be divided into the sub-components of Merchandise (A) and Services trade (B), as shown in the table above. As mentioned earlier, exports are entered into the BOP with a positive sign

as they indicate flow of money into the country while imports receive a negative sign as they entail money flowing out of the country. The same rule applies in the case of trade in services, but where just the net value of the subcomponent is entered. Services make up the costs of transactions that result from intangible actions like travel and transportation costs, business services, royalties or licensing fees etc.

Net Income from abroad (NY) includes the net receipts of salaries and the income from investments made by the residents of the country in foreign countries minus the income earned by foreigners on investments made in the domestic country. Notice that this only includes the income earned from different investments and not the value of the investments themselves (which, as we will see later, are part of the Capital Account). Net Income from abroad thus includes earnings from salaries, profits, dividends, interest payments etc. Along with goods and services, income earnings in the BOP show the transfer of actual resources between countries for productive purposes. Adding components A and B we get the balance of goods, service and income in the BOP.

The next sub-component of Capital Account is Unilateral Transfers or Current Transfers (C). Current transfers refer to those transactions in which a resident of a nation provides a non-resident with something having an economic value (it could be a real asset or a financial one) but does not receive something of economic value in return. Therefore, as such transactions are 'one sided', they are recorded as transfers in the BOP.

But what could be examples of such transactions? If you consider carefully, you will find that several transactions fit this definition. Take the case of remittances, the earnings sent back home by workers living and working abroad. When they send their earnings back to their families at home, such transactions are definitely one sided (as no goods or services are given in return). And so, remittances are one such transfer included under the heading of current transfers, which include the following:

- Worker's Remittances
- Pensions
- Donations made by private entities
- Official assistance
- Foreign Aids and Grants

Current Transfers can be broadly divided into two main categories:

- General Government - which include transfers in cash or kind made by one country to another or by an international organization (that is, foreign aids and grants, gifts of food, clothes, and medicine as part of relief effort after natural disasters and such)
- Other Sectors – this includes remittances, pensions, regular contributions to different charity, religious, scientific and cultural organizations and others.

Therefore, unilateral or current transfers are reported in the BOP separately from goods, services and income categories due to the one-sided nature of such transactions. The BOP records the net value of the current transfers (NCT).

Finally, adding up the three sub-components A, B and C, we get the current account balance, which is given by:

$$\mathbf{CA} = NX + NY + NCT$$

Recall that the current account shows the difference between the savings and investments of a country engaged in international trade. Therefore, when the current account balance is positive, it indicates that the country is a net lender to the rest of the world. Put simply, this means that the country gives out more than it receives from the rest of the world. Similarly, when the account is negative, the country is receiving more from the rest of the world (that it is giving out) and is thus a net borrower. Hence, a current account surplus increases the country's holding of net foreign assets by the amount of the surplus while a deficit leads to a reduction by the same amount.

As trade balance usually makes up the largest portion of the CA balance, changes in the exchange rate also affect the current account balance. When the local currency depreciates relative to the foreign currency, net exports increases and this leads an increase in the CA surplus or a smaller CA deficit. Similarly when the local currency appreciates, net exports decline which causes the CA deficit to be larger or the surplus to be smaller.

12.8.2 Capital Account

Now we turn to the Capital Account, the other major component of BOP. The **Capital Account** (KA) shows the net change in the amount of assets (both physical and financial) owned by a country. We have the following:

Capital Account = Change in foreign ownership of domestic assets – Change in domestic ownership of foreign assets

Therefore, the KA records the net change in the amount of claims on assets by the residents of a country. When the capital account is in surplus, it indicates that the change in foreign ownership of domestic asset is greater than the change in the domestic ownership of foreign assets. Thus, more money is flowing into the country than flowing out and so there is a net inflow of money into the country but these are due to changes in asset ownerships and not payments for work (which is part of the Current Account). Similarly, when the KA balance is deficit (i.e. negative), more money is flowing out of the country than flowing in and so the residents of the country are increasing their holding of foreign assets.

While the term 'Capital Account' is used to refer to the account that records changes in *both* physical and financial assets, the IMF and its associated sources splits the Capital Account into two accounts depending on the type of capital.

1. **Capital Account**
2. **Financial Account**

The Capital Account records the net changes in the transfer of ownership of fixed or physical capital by the residents of the country while the Financial Account records transactions involving financial capital. The Capital Account is divided in the following way:

Capital Account (KA) = Foreign Direct Investment + Portfolio Investment + Other Investment + Reserve Account

Foreign Direct Investment (FDI) refers to long term capital investments undertaken like purchasing machinery and construction of factories or plants. When the country has a net inflow of FDI, it shows up with a positive sign in the KA as foreigners are making more

investments in the country. But remember that, when profits from the investments are repatriated, they will be recorded with a negative sign in the Current Account. *Portfolio Investment* refers to the purchase of shares and bonds and hence comprises short term investments. When shares or bonds are purchased or sold in international markets, the transactions are recorded in the KA while payments of dividends and interests are recorded in the CA. *Other Investment* includes loans made or received and the flow of capital into bank accounts. Thus when capital flows between domestic and foreign financial institutions, they are included in the KA under other investments.

Reserve Account or the *Official Reserve Account* refers to the account maintained by the central bank of a country in order to buy and sell currencies in the foreign exchange market. If the central bank wants to intervene in the market, it has to have a reserve of foreign currencies at its disposal. The transactions of official reserves are recorded under this account in the KA.
We have already seen why the central bank would want to intervene in the market – to fix the exchange rate (in the case of a fixed rate regime) or manage its fluctuations (in a flexible rate regime). Additionally, the central uses the foreign currency reserves to balance its payments from time to time. Thus, whenever there is a shortfall or excess balance in an account, it is adjusted with the *Reserve Account* in order to balance out all the accounts. Hence, excess balance adds to the reserve while shortfalls lead to reductions.

The components of Capital Account can also be divided according to their term lengths into 'long term' and 'short term' capital flows or movements, as reported under sub-components D and E in Table 1. Adding up the five sub-components A, B, C, D and E, we get the official reserve transactions balance or Reserve Account (as the sum of all these sub-components adds or deducts from the official reserve).

12.8.3 Financing Method

Now that we have looked at the major components constituting the BOP of a country, we are left with the final piece of the picture – how the surplus or deficit of BOP is taken care of.
A deficit in the Current Account has to be financed through a surplus or a net inflow in the Capital Account. This imbalance has to be financed in some way and the only method available is through a net inflow in the Capital Account. Recall that when the KA is in surplus, more resources are coming into the country than going out and this surplus resource can be used to finance the deficit in the CA.

On the other hand, when the CA is in *surplus*, more resources are coming into the country then going out. This means that the KA must be in *deficit* i.e. with a net outflow of resources, in order for the BOP to balance. Recall that the KA also includes the *Reserve Account*. Thus if resources are not actually going out of the country, they are being added to the foreign currency reserve of the country in the Reserve Account.

Therefore we find that, in theory, any surplus or deficit in one account (CA or KA) has to be balanced by an equal deficit or surplus in the other account for a net value of zero. This comes from accounting rules - as each transaction in the BOP are recorded as both a credit and debit due to the double entry method of accounting. But in practice, as the data for the different

accounts are compiled from different sources, there may arise some degree of errors in measurement which are reported as **Errors and Omissions** in the BOP statement.

The following section provides an example of how a country can balance its BOP in spite of its *negative* trade balance.

Balancing the BOP: An Example

The central idea of the balance of payment is that it must balance. If you spend more than your income, your extra spending must come from borrowing or selling of assets. Similarly, if a country imports more than it exports, it requires additional foreign exchange to cover the expenses of import. Suppose that a country exports $80 whereas it imports $100. The country has a deficit of $20. How would the country manage this $20? The country can borrow from other countries or international agencies like the IMF. That is,

$$CA = \$80 - \$100; KA = \$20$$
$$BOP = CA + KA = -\$20 + \$20 = 0$$

Suppose the country could not borrow or sell assets to foreigners to pay for the additional $20. What would happen? The country can still draw down its foreign exchange reserve to pay for it. But this situation cannot last long as it will eventually exhaust foreign exchange reserve (R) completely.

$$BOP = CA + KA = -\$20 + \$0 = -\$20 = \Delta R$$

You have already noticed that remittance is a large part of the current account. In our previous example, the country does not need to deplete its foreign exchange reserve if its inflow of remittances is substantial enough to cover up the deficit every year. Suppose the country receives $25 of remittances.

$$\text{Now current account } CA = -\$20 + \$25 = \$5$$
$$\text{If } KA = 0,\ BOP = \$5 = \Delta R > 0$$

It shows that the remittances help build foreign exchange reserve after balancing the BOP. This is in fact the case of Bangladesh.

In the case of Bangladesh we have:

- ⇨ When $\Delta R > 0$, ➔ BOP surplus
- ⇨ When $\Delta R < 0$, ➔ BOP deficit

As you will see later, because of remittance inflow, current account has been in surplus in recent years. The remittance has allowed Bangladesh to consume more than it produces without any international borrowing and this has led to stability in the BOP. This is one of the foundations of overall macroeconomic stability of Bangladesh.

12.8.4 BOP Statement of Bangladesh

We conclude this section by looking at the actual BOP statement of Bangladesh to learn how the Bangladesh Bank reports the different components of BOP of the country. Table 2 presents the BOP statement of Bangladesh for FY16.

Table 2: Balance of Payment of Bangladesh for FY16

In Million USD

Items	2015-16
Trade Balance	**-6274**
Export f.o.b. (including EPZ)	33441
Of which: Readymade garments	28094
Import f.o.b. (including EPZ)	39715
Services	-2793
Credit (*receipts*)	3530
Debit (*payments*)	6323
Primary Income	-2582
Credit (*receipts*)	103
Debit (*payments*)	2685
Of which: Official interest payments	402
Secondary Income	15355
Official transfers	68
Private transfers	15287
Of which: Workers' remittances (current a/c portion)	14717
Current Account Balance	3706
Capital Account	478
Capital transfers	478
Financial Account	1610
Foreign Direct Investment (net)	2001
Portfolio Investment (net)	124
Of which: Workers' remittances (financial a/c portion)	215
Other investment (net)	-515
Net Aid Flows	*2055*
Medium and long-term (MLT) loans	2904
MLT amortization payments	849
Other long term loans (net)	-7
Other short term loans (net)	-435
Trade credit (net)	-2110
Commercial Banks (DMBs and NBDCs) (net)	-18
Assets	347
Liabilities	329
Errors and omissions	-758
Overall Balance	5036
Reserve Assets	-5036
Bangladesh Bank (net)	-5036
Assets	5322
Liabilities	286

Source: Bangladesh Bank

As usual, the elements of the Current Account are reported first. In FY16 the Trade Balance of the country (exports – imports) was negative in the tune of USD 6274 million. Services balance was also negative with USD 2793 million. While the Primary Income account was negative (USD 2582 million), the Secondary Income account registered a large surplus of USD 15355 million, of which workers' remittances (CA portion) accounted for the lions share with USD 14717 million.

Hence, the **Current Account Balance** was equal to:

$$\textbf{CAB} = (-6274) + (-2793) + (-2582) + 15355 = \textbf{3706}$$

And so the Current Account Balance for BD in FY16 was USD 3706 million, which is a surplus, implying that BD was a net lender to the rest of the world during this period.

Next the Capital Account is reported. We can see that the Bangladesh Bank reports the Capital and the Financial Accounts separately. The Capital account itself includes all investments in fixed capital and the balance on this account was USD 478 million. The balance on the Financial Account in FY16 was USD 1610 million and it includes net FDI flows, portfolio investments, Net Aid Flows, short and long term loans, net trade credit and net flow of funds in the commercial banks.

Thus, the **Capital Account Balance** was equal to:

KAB = 478 + 1610 = USD **2088** million

The Capital Account Balance was USD 2088 million, which is a surplus, indicating that there was a net inflow of money into the country during the period. Therefore, we find that both the CA and KA are in surplus, indicating that there was net inflow in both accounts.

The next item on the BOP is the adjustment term for Errors and Omissions which arises due to using data from different sources. It was negative and in the tune of USD 758 million for the period.

And so finally we have the Overall Balance of the BOP which is found by adding the Current Account with the Capital Account and making adjustments for Errors and Omissions. Thus, we have:

Overall Balance = CA + KA +Errors & Omissions = 3706 + 2088 + (-758) = USD **5036** million

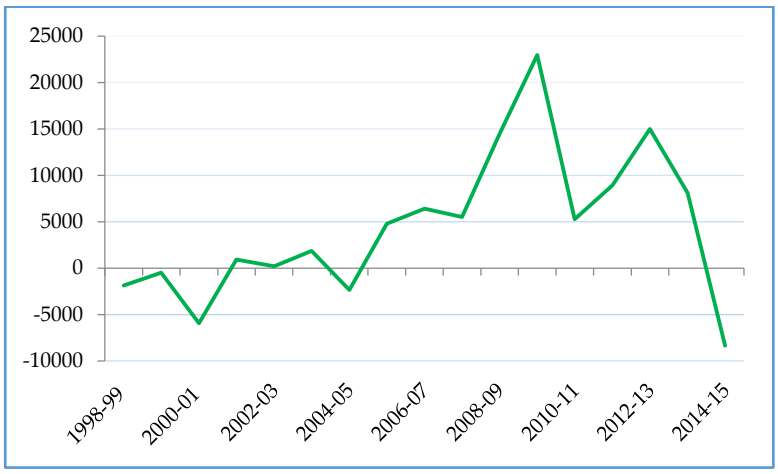
This is the overall balance of the BOP of the country for FY16. The balance shows a surplus. This means that the amount of surplus on the BOP balance is added to the official Reserve Assets of the Bangladesh Bank. And so we find in the BOP statement, that the Reserve Assets increased by the amount of USD 5036 million – the exact figure of the Overall Balance on the BOP (a negative value of the Reserve Assets mean that reserves have increased).

12.8.4.1 Trends in Current Account and Capital Account Balance of Bangladesh

Having discussed the elements of the BOP, we now look at the trends in the movement of Current Account and Capital Account balance of the country over time. The figures below show the trends in the CAB and KAB of Bangladesh.

Fig 8: Trends in Current Account Balance of Bangladesh (in crore Takas)

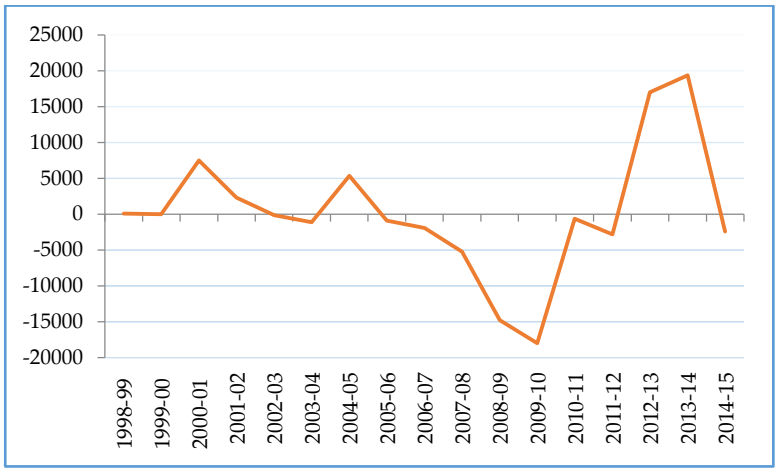
Source: Bangladesh Bank



From the above figure (Figure 3), it can be seen that the Current Account Balance of BD mostly registered surpluses during the period of FY99-FY15. While the balance fluctuated around zero or was negative during the early parts of 2000, the latter half of 2000 saw increased growth in the balance year-on-year, exceeding Tk. 20,000 crore in FY10. It then fell sharply in FY11, recovered by FY13 but became negative again in FY15 (for the first time since FY05).

Fig 9: Trends in Capital Account Balance of Bangladesh (in crore Takas)

Source: Bangladesh Bank



Now we turn to the movement in the Capital Account Balance over the same period of time and compare it with the Current Account Balance. As can be seen from the figure above, the movements in the Capital Account Balance closely mirror that of the Current Account Balance in that they tend to move similarly but in the opposite directions. Therefore, while the Capital Account Balance was mostly in surplus during the early 2000s, the latter half saw the balance become negative for most of the period. By FY10, the balance reached its lowest point with a negative value of around 18,000 crore Taka. It improved in FY11 and by FY13 it had registered a large surplus, reaching a peak value of around Tk. 20,000 crore in FY14. But it dropped sharply in the next year, becoming negative in the tune of about Tk. 2400 crore.

12.8.4.2 National Income identity in an Open Economy

We know the National Income of an open economy is given by the expression:

$$Y = C + I + G + Ex - Im$$

We have also learnt that the Current Account (CA) shows the net value of the export and import of goods, services and income of a country. So we can say:

$$Ex - Im = \mathbf{CA}$$

Combining the above expression with the National Income identity, we have the following:

$$Y - (C + I + G) > 0, \rightarrow CA > 0$$

This means that, if we produce more than we consume, we have: CA>0. On the other hand, if we consume more than we produce, we have: CA<0. Intuitively, if the production is higher than the consumption, the excess will be exported. Since imported goods are already included in C, I, and G, the net export, Ex – Im>0.

Recall the equation of the **twin deficit** we learnt in Chapter 2.

$$(S_P - I) + (IM - EX) = (G + TR - TA)$$

Put differently, it shows the relationship between the internal balance *(G +TR – TA)* and the external balance (IM – EX) of an economy. For a given level of private saving (S_P) and investment (I), a budget deficit implies a current account deficit i.e. if *G +TR – TA>0* → *CA*>0. It simply means if the government spends more than its income, it has to be financed through higher imports for a *given* level of output.

12.9 Balance of Payments and the Monetary Policy

We know from the Central Bank's balance sheet that there are two types of assets of the central bank – Net Foreign Assets (NFA), which consists of official reserve and gold and Net Domestic Assets (NDA), which primarily consists of treasury bonds held by the central bank. The liability of the central bank is the currency (in circulation in the economy) and the commercial banks' deposits with the central bank. This liability is the monetary base or the high powered money (H). We have learnt about it in Chapter 4.

So we can write from the balance sheet of the central bank:

$$\Delta \text{ NFA} + \Delta \text{ NDA} = \Delta \text{ H}$$

This means that the change in NFA and change in NDA should add up to the change in H. But we already know that:

$$\text{BOP} = \text{CA} + \text{KA (private)} = \Delta \text{ R}$$

Where Δ R denotes the change in the Reserve Assets of the central bank.
Therefore, we have:

$$\text{BOP} > 0 \rightarrow \Delta \text{ R}>0$$

That is when the overall balance on the BOP is positive, the change in the Reserve Assets is also positive and the reserves accumulate further. On the other hand when the BOP balance is negative, the reserves decrease.

Therefore, the above expression shows how the external imbalance (BOP) is linked with the monetary base (Δ R) and money supply and therefore the overall monetary policy. Think about how expansionary and contractionary monetary policies would impact the BOP.

12.9.1 Foreign Exchange Reserve

We have learned about the foreign exchange reserve while studying the balance sheet of the central bank and its role in money creation. In Bangladesh, foreign exchange reserve is one of the most important and talked-about macroeconomic variables since it's a major source of stability of the external sector. Therefore, we will shed some light on a few specific issues of foreign reserve. According to the Fifth Edition of the IMF's Balance of Payments Manual "Reserve assets consist of those external assets that are readily available to and controlled by monetary authorities for direct financing of payments imbalances, for indirectly regulating the magnitude of such imbalances through intervention in exchange markets to affect the currency exchange rate, and/or for other purposes". Therefore, two major purposes for holding foreign exchange reserves are apparent:

- Financing foreign payment imbalances
- Having control over foreign exchange rate

We have already learned about these two functions of the foreign exchange reserve. When there is a balance of payment imbalance, for example, import is much higher than exports, central bank draws down reserve to pay for import expenses. Central bank also intervenes in the foreign exchange market to smoothen out the fluctuations of the exchange rate. A large stack of foreign exchange reserve also helps boost confidence of the financial as well as the business sector as these sectors are confident that the central bank will be able to absorb the currency risk. Also, it guarantees that import financing wouldn't be a problem when the reserve can cover a few months' worth of imports.

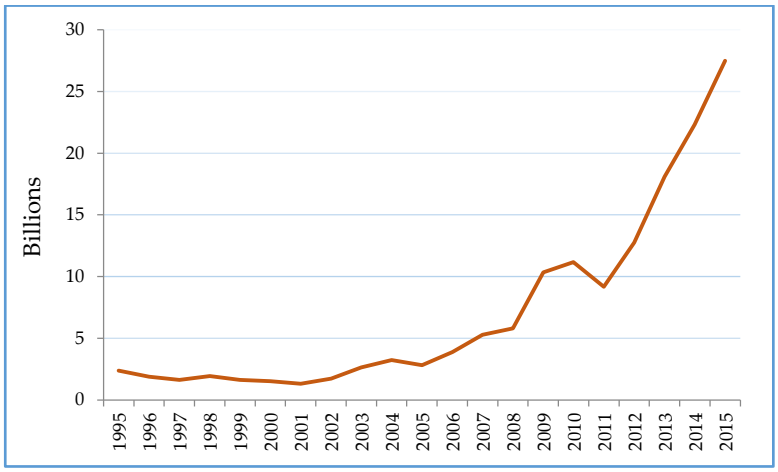
Now, the question is: how much foreign exchange reserve to hold? Put differently, what is the optimal amount of reserve a central bank should hold to perform its main tasks of international payment and hedging exchange rate risk? The adequacy of foreign exchange reserve is traditionally measured in terms of *number of months' worth of imports*. This indicator helps monitor the adequate reserve to cover foreign trade imbalances which is particularly critical for developing countries.

Over the last few years, Bangladesh Bank has accumulated unprecedented amount of foreign reserves which stood at USD 30.14 billion at the end of FY16. This huge accumulation is due to higher remittance inflows and export earnings as well as lower import prices, especially the price of petroleum in the world market. The country has saved huge amounts of foreign exchange because of drastic fall in fuel price which is reflected in the higher accumulation of reserve.

The figure below shows the trend in the accumulation of Official Reserve by Bangladesh during the period of 1995-2015. It can be seen that, while the growth of reserves was fairly stagnant during the latter half of the 90s and early 2000s, it started to pick up from 2006 onwards. It increased at an even larger pace in 2009, although the growth slowed down in 2011. But from that point onwards, the reserve has grown steadily at a very high rate.

Fig 10: Trends in the Official Reserve of Bangladesh (USD)

Source: World Bank Data

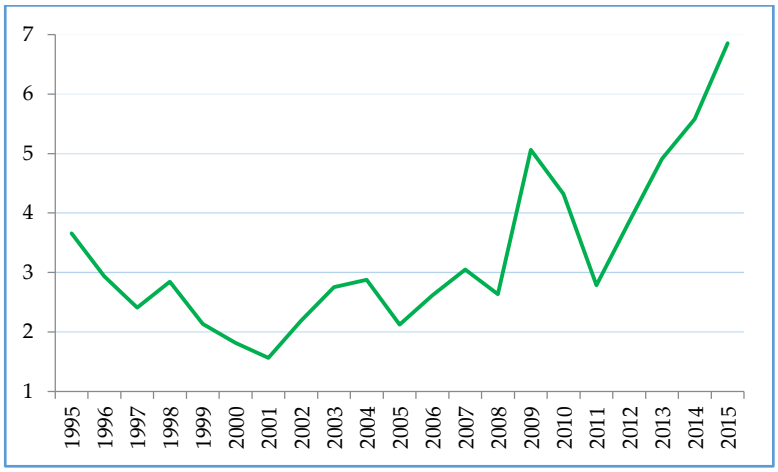


The next figure shows the trend in the reserve per month of imports for the same period of time. We can see that while this number was declining during the latter half of the 90s, from a high of 3.7 months to a low of 1.6 months (the lowest value for the entire period), it generally followed an upward trend for the rest of the period under consideration. It experienced some fluctuations during the 2000s, but generally increased over the period, exhibiting a large jump

in 2009 (5.1 months), followed by a sharp drop during the next two years (reaching a low of 2.8 months in 2011). But from that point onwards it grew at a steady pace for the rest of the period, reaching an unprecedented high value of 6.9 months in 2015.

Fig 11: Trends in Reserve per month of Imports (months)

Source: World Bank Data



Foreign exchange reserve is not the government's income!

As the foreign exchange reserve has been piling up over the last few years, it has drawn attention of many people and the question has been raised why the government has not been using this huge amount of asset for building infrastructure in the country. This kind of demand stems from the misconception of the nature and function of foreign exchange reserve. As we have learnt in this chapter, the foreign exchange reserve is the source of the monetary base. The amount of money supply in the economy depends on it. It acts as a monetary anchor of the country which ultimately influences all monetary variables such as money supply, credit, price, exchange rate, interest rate, etc. The Government cannot just use the reserve as its source of revenue because it is **not** government's revenue. Let's have a look at the central bank's balance sheet again.

Balance sheet of the central bank			
Asset		**Liability**	
Net Foreign Asset (Foreign Reserve)	$80	Currency	$30
Net Domestic Asset	$20	Banks' Reserve	$70

Suppose the government wants to use $20 of foreign reserves. How can the government use it? The government can only borrow this $20 in exchange of $20 worth of Treasury bonds. After the borrowing, the balance sheet of the central bank looks like the following:

Balance sheet of the central bank			
Asset		**Liability**	
Net Foreign Asset (Foreign Reserve)	$60	Currency	$30
Net Domestic Asset	$40	Banks' Reserve	$70

Thus the borrowing by the central bank has just lead to the rearrangement of the assets of the bank, from NFA to NDA, but the total value of assets have remained unchanged.

Let's take the example of remittances. When a person working in the USA sends money back home, he or she sends USD to the account of the bank of his/her family member. The USD stays with the Bangladesh Bank and his/her family member's account in the bank is credited with the equivalent amount of BDT. That is, the remittance has already been used up in the form of BDT paid out to the remittance recipients. How can the government then use the same amount again in the country, which is in the form of foreign exchange reserve of the central bank in USD?

It will be easier to think it through if we assume that the currency of Bangladesh is *USD*. The family member withdraws money in USD and uses it in the country. There is no need for exchange of currency between USD and BDT and to hold foreign exchange reserve. Therefore, the reserve can only be used to convert national currency into foreign currency, especially USD, to make international payments. However, this reserve can be invested internationally in foreign currency denominated securities such as Federal Reserve bonds of the USA. A large share of the reserve of Bangladesh Bank is in fact invested in Federal bonds.

12.9.2 Balance of Payment, Capital Mobility and the Mundell-Fleming Model

So far, we have discussed about the BOP of a country and looked at how a deficit in the Current Account can be financed through a net inflow in the Capital Account. Now we refine our model by including the aspect of **perfect capital mobility** - i.e. when there are no restrictions to capital movements across countries, and look at its implications on the monetary policies of the country. The analysis involving an open economy with perfect capital mobility is called the Mundell-Fleming Model after the Nobel laureate Robert Mundell and Marcus Fleming.

So what does perfect capital (financial) mobility mean? When capital is mobile, it means that it is free to move across the borders of countries and into international markets. Thus, when capital is free to move, investors will seek out the markets that provide them with the highest returns while borrowers will try to find the market with the lowest interest rates. But if the flow of capital is perfectly mobile, it will mean that the interest rates across the markets in different countries will have to be equalized. Say for example that the interest rate in India increases relative to that in Bangladesh. What will the investors in BD do now? If, capital is allowed to flow across boundaries, the investors in BD will buy assets in India (which now gives a relatively higher rate of return) while the borrowers in India will take loans from capital market of BD (as the interest rate in BD is relatively low). Now, if we assume perfect mobility of capital i.e. there are no additional costs or restrictions in moving capital, the flow of capital in India and Bangladesh will continue until the interest rate is equalized in the two countries.

Capital would be perfectly mobile under the following assumptions: i. Exchange rates are fixed (i.e. there are no risks due to exchange rate fluctuations) ii. Tax rates are the same across countries, and iii. There are no forms of restriction on foreign asset holdings in the countries. We can see that these requirements rarely exist in real world and so capital cannot truly be perfectly mobile. Nevertheless we assume perfect capital mobility in our analysis as the benchmark.

We can see that with perfect capital mobility, the interest rate in a particular country cannot deviate from the world equilibrium value for long as such deviations would give rise to huge amounts of capital flows in or out of the country (until the yield is restored to the world level). Therefore, we can now see the relationship between domestic interest rates and its impact on the BOP through the flow of capital in or out of the country (which is recorded in the Capital Account).

Capital flows and the BOP balance

We assume that when capital is perfectly mobile, it can flow at an *unlimited rate* into the country which has a higher interest rate than the world interest rate (i.e. the interest rate in the international financial markets) while flowing out of the country that has a relatively lower interest rate.

We know that the BOP balance (BP) is equal to the sum of the trade balance (NX) and the balance on the Capital Account (KA), that is:

$$BP = NX\ (Y_D, Y_F, R) + KA\ (i_D - i_F)$$

The expression above states that while the Trade Balance is a function of domestic income (Y_D), foreign income (Y_F) and the real exchange rate (R), the Capital Account balance is a function of the difference between the domestic and international interest rates ($i_D - i_F$). An increase in the domestic income level increases the demand for imports in the home country and so the trade balance worsens while an increase in the interest rate above the world rate creates an inflow of capital into the country and so the capital account improves. This shows that when capital is perfectly mobile, there opens up another way of financing the deficit in the trade balance – a *net capital inflow* in the Capital Account. This ability of capital flows to finance current account deficits is very much important for countries engaged in international trade.

12.10 Perfect Capital Mobility under Fixed Exchange Rate

With perfect capital mobility, even the slightest deviation of the domestic interest rate from the world interest rate will lead to large flows of capital. It follows that with perfect capital mobility under a fixed exchange rate regime, the central bank no longer has the ability of conducting independent monetary policies. This is also referred to as the 'Impossible Trinity', which is discussed below.

Impossible Trinity

Policy makers have to face a '***policy trilemma***' – an economy cannot achieve these three objectives simultaneously:

1. **Independent monetary policy**
2. **Fixed exchange rate**
3. **Free flow of capital** (perfect capital mobility)

The policy makers can achieve at most two of the above objectives simultaneously. For example, if the monetary authority of a country can change its money supply or interest rate at its will (independent monetary policy) and have a fixed exchange rate, it cannot have a free flow of capital. Similarly, if the policy makers choose to have an independent monetary policy with free flow of capital, it cannot maintain a fixed exchange rate.

Let's consider an economy with independent monetary policy and fixed exchange rates. Now the economy opens up its capital account so that capital can move freely between countries. Suppose the monetary authority expands the money supply to stimulate the economy. It lowers the interest rate in the domestic economy. As the domestic interest rate is lower than the international interest rate, capital flights occur (i.e. capital flows out). Investors find foreign assets more attractive (due to their relatively higher rate of return) than the ones in the domestic economy. It puts an upward pressure on the foreign currencies such as USD and depreciates the local currency. Therefore, the exchange rate does not remain constant. So, the central bank intervenes by selling dollar in the foreign exchange market in exchange of local currency. That is, the central bank is withdrawing local currency from the market (a contractionary move). And it beats the whole objective of stimulating the economy by supplying more money into the economy.

Therefore, with full capital mobility, monetary policy is ineffective under a fixed exchange rate regime. That is, if we want to achieve objectives (2) and (3), we cannot achieve objective (1). However, the link between monetary policy and exchange rate will break down if there is capital control in the economy. So, if we want to have an effective monetary policy under managed floating regime like Bangladesh, capital control is essential.

12.11 Perfect Capital Mobility under Flexible Exchange Rate

Now we turn to the case of perfect capital mobility coupled with flexible exchange rates. When the exchange rate is flexible, it is determined by the market supply and demand forces and so the central bank does not need to intervene in the market.

Under a flexible rate regime, with no intervention by the central bank, any current account deficit has to be financed by a net inflow in the capital account while surpluses will lead to net capital outflows. Therefore, when there is perfect capital mobility together with flexible exchange rates, the balance of payments must equal zero. This is achieved through changes in the exchange rate which ensure that the sum of the current and capital accounts is zero.

Additionally, as the central bank does not need to intervene in the market to set the exchange rate, it is free to pursue independent monetary policies by changing the *money supply*. Therefore there no longer exists the relationship between money supply and BOP which we saw in the case of fixed exchange rates.

But how do changes in the exchange rate ensure that the balance of payments is equal to zero? Recall that, with perfect capital mobility, the interest rate in the country must equal the *world interest rate* (or else capital flows will take place until this equality is attained). So we have,

$$\mathbf{i}^{D} = \mathbf{i}^{F}$$

Thus only when the domestic interest rate ($\mathbf{i}^{D}$) is equal to the world interest rate ($\mathbf{i}^{F}$), will the balance of payments be balanced and equal zero.
To see why this is so, suppose that the domestic interest rate is above the world rate. The relatively higher rate of return will create an inflow of capital into the country and the Capital Account will improve (surplus). This inflow will increase the demand for the domestic currency (as foreign investors invest in the country using the local currency) and its price will

increase. Recall that a higher price of the domestic currency (in terms of foreign currency) means that the domestic currency appreciates. This appreciation of the local currency will make imports of the domestic country cheaper while making its exports dearer and thus net exports will decreases. The trade balance will worsen and this will be reflected in the Current Account (deficit). And so the surplus in the Capital Account will lead to a deficit in the Current Account. This process will continue until the inflow of capital causes the domestic interest rate to decline to the world level, at which point the balance of payment will again be zero.

Similarly, if the domestic interest rate were to fall below the world rate, capital would flow out of the country, the domestic currency would depreciate, net exports would increase and the capital account deficit would lead to a current account surplus.

Therefore, we find that with perfect capital mobility under flexible exchange rate, it is the changes in the exchange rate which ensure that the sum of current and capital accounts is zero and the balance of payments is balanced.

12.12 Opening up the capital account: where do we stand?

While the Taka is presently freely convertible in the Current Account, it is not so in the Capital Account. Convertibility in the capital account would mean that the Taka could easily be converted into foreign currencies (like USD) so that domestic residents could invest and provide loans in foreign countries. And so there are restrictions on the free movement of capital between the residents of the country and foreign residents. *Opening up the capital account* thus refers to removing or relaxing the restrictions that impede the free flow of capital between countries. We have already seen how a free flow of capital impacts the BOP balance and how monetary and fiscal policies work differently under these conditions. Therefore the question that naturally arises is: to what extent should the government open up the capital account of the country. In trying to answer this question, we have to look at both the costs and benefits associated with opening up the capital account of a country like Bangladesh.

Capital account convertibility is the ability of the residents of the country to freely convert local financial assets into foreign financial assets (through loans, investments etc.) and vice-versa at the exchange rate determined by the market. Therefore, when there are restrictions on capital account convertibility, capital is not free to move and so domestic savings cannot flow out of the country. This is one of the reasons for capital control – to retain the savings for financing domestic investment. But the most important reason for capital control is to protect the domestic economy from external shocks. This is because when capital is free to move, it opens up another problem in the form of sudden and quick flights of large amounts of capital out of the country all at once. That is, the capital can flow out of the country just as fast as it had entered. This poses severe problems for the countries unlucky to have experienced it.

Capital Flight and the Asian Crisis of 1997: A cautionary tale

This 'capital flight' phenomenon was largely responsible for the Asian Crisis of 1997. During the early 1990s, several developing and transition economies in East Asia opened up their financial accounts to the world and became emerging markets which attracted huge amounts of foreign loans and investments. This inflow of capital was primarily in the form of short term bank loans as the securities markets in these countries were still not well developed.

Initially this caused the domestic economy to prosper and asset markets experienced booms. But when the confidence of the foreign investors took a U-turn and they began to pull their money out of the investments, the BOP of these countries came under severe pressure. As capital flew out, the currency of these countries depreciated and an 'illiquidity' problem arose in the banks as they were unable to pay back the foreign investors who demanded immediate payments. In the process, the banks became insolvent and could not function properly and the domestic demand saw a steep decline. This caused a serious recession in the countries which lasted for one or two years.

In looking at the causes of the crisis, it is believed that both the speed and sequence of the process of capital account liberalization was wrong. The countries had liberalized their capital accounts too quickly and without sufficient preparation, leading to over borrowing by the private sector that contributed to the boom in asset prices. Additionally, there was a lack of proper monitoring of the capital inflows by the government, or in some cases, they were unwilling to control the flows. The lesson we can learn from here is this. In order to open up the capital account of a country properly, the process has to be gradual and must follow the right order or sequence, coupled with strengthening of the financial system and ensuring proper monitoring by the authorities.

An ongoing debate among economists is about the relative benefits and costs of a quicker transition to an open economy (which is sometimes called the 'big bang' approach) compared to a more gradual and easy approach that puts emphasis on the reforms in the real and financial sectors of the economy and the liberalization of the current account before opening up the capital account. An advocate of the former position is the MIT economist *Rudiger Dornbusch*, who puts forward that, as resources are lost due to impediments facing the free flow of capital (which is common with policies that are *protectionist* in nature), the sooner the transition to a liberalized capital account is achieved the better.

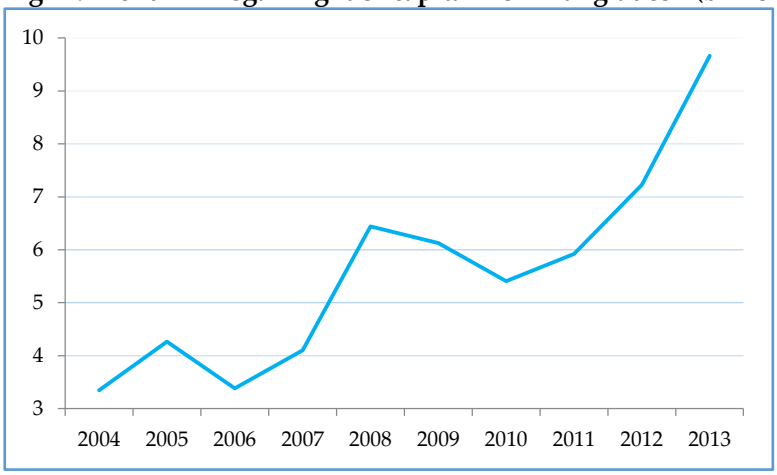
Bangladesh has only just begun its journey to access the international capital market by allowing some corporations to borrow from abroad in foreign currency terms on a limited case by case basis. As the current position of the BOP of the country is relatively strong, with surpluses in both the current account and the overall BOP balance in most of the past years, it is generally regarded that Bangladesh now has the capacity to go for opening up its capital account for inflows and in some selected cases for outflows.

Box 2: Illegal Capital Flights: The case of Bangladesh

According to the Global Financial Integrity (GFI) report 'Illicit Financial Flows from Developing Countries: 2004-2013' published in 2015, illegal capital flight from Bangladesh was 9.66 billion USD in 2013, which was 6% of GDP or about one-third of the total value of exports of the country in that year. This puts Bangladesh at the 26th position among 149 countries in the world that were illegally exporting capital. The figure below shows the trend in the illegal flows of capital out of the country during the period of 2004-13.

It can be seen that illegal capital flight has more or less steadily increased over the period of time shown. While it was only USD 3.35 billion in 2004, it had increased to USD 9.66 billion in 2013, making a yearly average of USD 5.59 billion in illegal capital outflows during the period.

Fig 12: Trend in illegal flight of capital from Bangladesh (billion USD)



Source: GFI report 2015

The flow of capital is termed as illegal when the money is illegally earned, transferred or utilized. The report also revealed that, of the USD 9.66 billion illegal outflow in 2013, USD 8.35 billion (about 86%) was siphoned off through trade misinvoicing while the rest of the amount totaling USD 1.31 billion could not be traced through the balance of payments data (unrecorded flows). Trade misinvoicing is a mechanism for illegally moving money across countries that involve intentionally misreporting the value of a commercial transaction on the invoice submitted to customs authorities. It is carried out through under-invoicing (under reporting the price) in the case of exports and over-invoicing (over reporting the price) for imports.

Chapter 13
Long Term Economic Growth

What is economic growth? When we hear the news that the economy has been growing at a very high rate, how would we translate it to our own experiences? When economic growth persists, it simply implies that the current generation enjoys higher living standard than the previous generations. Even without looking at the numbers, we can get a feeling of such changes. If you visit a random village of Bangladesh now and take a note of the products the village grocery shop is selling, you will be surprised to see how the consumption basket of the rural household has changed over time. You might even find a toilet tissue on the shelf! Let's run a quick survey of your classmates or colleagues: compare the living standard of you or your father with your grandfather or great grandfather. In almost all cases you will find that over the span of one to two generations, the standard of living has risen significantly - you or your father earns more, live in a better house, and have access to better amenities. For a large group of respondents you will find a significant upward economic and social mobility for the newer generations. This is, in short, the essence of economic growth.

In the prehistoric period, there was hardly any difference in living standard across different regions in the hunter-gatherer society. The consumption basket was quite similar with varying degrees of hunting and gathering activities, depending on the regional characteristics. When people learned how to farm and domesticate animals in around 11,000 BC, it increased their food production and made them less dependent on nature. This increased production of food could support larger population and as a result population grew very fast. The larger number of people allows some of them to spend time on making tools and specialize on other non-food activities. This leads to proliferation of other professions in the society, grown out of the surplus of agricultural output. This is how the first civilization started and it is the beginning of the differences in the living standard across different regions of the globe. Historians attribute favorable geography and climate to rise of civilization and it only occurred in some parts of the world but not in all places. Most of the earlier civilizations sprouted in the regions with fertile land and comfortable weather for living. Therefore, differences in geography and climate offer the first explanation of economic growth for some regions and it was the beginning of the regional disparity in living standard on earth.

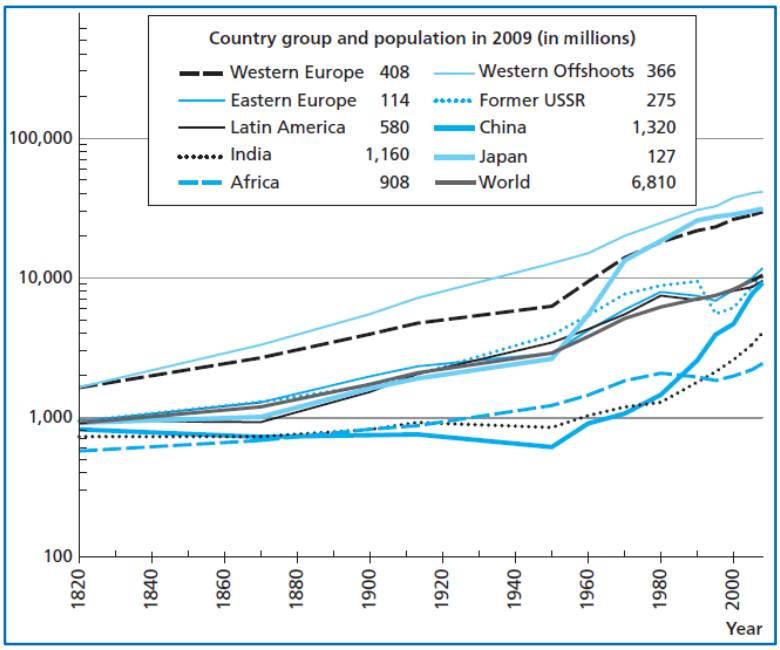
However, at the initial stage of civilization, the difference in living standard was very little as the pace of growth was glacially slow. It is worth noting Keynes' comments on the growth of the pre-historic period, "From the earliest times of which we have record—back, say to two thousand years before Christ - down to the beginning of the eighteenth century, there was no very great change in the standard of life of the average man living in the civilized centers of the earth". When the practice of agriculture became widespread across the globe, it is the land which was considered the main source of accumulation of wealth and thus the economic growth. Ownership of land contributed to the main source of differences in income across and within regions for thousands of years up until 17th century A.D., when machines started to take over the power of the draught. The industrial revolution that started in United Kingdom in 1750s completely changed the process of production - it is the new technology embodied in

physical capital (e.g. steam engine) that ushered in a new era of high and persistent economic growth. New tools and machines increased the productivity of labor by astronomical folds. For example, it took about 500 man hours to convert one pound of cotton to threads and after the invention of new spinning machine, it was reduced to only 3 hours! Why industrial revolution took place in UK, not in other European country or China? Coal gives one plausible argument: during that period coal was found abundant in UK, unlike other regions, which was the main source of power for steam engine. The wages of industrial workers were also very high in UK compared to other parts of Europe. So, the entrepreneurs were actively searching for means for cutting down the production cost. Moreover, it is also argued that economic and political institutions (e.g., private property rights, patents, etc.) were more conducive for innovation in UK than other regions.

There are some estimates available which show the slowness of economic development since 1500. According to Angus Maddison, the average per capita GDP growth of the world was 0.04% per year during the period 1400-1700 and at a rate of 0.07% during period 1700-1820.

Figure 1: GDP per Capita (2005 Dollars, ratio scale)

Source: Reproduced from N. Weil, Economic Growth, 3rd Edition



The figure above shows the trends in the per-capital GDP during the period of 1820-2008 for the entire world divided into 10 groups of countries. The country groups include both single countries (India, China, and Japan), groups of similar countries (Western Europe, Latin America etc.) and the whole world. In order to provide a sense of the size of the country groups, the figure also reports the size of the population (in millions) of each of the country group in 2009.

It can be seen from the figure that all of the country groups have experienced growth over time except for India, China and Africa till 1950s. The average GDP per capita of the world grew at a meager rate of 0.5% per year during the period of 1820-1870, while it grew at the pace of 1.1% and 2.2% per year during the periods of 1870-1950 and 1950-2008, respectively. We can also observe from the figure the pace of growth of the different country groups and how their relative positions (in terms of per capita GDP) have changed over time. In 1820, Western Europe and the Western offshoots (USA, Canada, Australia and New Zealand) were

among the wealthiest while Africa was the poorest. The Western offshoots experienced high growth which enabled them to surpass and then have twice the income of Western Europe by 1950. China, which was even pooper than Africa in 1950, saw miraculous growth and by 2008 had more than twice the per capita GDP of India or Africa.

The 1950s also saw Japan on its meteoric rise on the back of rapid economic expansion to exceed Western Europe's per capita GDP by the late 1970s. While both India and the African continent saw increasing growth from the 1950s, the growth rate of Africa dwindled during the 1980s while India continued on its higher growth path. The former USSR had been on a steady growth path (with a relatively high growth rate) but took a large dip in the late 1980s when it disintegrated into separate countries, and its per capita GDP values came closer in line with the world average. In 2008, the Western offshoots were the richest group of countries, while the African continent was still the poorest.

The figure also shows us the trends in the level of income inequality among the country groups over the period of 188 years. Even in 1820, the wealthiest parts of the world had three times the average income levels of the poorest. But by 2008, this gap had widened to an astounding level of seventeen times. That is, the richest parts of the world had income per capita 17 times that of the poorest! But even these simple figures will not allow us to fully comprehend the level of inequality that exists in the world today.

This chapter intends to explain why some countries enjoy very high standard of living while some other countries are trampled with dire poverty and hardship. The answer lies in the age old fundamental question: How does an economy grow? The factors that are responsible for an economy to grow faster are also responsible for the differences in income level or the living standard across countries.

13.1 Calculating Economic Growth

All macroeconomic variables change over time. Some changes are visible and can be captured within short period of time such as daily or weekly, while other variables change very slowly and we need longer horizon (e.g., quarter, year) to capture their changes. Examples of variables with high frequency of change are stock prices, exchange rates, commodity prices, etc. On the other hand, output, employment, inequality, etc. are 'sluggish' variables and measured quarterly or yearly. Therefore, an important part of empirical economics is to measure the changes of these variables.

We denote change of any variable between two periods by 'Δ' (delta). Suppose that, GDP in year t is Y_t and in year t-1 is Y_{t-1}. Therefore,

$$\Delta Y = Y_t - Y_{t-1}$$

Economic growth is the percentage change of output,

$$g = \Delta Y/Y = (Y_t - Y_{t-1})/Y_{t-1}$$

This base year, $Y_{t-1}$is very important as the rate of growth depends on which base year we choose. If GDP is low in the base year, the growth rate will be very high in the following year and vice versa.

For example, the real GDP of Bangladesh was Tk. 774136 crore in FY14 in 2005-06 prices and it was Tk. 729896 crore in FY13 in 2005-06 prices. [Remember the definition of GDP at constant prices as opposed to GDP at current prices from Chapter 2]
Therefore, growth of real GDP between FY13 and FY14 is:

$$\frac{774136 - 729896}{729896} \times 100\% = 6.06\%$$

13.1.1 How do we calculate annual growth for a long period?

Suppose, we want to calculate the average annual growth rate of GDP over the last decade (FY06-FY16). Let us work it through with data.

The table presents the Real GDP figures (in Crore Takas) of the country for the mentioned period.

FY	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
R.GDP	482337	516383	547437	575056	607097	646342	688493	729896	774136	824862	883539

There are 3 ways to calculate it:

(i) We take *simple average* of the beginning year and terminal year as follows:

$$g(i) = \frac{1}{10}.[(Y_{2015-16} - Y_{2005-06})/Y_{2005-06}] \times 100$$

$$g(i) = \frac{1}{10} \times [(883539 - 482337)/\ 482337] \times 100$$
$$= 8.32\%$$

(ii) We take annual average of all two adjacent years and then take overall average. That is, we have to calculate the growth rate for each year for the period FY06-FY16 and then take simple average.

FY	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
g	-	7.06	6.01	5.05	5.57	6.46	6.52	6.01	6.06	6.55	7.11

The growth rate of FY07 is the growth in GDP between FY06 and FY07. Therefore, we need additional information of GDP for FY06 in this case, unlike case (i). Similarly, the growth rate of FY08 is the growth rate between FY08 and FY07 and so on.

Thus we have:

$$g(ii) = \frac{7.06+6.01+5.05+5.57+6.46+6.52+6.01+6.06+6.55+7.11}{10} = 6.24\%$$

(iii) The third method is the *annual compound rate*. It can be thought of as the growth rate of GDP that transforms GDP of the beginning year to the GDP of ending year through compounding over the time period. In this case, the 'base' value changes continuously unlike method (i).

The formula is:

$$g(iii) = [Y_n/Y_0]^{1/n} - 1$$

Where:
Y_n = End period value of GDP
Y_0 = Starting period value of GDP
n = Number of periods (in years)

Given that any variable, in this case GDP, grows at the rate of 'g' per unit time, we have:
$Y_1 = Y_0 (1 + g)$
$Y_2 = Y_1 (1 + g) = Y_0 (1 + g)^2$

Similarly, $Y_n = Y_0 (1 + g)^n$

Therefore, $g(iii) = [Y_n/Y_0]^{1/n} - 1$

In our example, $g(iii) = (\frac{824862}{482337})^{1/10} - 1 = 5.51\%$

Now the question is which method is the best? The first method overestimates the growth rate as it does not take into account that the base year increases continuously. So, this method should not be used. The second method uses all the information available and continuously changes its base year when information for all years is available. The third method is the best when information about only beginning and terminal year is available. For a very long series, even if when all information is available, the second method is very tedious to calculate and we can use the third method instead.

13.1.2 'Rule of 70'

It is a handy formula we use frequently to calculate the length of time needed for some growing variable to double. This is an approximation. Suppose a variable X is growing at an annual rate of 'g' starting from time t=0. Therefore, at time t, the value of X is:

$X(t) = X(0) [1 + g]^t$
⇨ $2.X(0) = X(0) [1 + g]^t$ [X(t) = 2X(0); indicating doubling of the initial value]
⇨ $2 = [1 + g]^t$
⇨ $\log 2 = t \log [1+g]$

⇨ $t = \frac{\log 2}{\log [1+g]}$

$$Time\ to\ double = \frac{70}{growth\ rate}$$

If g is small, log [1+g] is approximately equal to g and similarly, log (2) is approximately equal to 0.7. So, if a variable is growing at a rate of 3.5% per year, and if we want to know how many years it will take to double the value of the level, we can simply divide 70 by the growth rate to get the answer. In this case it is about 20 years. For example, the per capita GDP of Bangladesh has been growing at around 4%. Therefore, it would take about 18 years to double its per capita GDP. Intuitively, it would take about 18 years to double the living standard of the people of the country.

13.1.3 GDP per Capita and its Growth Rate

GDP per capita is a better measure of the wellbeing of a country than the total GDP. For example, the total GDP of Bangladesh was USD 156.6 billion and that of Luxembourg was USD 60.6 billion in 2015 (in constant 2010 US dollars). But per capita GDP in 2015 was USD 973 and USD 106409 for Bangladesh and Luxemburg respectively (in constant 2010 US dollars). This is indeed a very large difference between the per capita GDP values of the two countries. Therefore, we can now see why comparing the standard of living across countries based on the value of total GDP could be misleading – it does not take into account the size of the population of the countries. Even if a country has a large value of total GDP, the share in the GDP of each resident of the country could be rather small if the country has a large population (as in the case of Bangladesh). And so, GDP per capita is a more accurate reflection of the standard of living enjoyed by the residents of a country. GDP per capita is given by:

$$\textbf{GDP per capita} = \frac{GDP}{Total\ Population}$$

From the above definition, we can also have the following:

Growth of per capita GDP = growth of GDP – growth of Population

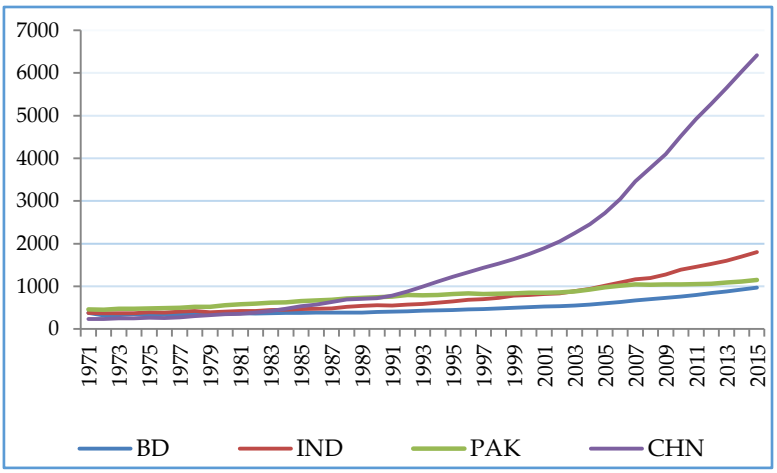
That is, the growth of GDP per person is equal to the growth rate of output (GDP) minus the growth rate of the population. Can you see why the growth rate of population is subtracted? This is because, when the population is growing, the GDP has to be divided among a larger number of people. Therefore the growth of GDP has to account for the growth of population in deriving the growth rate of per capita GDP. The growth of GDP per capita for Bangladesh in 2015 was 5.28%.

In the next part of this section, we look at the trends in the per capita GDP values of some countries which have been divided into two groups based on the level of economic development. Group A consists of developing and emerging economies while Group B includes developed countries. We will use this similar classification of countries in several other applications in the rest of the chapter to not only help us show the differences in the level of economic development across countries but also identify possible underlying reasons behind the observed disparities.

Group A: Developing and Emerging Countries - Bangladesh, India, Pakistan and China

Figure 2: Trends in GDP per capita – Developing countries (constant 2010 USD)

Source: World Bank data



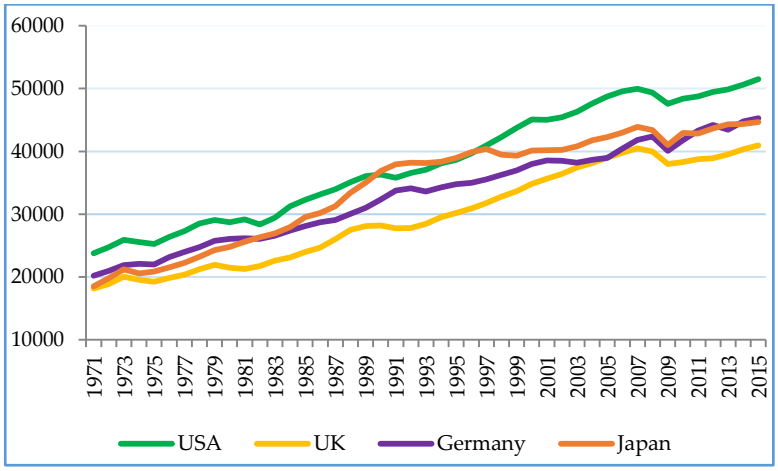
In this example, Group A consists of the developing countries - Bangladesh, India and Pakistan and the emerging economic giant China. The figure above plots the trend in the per capita GDP values of the countries over the period of 1971-2015. Over this long period of time, while all the economies have experienced growth, the pace of growth of China dwarfed that of all the other countries. In the early 70s, the per capita GDP of the four countries were quite similar, with Pakistan having the highest of USD 463 while China had the lowest with USD 235 in 1971. Both Bangladesh and India fared better than China at that time. But China saw increased growth during the late 80s which helped them to overtake the other countries and by late 90s, had almost double the per capita GDP of Pakistan. This meteoric growth continued and by 2015, China had more than three times the per capita GDP of India.

India overtook Pakistan in terms of per capita GDP during the early 2000s and since then has been on a higher growth path compared to both Pakistan and Bangladesh. While historically Pakistan can be seen to perform better than Bangladesh, more recently in the mid-2010s, their values appear to be converging. Among the four countries, Bangladesh's growth in GDP per capita has been relatively slow, although the pace has been increasing especially since the early 2000s. In 2015 Bangladesh's per capita GDP was USD 973 (in constant 2010 US dollars) which in nominal terms is USD 1212.

Group B: Developed Countries - USA, UK, Germany and Japan

Figure 3: Trends in GDP per capita – Developed countries (constant 2010 USD)

Source: World Bank data



Next we have the panel of developed economies – USA, UK, Germany and Japan which make up Group B in this example. The figure above presents the same information for the four countries. The first thing that we immediately observe is that the per capita GDP of these countries is much higher than the countries in Group A. For example, the per capita GDP of Japan was USD 18527 in 1971 while that of Pakistan was only USD 463 - a difference of more than 40 times. Fast forward to 2015 and the difference in per capita GDP values between China and Japan is still about 7 folds while that of Bangladesh and USA is almost 53 times! This shows the large income disparity between developing and developed countries.

The four countries have experienced more or less similar patterns of growth over time with the trends of USA and UK closely mirroring that of each other. The USA generally enjoyed the highest per capita GDP values amongst the countries, with a value of USD 51486 in 2015. Japan was able to briefly surpass the USA in the early 90s but could not maintain the high

growth rate for long. Germany also grew fairly steadily over the period and appears to be converging with Japan in the level of per capita GDP.

13.1.4 GDP per worker

Sometimes we are also interested in the GDP per worker which gives us a crude measure of the productivity of worker. GDP per worker is defined as the value of GDP per employed person. Since the number of person employed is less than the total size of the population, GDP per worker will naturally be higher than GDP per capita.

$$GDP\ per\ worker = \frac{GDP}{Number\ of\ Workers}$$

And similarly, we have:

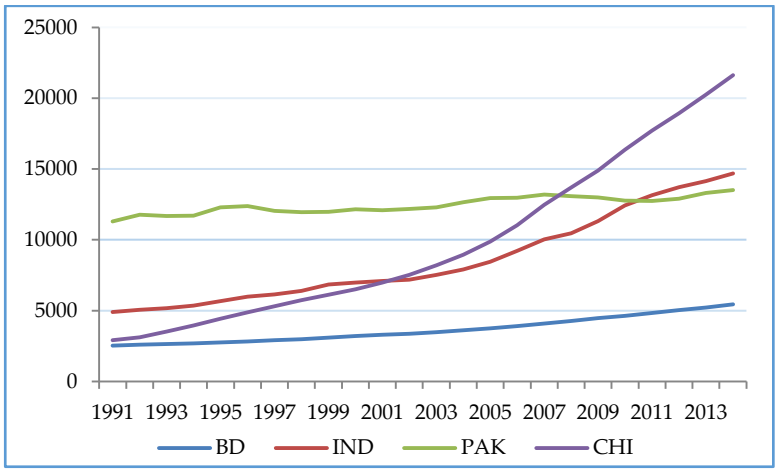
Growth of GDP per worker = growth of GDP – growth of Labor Force

Now we compare and contrast the trends in GDP per worker of developing and developed countries by similarly dividing them into two groups.

Group A: Developing and Emerging Countries - Bangladesh, India, Pakistan and China

Fig 4: Trends in GDP per worker – Developing countries (constant 2011 PPP USD)

Source: World Bank data



The figure above shows the trends in GDP per worker for the three developing countries – Bangladesh, India and Pakistan and the emerging economy China for the period of 1991-2014 (the values are in constant 2011 PPP adjusted US dollars). As mentioned earlier, the values of GDP per worker for the countries are much higher than their respective GDP per capita. The trends in GDP per worker for the countries are very much similar to those observed in the case of GDP per capita. In 1991, Pakistan had the highest value with USD 11286 while Bangladesh and China were comparable to each other with USD 2533 and USD 2915 respectively. But China was already on its high growth path and surpassed the level of Pakistan in 2008. By 2014, Chinese GDP per worker had increased to USD 21630, marking a growth of almost 650% over its value in 1991.

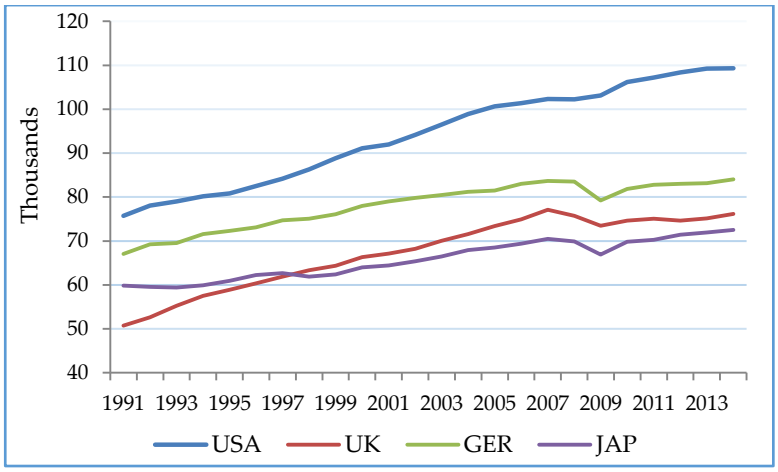
India also saw its GDP per worker rise at an increasing pace during the period, growing by almost 200% in the 23 years. Pakistan on the other hand, experienced a meager growth with

only about a 20% increase over the period. While the GDP per worker of Bangladesh grew at a relatively high rate of almost 115% over the period, its value is still largely lagging behind those of the other countries especially when compared to China, given that they were once almost at par.

Group B: Developed Countries - USA, UK, Germany and Japan

Figure 4: Trends in GDP per worker – Developed countries (constant 2011 PPP USD)

Source: World Bank data



Next we turn to the case of the developed countries in our example. As before, we see a marked difference in the level of GDP per worker between the panel of developing and developed countries. For example, in 1991, the GDP per worker of Pakistan was USD 11286 while that of the UK was USD 50703 – difference of almost 4.5 times. While all the countries have experienced growth in per worker GDP over time, the USA historically had the highest figures. UK and Germany followed similar growth trends while Japan has a relatively higher growth in GDP per worker. In 2014, GDP per worker for Germany was USD 84050 while that of Bangladesh was USD 5433 – a difference of more than 15 folds.

Building blocks for understanding the factors behind economic growth and growth models

Theories of economic growth tend to answer basically three questions:

1. Why does an economy grow?
2. Why do some economies grow faster than other economies?
3. Are public policies helpful in promoting growth?

13.2 Production Function

The central idea of economic growth is that something has to be produced. When an economy keeps on producing additional output every year, the economy grows and the standard of living of the people improves. But what keeps the economy growing all the time? As we discussed, land plays an important role in agrarian society along with labor to produce output. As the economy advances, people learn how to make tools and machines, and capital stock becomes an integral part of production process. In short, land, labor and capital are the three inputs required to produce output. These inputs are called '**factors of production**'.

Mathematically, a function transforms some variables to other variable. For example, **Y = F(X)** is a function which shows how **X** is transformed into **Y**. Analogously, a production function describes how inputs are combined together to produce some specific output. In particular, a

production function describes the maximum output that a firm can produce for all combinations of inputs. In microeconomics, a production function is used to describe the structure of production (input, output, and technology) of a particular firm. But in macroeconomics, we use an aggregate production function for the whole economy. We assume that the structure of production of the whole economy can be explained by the total amounts of factors of production such as total capital stock, land and total number of labor in the economy. A state of technology can also be defined for an economy which represents *productivity* of the factors of production. Therefore, an aggregate production function is an ambitious generalization of the structure of production of the entire economy.

Formally,

Output = Factor Productivity. F (Labor, Capital, Land)

Total Factor Productivity (TFP) shows how effectively the factors of production can be transformed into output. For the sake of simplicity, let us assume that there are only two factors of production, labor (L) and capital (K). Therefore, we have:

$$Y = A.\ F(L, K)$$

We can divide both sides by L to present it in *per capita* terms by assuming *constant returns to scale*. We will learn about it shortly.

$$y = A.\ f(k) \qquad [\text{where, } y = Y/L \text{ and } k = K/L]$$

13.2.1 Factors of Production

13.2.1.1 Capital Stock

An intuitive understanding of what is capital stock and how it grows is central to the understanding of the modern growth process. In Chapter 2, we distinguished between physical capital and financial capital. By capital stock, we strictly mean physical capital which is used as an input to the production and remains unchanged after the production takes place. Simply put, it is the tools and machines that make labor more productive – workers can produce more output in lesser time using capital stock. Capital has to be productive, by definition. That is, countries with higher capital per worker have higher level of output per worker than the countries with low capital per worker.

13.2.1.2 Gross Capital Formation

Gross Capital Formation or Gross Domestic Investment is the addition to the existing stock of capital of the economy through investments undertaken in a given year. It includes both additions to the *fixed assets* of the economy (such as land improvements, machinery purchases, construction of factories and plants, building roads, hospitals schools etc.) and net changes in the level of *inventories* (which includes work in progress, partially completed goods and unsold goods). Therefore, gross capital formation shows what is newly added to the capital stock of an economy in a year.

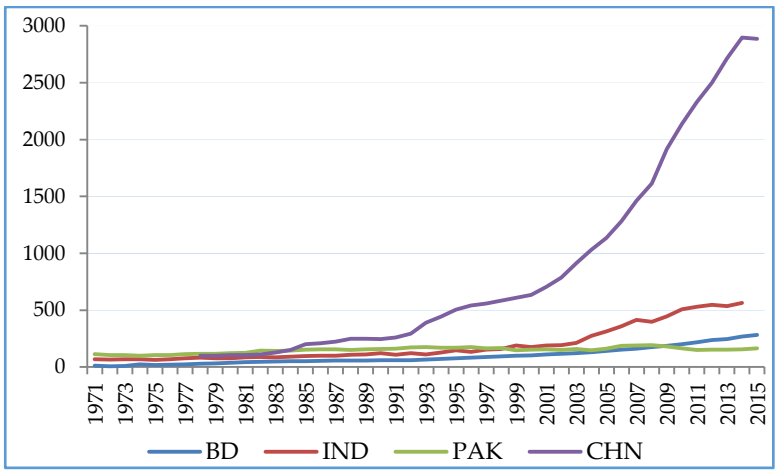
Now let us look at the trends in per capita gross capital formation (i.e. value of gross capital formation divided by size of total population) over time for the developing and developed

country groups. Per capita terms are used to provide a better indication of the level of capital available for each person in the economy.

Group A: Developing and Emerging Countries - Bangladesh, India, Pakistan and China

Fig 5: Gross Capital Formation per capita – Developing Countries (constant 2010 USD)

Source: World Bank data



The figure above presents the trends in per capita gross capital formation of the countries in our developing and emerging economies group (the data are in constant 2010 US dollars).

It can be seen that all the countries in this group started with relatively low levels of per capita gross capital formation during the period. For example, even in 1980, the highest per capita capital formation among this group was that of Pakistan with USD 122 while the lowest was of Bangladesh with only USD 36. China too had a meager value of USD 106 while the figure for India was USD 75. During the the mid to late 80s, China began to experience increased growth which accelerated at a much faster rate from the early 90s. By 2015, China's per capita gross capital formation value was USD 2886, registering an increase of more than 27 folds over its value in 1980.

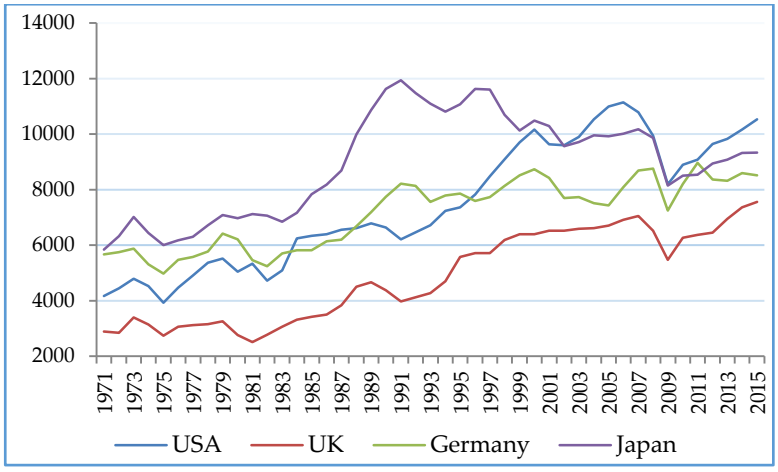
While the three other countries also saw growth in per capita capital formation over the period, their experience was not so spectacular like China. India experienced higher growth from the late 90s and in 2014 had a value of capital formation per capita of USD 562, marking an increase of nearly 3 times over its value in 1999. While initially performing better than both China and India, Pakistan's growth in per capita capital formation stagnated during the early 2000s and since then its level of capital formation has been relatively slow. Its value of only USD 164 in 2015 was the lowest among this group. Bangladesh on the other hand, exhibited slow but steady growth throughout the entire period, with the growth rate picking up from the mid-90s. After gaining independence in 1971, its per capita capital formation was equal to only USD 11, which dropped to USD 5 in the next year. But since then capital formation in Bangladesh has grown steadily and even over the past decade it has exhibited a nearly doubling of the level of per capita capital formation (from USD 152 in 2006 to USD 282 in 2015).

Therefore we find that, while all countries have seen growth in per capita capital formation over time, none could mirror the high growth experience of China.

Group B: Developed Countries - USA, UK, Germany and Japan

Fig 6: Gross Capital Formation per capita – Developed Countries (constant 2010 USD)

Source: World Bank data



Next we have the trends of gross capital formation per capita for the group of developed countries. One will immediately notice, after looking at the values on the vertical axis of the above figure, that developed countries have per capita gross capital formation that is many times greater than that of the developing and emerging countries. Even UK, which had the lowest per capita capital formation among the group of developed countries in 2015, had more than twice the level of China in the same year. Hence the disparity in the level of per capita capital formation between the developed and developing country group is clearly evident.

But similar to the developing countries, the developed countries also exhibited increasing trends over time in the level of per capita gross capital formation. While USA and Germany followed closely similar patterns during the period, Japan experienced the most fluctuations. From the 70s through to the late 90s, Japan had the highest per capita capital formation but from 2002 onwards, their levels dropped below and closely followed that of USA. Both USA and Germany saw steady growths in their capital formation during the period with USA experiencing the highest growth among the countries. Its per capita gross capital level increased from USD 4166 in 1971 to USD 10537 in 2015 – a growth of about 126% over the span of 45 years. UK historically had the lowest level of per capita capital formation among the countries but also witnessed more or less steady growth over the period.

An interesting observation is that all the four countries in the developed group saw a large dip in their per capita capital formation during the period of 2007-09, which could be the result of the then global financial crisis.

While the size of per capita gross capital formation for the developed country group is much higher than the developing and emerging group, the growth rates of the countries in the latter group are generally much higher than the former. For example, between 2000 and 2015, Bangladesh saw of growth rate of more than 173% in per capita capital formation while the same figure for UK is around 18%. This is basically due to the low initial values of the developing countries which usually have large deficiencies in capital formation. On the other hand, the base of developed countries is already high due to their historically high levels of capital formation and so growth of new capital is comparatively slower.

On top of machines and tools, infrastructure such as roads, bridges, power-plants, office buildings, etc. are also considered as capital stock as they help produce output. In developing countries, public capital, capital stock produced by the government makes up a significant share of total capital stock. As discussed in Chapter 9, there is a high degree of *complementarity* between public and private capital. Private investment depends crucially on the extent of public investment in infrastructure and power. Building a road by the government helps transport the raw materials and goods, and thus reduce the production cost and time. It also helps entrepreneurs set up factories along the road side. We also see small service industries such as restaurants, repairing shops and also small grocery shops mushroom along the roads. In developing countries such as Bangladesh, we observe deliberate attempts by the government to boost private capital accumulation through higher public investment.

How capital stock grows over time? Who creates capital? What is the role of private sector in creating capital? As developing counties do not produce capital goods, how would they get access to it? What is the role of government in enhancing the capital base of the economy? One important characteristics of capital is that it is created or produced and this distinguishes capital from natural resources such as land. Since we need to use resources to produce capital, it means that, we have to forego the present consumption in order to produce capital goods. At the individual level, we consume less to save and this saving can be invested to produce capital.

From the National Income identity, we know:
$Y = C + I$
$Y = C + \Delta K$ [recall that, change in capital stock is the investment]

Since output depends on capital, Y(K), we can write,
$Y(K) = C + \Delta K$

As capital stock increases, it increases the ability to produce more output. With increased output, more output is available for investment (for producing new capital) and which in turn again increases output and this process continues. This is the basic idea of capital formation upon which growth theory is based.

13.2.1.3 Labor and Human Capital

Even in the primitive hunter-gatherer society, skilled, knowledgeable and healthy people were better hunter and could hunt more. That is, it is the ability of the worker that matters in the process of production. The set of attributes of the worker that is responsible for production is termed as 'human capital'. This is termed as capital as it shares some common characteristics with physical capital. First, like physical capital, human capital helps a person to produce more. It increases the productive capacity of the labor. Second, human capital is also produced or acquired. One has to invest time and money to acquire human capital. Third, both the types of capital depreciate with time. Skill and knowledge can wear out and health can deteriorate if adequate subsequent investment is not made.

There are two major components of human capital - **education** and **health**. Cross-country studies show that the average number years of schooling is highly correlated with the level of

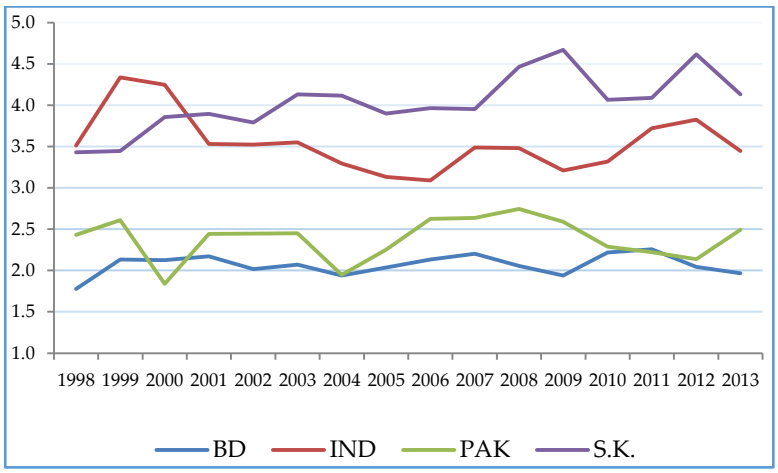
development. The country which invests more in education and research grows at a faster rate than the countries that invest less. Public investment in education and research is a contributing factor responsible for income differential among countries. That is investment in education partly explains why some economies have higher income than other counties with lower investment in education.

Now let us compare the levels of public expenditure on education by the different countries in our groups of developing and developed economies.

Group A: Developing and Emerging Countries - Bangladesh, India, Pakistan and South Korea

Fig 7: Government Expenditure on Education (% of GDP)

Source: World Bank data



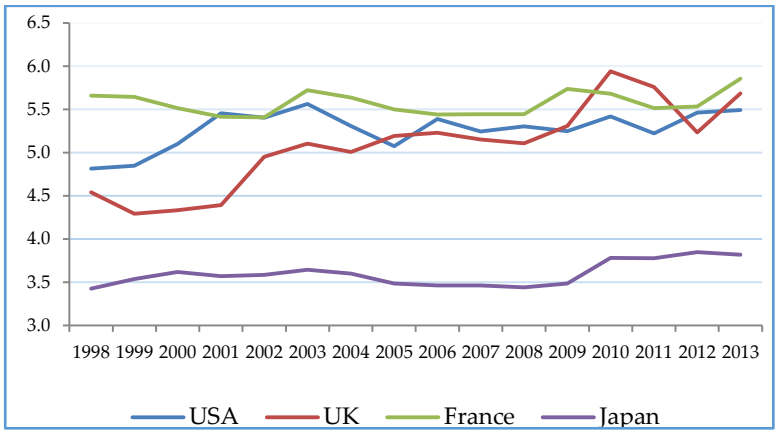
The figure above shows the trends in public expenditure on education as a percentage of GDP by the group of developing and emerging economies. This group includes Bangladesh, India, Pakistan and the fast growing economy of South Korea (S.K.). It can be seen that, India and South Korea have dedicated a larger portion of their GDP for public expenditure on education compared to either Pakistan or Bangladesh. In fact, among the four countries, Bangladesh's share of education expenditure is the lowest and has hovered around 2% of GDP during the period of 1998-2013. Pakistan fared a little better, spending closer to 2.5% of GDP but exhibited more fluctuations.

While India's expenditure was initially higher than 4% of GDP, it came down and hovered around 3.5% since the early 2000s but never dropped below the 3% mark. South Korea on the other hand, displayed an upward trend over time in its share of public expenditure on education, from about 3.5% of GDP in the late 90s to more than 4.5% in the mid-2010s. In light of these observations, we can make out a general pattern linking economic growth with expenditure on education: In order to grow and grow faster, an economy must spend more on education.

Group B: Developed Countries - USA, UK, France and Japan

Fig 8: Government Expenditure on Education (% of GDP)

Source: World Bank data



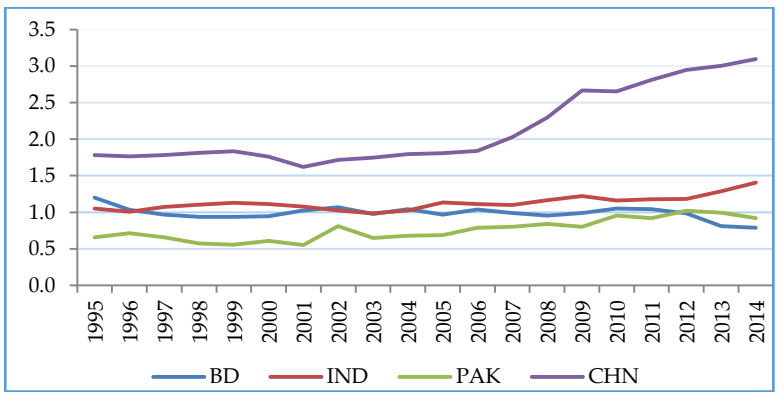
The next figure shows the trends in public expenditure on education by our group of developed countries. This group consists of USA, UK, France and Japan. It can be seen that the developed economies generally tend to spend a larger fraction of their national income on education, usually in the range of 5% to 6% of GDP. The exception to this case is Japan which had a relatively smaller share of expenditure on education, hovering around 3.5% of GDP for most of the years under review but which increased to around 3.8% in the 2010s. While all the countries exhibited increasing trends over time in the level of expenditure on education, UK had the most increase followed by USA. France showed some small fluctuations but managed to hover around the level of 5.5% of GDP during the period. Therefore we can see that developed countries have higher levels of public expenditure on education compared to developing countries.

Health is also as important as education in producing output. In fact, without good health, skill and knowledge acquired through education may not have the desired impact on output. So, there is a high level of complementarity between education and health investment. Where the life expectancy is low, people have little incentives to investment in education as the benefits of investing in education (both time and money) cannot be enjoyed for a long period of time. This is one argument that economists put forward in explaining the low investment in education in Africa where life expectancy is low due to diseases such as AIDS and Malaria. Similar to education, we also observe positive correlation between health expenditure by the government and the level of development. Next we similarly look at the trends of public expenditure on health by the group of developing and developed countries.

Group A: Developing and Emerging Countries - Bangladesh, India, Pakistan and China

Fig 9: Public Expenditure on Health – Developing countries (% of GDP)

Source: World Bank data



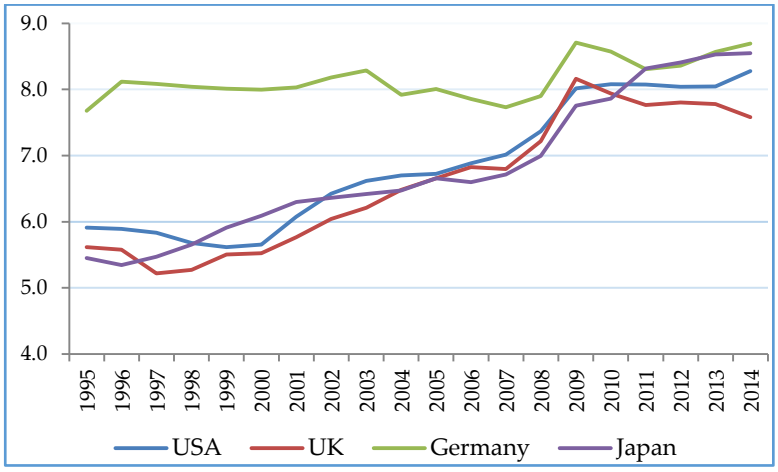
The figure above presents the trends in the level of public expenditure on health as a percentage of GDP for the group of developing and emerging countries over the period of 1995-2014. Compared to public expenditure on education, the share of health expenditure in GDP is generally observed to be smaller. For example in 2013, education expenditure as part of GDP was 1.97% for Bangladesh while health expenditure was only 0.79%.

Among the four countries, China had historically the highest share of public expenditure on health, accounting for around 1.75% of GDP over the period of 1995-2005, which then increased to over 3% by 2014. While both Bangladesh and India hovered around the 1% level for most of the years under review, India began to see an increasing trend from the late 2000s while share of Bangladesh GDP in health expenditure began to decline around the same time. Pakistan, which had initially much lower public expenditure on health (about 0.5% of GDP during 1995-2001), witnessed a positive growth from the early 2000s and by 2012 had exceeded the share of Bangladesh (being closer to the 1% level). In general we observe that the developing countries tend to have lower shares of healthcare expenditure in total GDP.

Group B: Developed Countries - USA, UK, Germany and Japan

Fig 10: Public Expenditure on Health – Developed countries (% of GDP)

Source: World Bank data



Having looked at the trends of developing and emerging economies, we next turn to the case of the share of public health expenditure in GDP of the developed countries. As before, the time period under review is 1995-2014. One can immediately notice the higher levels of health expenditure by the developed countries compared to the developing ones. For example, in 1995, Japan had the lowest share among the four developed countries but it was still almost three times the share of China in the same year (5.45% vs. 1.78%). This gap closed very little over the period of 19 years as evident from the fact that Japan's share in 2015 was 8.55% while that of China was only 3.10%, marking a difference of about 2.75 times.

The three developed economies of USA, UK and Japan exhibited almost similar trends in the growth of public expenditure in health. As can be seen from the figure, they tended to grow over time in a close knit group from around 5.5-6% of GDP in 1995 to about 8% in 2010. But in the years since, while Japan continued on its growth path to reach 8.55% in 2014, USA and UK plateaued at around 8% and 7.75% of GDP respectively. The exceptional case is that of Germany which maintained a very high share of public expenditure in health throughout the

entire period, hovering around 8% of GDP for most of period and more recently registering 8.7% in 2014 (the highest in our developed country group).

13.2.2 Some important features of production function

13.2.2.1 Returns to Scale

Return to scale shows how output changes when all the factors of production are changed by the same proportion. There are three types of return to scale – increasing, decreasing and constant. In case of increasing return to scale (IRS), output changes more than the change in inputs. In case of decreasing return to scale (DRS) output changes less relative to inputs whereas in case of constant return to scale (CRS) output changes by the same proportion of inputs.

In *neoclassical growth theory*, the production function is assumed to hold CRS.

Simply put, constant return to scale shows that if we double all the inputs, the output will be doubled.
$Y = A.F(L, K)$

Now suppose we increase L and K by the factor **m**. In case of CRS, we have:
$A.F(mL, mK) = mY$

For example, $A.F(2L, 2K) = 2Y$

Let, $m = 1/L$,
$Y/L = A\,F(1, K/L)$
$y = A.f(k)$

The above production function shows the relationship between per capita output and per capita capital stock. Constant return to scale helps us express the production function in per capita terms.

13.2.2.2 Marginal Product

In Economics, when we talk about the 'marginal' amount of something, we are referring to the additional or extra amount (of output) associated with increasing something else by one more units (input). Therefore in the context of the production function, marginal product of an input (or factor of production) is the change in the amount of output produced by increasing the given input by one unit while all other factors of production are held constant. Hence the marginal product of labor is the change in the amount of output produced when labor is increased by one more unit while keeping the amounts of all other factors of production, such as land and capital, the same as before. An example will help to illustrate this point.

Suppose that you own a small boutique shop that can make 10 shirts per day with 2 tailors working full time. But due to increased demand you have to produce more number of shirts daily and assume that the only way to do so is by hiring more tailors. And so you hire a new

tailor and find that your total output now increases to15 shirts per day. This means that the additional tailor has the ability to produce 15-10 = 5 more shirts per day. This is the *marginal product* of the 3rd tailor which is equal to the amount of *additional* output he/she can produce. In the same manner, you hire another tailor and observe that the total output is now 22 shirts per day. Therefore the marginal product of the 4th tailor would be 21-15 = 6 shirts.

This is the concept of marginal product which shows the change in total output produced when one of the factors of production is increased by one unit while keeping all other factors fixed.

Diminishing Marginal Product

Let us continue with the above example. Suppose that due to further demand, you decide to hire more tailors in your boutique shop. So you hire a fifth tailor and observe that total output increases to 25 shirts. Thus the marginal product (MP) of the 5th tailor is 25–22 = 3 shirts. Then you add a sixth tailor and total output increases to 26 shirts, indicating the MP of the 6th tailor is 26-25=1 shirt. Still facing increased demand from your customers, you decide to add yet another tailor to your shop. But now you observe that the total output is no longer increasing but rather falls to 24 shirts per day (from 26 shirts). Therefore the MP of the 7th tailor is 24-26 = -2, implying that the new tailor has a negative marginal product! But why is the output falling in spite of increasing the number of labor (tailors) in the shop?

To answer this question, recall that, we have only increased the number of labor in the shop while none of the other inputs of production such as number of sewing machines and workshop area has been changed. Therefore, when new tailors are added to the shop, they have to work with the same machines and in the same work space. Initially the new tailors will be able to produce more shirts as the machines and work space will be utilized to a higher degree, resulting in increasing marginal product of labor.

But as the number of tailor increase further, there will be fewer machines and less space to work for each tailor and so they can no longer work properly. Therefore, the additional output i.e. marginal product of new tailors will be declining and may even be *negative* if it gets too crowded and none of the tailors are able to work at full capacity. Now the question is: why don't you then increase the number of sewing machines or shop space? In the short run, it may not be possible to increase other inputs such as sewing machine or shop space. Because it takes time to borrow from the bank or market, and then procure capital and build space.

This decline in the value of marginal product of labor, while other factors of production were held constant, is an application of the *law of diminishing marginal product.* Stated in more general terms, the law of diminishing marginal product says that: as more and more of a given factor of production is increased while all other factor inputs are kept constant, the marginal product of the given factor will eventually be diminishing. Our example above thus illustrates diminishing marginal product of labor.

Now let's consider an interesting question: Is it possible to have *diminishing returns to a single factor of production* and *constant returns to scale* at the same time?

To answer this question, we have to focus on the definitions of the two concepts and see how they relate to different things. Diminishing marginal product of a factor such as labor refers to the declining marginal product of labor when all the other factors of production are held constant. On the other hand, constant returns to scale takes place in the production setting when all the inputs are increased by the same factor and in response the output also increases by the same factor. Therefore while the individual factors of production will eventually exhibit diminishing returns, when all the factors are combined together and changed in the same proportion, they may exhibit increasing, decreasing or constant returns to scale. Hence the difference between the two primarily lies in the fact that diminishing returns occur when only **one** of the factors of production is changed while in the case of returns to scale **all** factors of production are changed.

13.2.2.3 Factor Productivity

Let's have a look at a production function again of the following form:

$$Y = F(K, H)$$

where K is the physical capital and H is the human capital

If this production function represents the aggregate production of the economy, change in output should be fully explained by change in physical and human capital. But empirical studies show that these factors can explain only a part of the change in output. What explains the remaining part of output? It indicates that something is missing from the production function. This is productivity. It captures how effectively the factors of production - physical and human capital – are turned into output.

Suppose there are two counties A and B. These countries have the same amount of physical and human capital of the same quality. That is, $K^A = K^B$, $H^A = H^B$, but Y^A is not equal to Y^B. This is because productivity of K and H are different in these two countries. Now the production function looks like the following after incorporating productivity:

$$\text{Output} = \text{Productivity}.\ F(K, H) = A.\ F(K, H)$$

A indicates the level of **productivity** of the different factors of production of the economy.

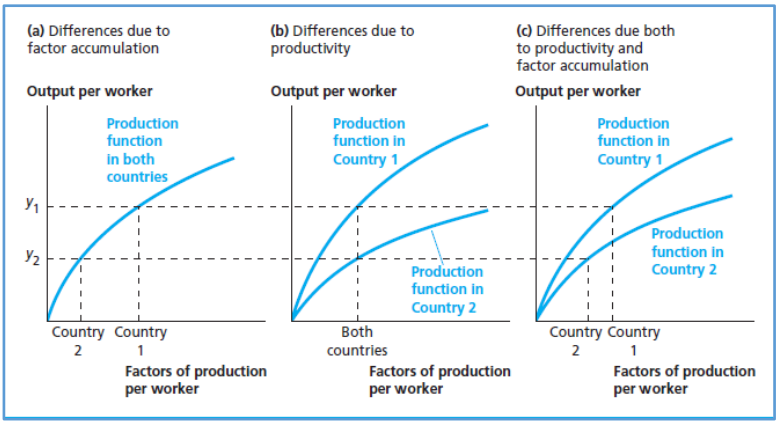
Now we have:

Growth of **output** = growth of **productivity** × growth of **factors of production**

The above expression thus shows that two countries with the same growth rates in their factors of production can have different growths in output if their growth in factor productivity is different. The diagram below depicts in detail the possible sources of differences in output per worker across different economies.

Fig 11: Possible sources of differences in output per worker

Source: Reproduced from N. Weil, Economic Growth, 3rd Edition



The above diagram includes three panels. Each panel shows a possible explanation for why two countries can have different levels of output per worker.

Panel (a) shows the case of differences in output per worker due to different rates of **factor accumulation** i.e. different growth rates of the factors of production. Suppose there are two countries: Country 1 and Country 2. While the two countries have the same growth rates of factor productivity (they have the same production function), they have different rates of factor growth. In particular Country 2 has a lower growth rate of factors of production per worker and hence a smaller factor accumulation. This lower level of factor accumulation leads to a lower level of output per worker ($\mathbf{y_2}$) for the country compared to Country 1 (whose output per worker is higher at $\mathbf{y_1}$). Therefore the difference in output per worker in this case stems from the differing rates of factor growth.

Panel (b) shows the case of differing **factor productivity**. The two countries are assumed to have the same level of factor accumulation while their growth in factor productivity differs. Country 1 has a higher growth in factor productivity and so its production function is steeper meaning that for a given level of factors of production per worker, Country 1 will be able to produce more output per worker than Country 2. This is exactly what is depicted in the panel. While both countries have the same level of factors of production per worker, output per worker is different due to differing rates of factor productivity.

And finally panel (c) shows the case of differing levels of both **factor accumulation** and **factor productivity**. In this case Country 1 not only has a higher growth rate in its factors of production than Country 2 but also possesses higher factor productivity. And so both the production function and the level of factors of production per worker are higher for Country 1. This clearly leads to the higher output per worker in Country 1 relative to Country 2.

Empirically it has been observed that about half of the variation of output can be explained by the variations in factor productivity. The level of productivity differs widely among countries. Productivity in many poor countries is only a fraction of the productivity in rich countries. As an example, the productivity of the poorest one-fifth of countries is only about 15% of that of US levels. Put differently, this means that if the same amount of physical and human capital is used by the poor countries and USA, the output produced by USA will be more than 6 times that of the poor countries. But the difference does not stop just in the case

of poor and rich countries. Even among the rich economies there are large differences in the level of productivity. For example, Japan's productivity is about 70% of that of USA.

Why is the productivity difference between rich and poor countries so high? To understand it fully, we need to unbundle the concept of productivity. Generally, productivity has two major parts:

Productivity = f (technology, efficiency)

Productivity can be decoupled into two components – **technology** and **efficiency**. Technology is the ways and methods of combining inputs, both physical and human capital, into output. On the other hand, efficiency measures the organizational structure of the production process – how inputs are translated into outputs for a given technology. We discuss these two issues briefly below.

It is important to distinguish technology from capital stock. A computer is a capital whereas the software it uses is a technology. Suppose you can perform a work in eight hours with your computer. But with the installation of new software, you can now do it in 6 hours. That is, you can do the same work with the same piece of capital in less time using new technology. There are a few characteristics of technology that make it unique and help contribute an economy to grow persistently.

First, unlike growth of factors of production, technological improvement can go on indefinitely. Accumulation of physical and human capital will eventually slow down because of the diminishing returns. Second, technology is more like ideas or blueprint and it is by nature 'non rival'. If one person uses a technology, it does not prevent others from using it. Hence, transfer of technology is more common than movement of factors among countries. Since innovation is costly which requires huge amount of investment both by private and public sector, developing countries either imitate or import technology from the developed countries.

Third, in most of the cases, technology is embodied in the capital stock and this type of technological change is known as 'embodied technological change'. This type of technology is expensive and cannot move as fast as the technology which can be separated from the capital stock. In case of embodied technology, the whole machine has to be replaced in order to upgrade technology. This has important implications for technological progress in a developing country like Bangladesh.

Economists observed that the developed countries experienced slowdown of productivity in the period of 1970s to early 1990s and they thought that this was due to slowdown of technological progress. However, empirical study showed that the slowdown of productivity was not due to slow technological progress; rather it was due to something else. It was argued that it was the efficiency of the US economy that fell. Moreover, technological differences could not explain the productivity gap between the developed and developing countries. The institutional structure at the national, industry and firm level have significant bearing on the productivity. With same level of factors of production and technology, some firms will produce less largely due to weak monitoring and inspection, inadequate incentives,

unfavorable work environment, etc. than other similar firms of the same industry. Some industries may be more productive than others because of effective government policies. Similarly, some countries are more productive due to better governance which includes rule of law, effectiveness of government regulations, and other aspects of governance.

There is a concern that the RMG sector of Bangladesh is less productive than its competitors such as Vietnam and China. Though there is no evidence available based on comparable firm level data, export volume per worker gives us some indication. Each worker in RMG produces about $5,300 worth of export for Bangladesh while this figure is about $7000 for Vietnam. That is, per worker volume of RMG export of Vietnam is more than 30% higher than that of Bangladesh.

13.3 Growth Accounting

Is the recent high steady growth of Bangladesh due largely to growth of productivity or growth of factors of production? If it is the factors of production, which factor contributes more – capital or labor (human capital)? To answer these questions, we need to work with the production function and calculate the relative contribution of the factors of production and productivity to growth. This exercise is known as '**growth accounting**'

Growth accounting shows one important fact – contribution of factors of production to output growth depends on their respective share in total output. Remember, we have learnt in Chapter 2 that 'income approach' is one way of measuring national income. In this case, factors of production are paid with their returns - labors get wages and owner of capital gets rents. In a very simple economy, total wages and rents add up to national income. If this is a labor-abundant developing economy, total share of wages must be higher than total share of rent from capital. Therefore, share of factor income in total income plays an important role in determining the contribution of each factor of production to growth.

Growth accounting shows that:
Productivity growth = Output growth - [Capital share × Capital growth] - [Labor share × Labor force growth]

Derivation of the above equation requires understanding of basic calculus. If the reader is not comfortable with calculus, he or she can skip the following derivation part.

Suppose, we have a production function of the following form:

$$Y = A.\ F(K, L) = A.K^{\alpha}L^{1-\alpha}$$

This is called a **Cobb-Douglas** production function. Taking the natural logarithm of both sides, we have:

$$\text{Log } Y = \log A + \boldsymbol{\alpha}\ \text{Log } K + (\mathbf{1}\text{-}\ \boldsymbol{\alpha})\ \log L$$

Now taking first derivative with respect to time in both sides,

$$\frac{\frac{dY}{dt}}{Y} = \frac{\frac{dA}{dt}}{A} + \alpha\frac{\frac{dK}{dt}}{K} + (1-\alpha)\frac{\frac{dL}{dt}}{L}$$

The above expression states that:

Growth of Y = Growth of A + α. Growth of K + (1- α). Growth of L

That is, the growth in output is equal to the summation of growth in productivity (A) and the growth in the factors of production, capital (K) and labor (L).

We know that,

$$\frac{dY}{dK} = \text{MPK} = \text{A. } \alpha\, K^{\alpha-1}L^{1-\alpha}$$

$$\frac{dY}{dL} = \text{MPL} = \text{A. (1- } \alpha). \, K^{\alpha}L^{-\alpha}$$

In a competitive market, a factor will be paid equal to its marginal product.

Rent of capital	= MPK = A. $\alpha\, K^{\alpha-1}L^{1-\alpha}$
Wage of labor	= MPL = A. (1- α). $K^{\alpha}L^{-\alpha}$
Capital's share in output	$= \frac{K \times MPK}{Y}$ = K. A. $\alpha\, K^{\alpha-1}L^{1-\alpha} / A.K^{\alpha}L^{1-\alpha} = \alpha$
Labor's share in output	$= \frac{L \times MPL}{Y}$ = L. A. (1-α) $K^{\alpha}L^{-\alpha} / A.K^{\alpha}L^{1-\alpha}$ =1- α

Therefore we have:

Growth of Y = Growth of A + (Capital share × Growth of K) + (Labor share × Growth of L)

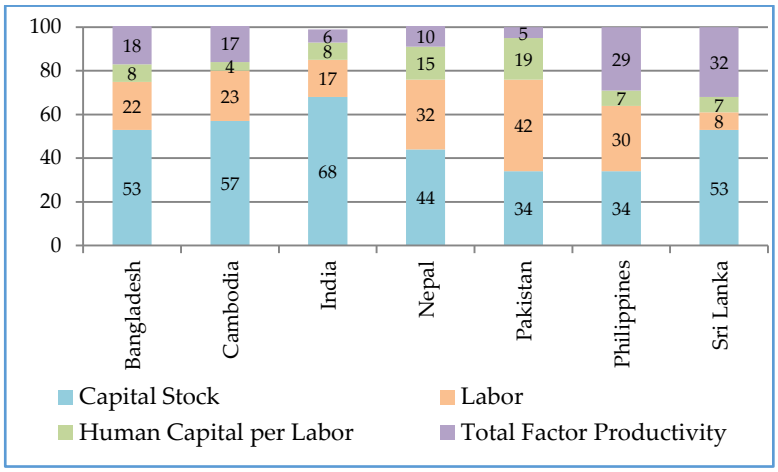
Put differently, the above expression states that:
Output growth = [Productivity growth] + [Capital share × Capital growth] + [Labor share × Labor force growth]

We know the output growth, capital growth and labor growth. So, we take the above equation to the data and estimate capital and labor's share in total output. Once we estimate the share parameters, we calculate productivity growth residually. That is,
Productivity growth = Output growth - [Capital share × Capital growth] - [Labor share × Labor force growth]

The World Bank routinely estimates the shares of factors of production and productivity in total output for developing countries. Let's look at the following figure which compares the shares of capital, labor, human capital and productivity for seven countries. Note that in this case, labor is distinguished from human capital.

Fig 12: Shares of Factors of Production and Factor Productivity in total output (%)

Source: World Bank



The figure above presents the shares of the factors of production (capital, labor and human capital) and total factor productivity (TFP) for the 7 developing economies of Bangladesh, Cambodia, India, Nepal, Pakistan, Philippines and Sri Lanka. As can be seen, the countries generally have lower shares of TFP in total output. Only in the case of Sri Lanka and Philippines, TFP accounted for about one third of the total output while for the rest of the countries it was much lower, the lowest being 5% for Pakistan. Therefore, we can see that the growth of output of these developing countries largely came from the growth in the factors of production as opposed to growth in factor productivity. But at the same time, there is also considerable variation in the shares of the different factors of production among the countries. In the case of Bangladesh, Cambodia, India and Sri Lanka, more than 50% of the share of output came from **capital stock** while Nepal, Pakistan and Philippines had comparatively larger shares of **labor**. Share of **human capital per labor** is found to be relatively low for these countries with the highest being 19% in the case of Pakistan, followed by 15% in Nepal while the shares of the rest of the countries were less than 10%.

Looking at the distribution for Bangladesh, we can see that capital stock accounted for 53% of total output while share of labor, human capital per labor and TFP were 22%, 8% and 18% respectively. While Bangladesh is certainly a labor abundant country, the share of capital stock in total output is found be more than double of that of labor. Even adding the share of human capital to labor does not make the shares equal. Therefore the growth of Bangladesh is coming largely from the growth in capital stock implying the labor abundant economy crucially hinges on capital for output growth.

When growth is driven too much by factors of production, it is likely to slow down because of the very nature of the factors of production. Diminishing return is likely to set in at some point. Note that accumulation of factors of production account for about 94% of growth of Indian economy. From this figure one can readily comment that the high economic growth rate of India is not likely to persist for long. This issue was first pointed out by Noble laureate economist Paul Krugman when he observed that the growth of the economy of Singapore in 1990s was driven largely by factor accumulation with little productivity growth. He warned the government of Singapore about the possible slow-down of the economy and interestingly the government took the advice very seriously and undertook several measures to increase productivity of the workers.

13.4 Growth Theory: Physical Capital based explanation of growth and income differential

13.4.1 Harrod Domar model

The Harrod-Domar (HD) model was developed independently by Roy Harrod in 1939 and Evsey Domar in 1946. According to this model, the main source of growth is the savings of the economy and the productivity of capital. That is, the amount of savings, the rate of transformation of saving into formation of physical capital stock and rate at which capital stock is transformed into output are the three main ingredients of achieving economic growth. It implies that if a country wants to grow faster, it should:

- Save more
- Ensure that saving will be invested in building physical capital
- Make sure productivity of physical capital will be high

Let's describe the model with some notations.

HD models introduced the concept of **incremental capital output ratio** (ICOR). It is simply the *inverse* of the marginal product of capital.

$$ICOR = \Delta K / \Delta Y$$
$$= \Delta K/Y \,/\, \Delta Y/Y \text{ [dividing numerator and denominator by Y]}$$
$$g = \Delta K/Y.\ 1/ICOR \quad [\text{as, } \Delta Y/Y = g]$$
$$= I/Y.\ 1/ICOR \quad [\text{as, } \Delta K = I]$$
$$= S/Y.\ 1/ICOR \quad [\text{as, } S = I]$$
$$= sY/Y.\ 1/ICOR \quad [\text{as total saving } S = s.Y,\ s = \text{average saving}]$$
$$\Rightarrow \ g = \frac{s}{ICOR}$$

From the above expression, we can see that the growth rate of output increases with the saving rate (s) and decreases with ICOR. By definition, the inverse relationship between output growth and ICOR implies the positive relationship between growth and marginal product of capital. The value of '1/ICOR' captures the productivity of capital and plays an important role in planning purposes. Long term government plans such as the Five Year Plans of Bangladesh still uses the essence of Harrod-Domar model to estimate the amount of investment required to achieve some target level of growth. For example, we can write the above equation in the following form:

$$s = g.\ ICOR$$
$$\Rightarrow \ S/Y = g.\ ICOR$$
$$\Rightarrow \ \mathbf{I} = g.\ ICOR.\ Y$$

Suppose, in a hypothetical economy current GDP is $100 billion. The country wants to achieve 7% growth in the next year. The planners estimate that the ICOR of this country is 3. Therefore, the amount of investment required to achieve 7% growth rate is:

$$I = 0.07 \times 3 \times 100 \text{ billion} = 21 \text{ billion}$$

This implies that the economy requires an additional $21 billion of investment to achieve 7% growth rate.

Importantly, the 7th Five Year Plan of Bangladesh uses this simple formula to calculate the required amount of investment. The ICOR is assumed to be 4.3 throughout the whole planning period of 2016-2020.

Table 1: ICOR, target growth and required investment for Bangladesh

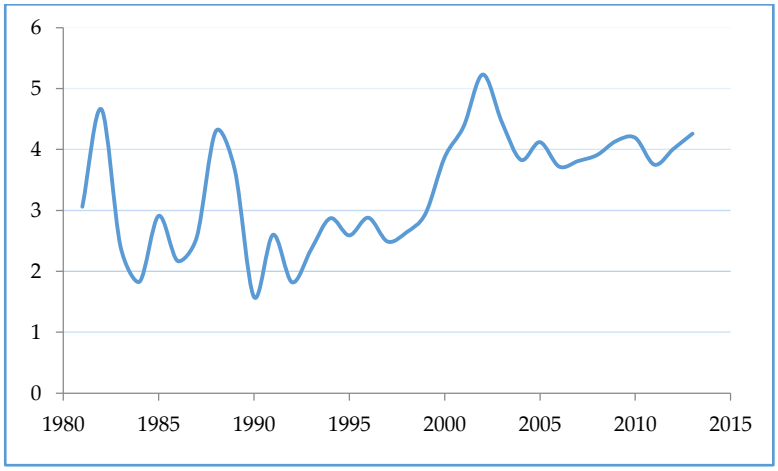
Year	ICOR	Target Growth rate (g)	Required investment as % of GDP: I/Y
	(I)	(II)	(I) × (II)
2016	4.3	7	30.1
2017	4.3	7.2	31
2018	4.3	7.4	31.8
2019	4.3	7.6	32.7
2020	4.3	8	34.4

Source: Adapted from the 7th FYP. GED, Planning Commission

Generally ICOR increases with the level of capital stock and GDP of the country. As capital stock increases, its contribution to output decreases gradually and as a result ICOR increases. Let's look at the ICOR of Bangladesh. It is interesting to observe that ICOR has become more stable since 2005 (Figure 13).

Figure 13: Trend in ICOR

Data Source: The World Bank



We can discern two periods very clearly – in 1980s and 1990s when the ICOR was around 3 with lots of fluctuation around the mean and the post 2000 period which saw ICOR hovering around 4. This reflects the structural shift of the economy from lower capital intensive agriculture to higher capital intensive manufacturing. The steep increase in ICOR towards the end of 1990s and at the beginning of 2000s is largely due to capital deepening in RMG and other manufacturing sectors.

How seriously we should take this ICOR and ICOR based estimates? Harrod-Domar type growth model considers physical capital as the only source of growth, ignoring the importance of human capital and technological innovations. The model also assumes no factor *substitutability* and unchanging production structure. Factor substitutability implies that to

produce the same amount of goods, producers can use different mix of factors. That is, producers can substitute one factor for another in response to price, policy or technological changes. None of these assumptions seem to hold for a rapidly changing economy such as Bangladesh. Therefore, the relationship between the economic growth rate, investment and ICOR becomes weaker when any of these assumptions is violated. Therefore, ICOR based estimates are very indicative in nature and should be considered with cautions.

13.4.2 Solow Model

The most influential capital based argument for economic growth came in 1956 when Robert Solow, professor of MIT, developed an elegant model of economic growth. This was the beginning of the neoclassical economic growth theory which relies on the classical properties of the production function such as constant returns to scale and diminishing marginal product of capital. Unlike, Harrod-Domar model, the Solow model starts with the production function and shows how capital per worker and therefore output per worker changes with savings, technology, population growth and capital depreciation. This sounds very similar to what we have learnt from the H-D model. What more do we learn from the Solow model? Solow model not only explains the factors of growth, but also explains why a country grows faster than other countries and thus explains the cross-country income differential.

It also lends important insight on the 'convergence' of countries – a country with low capital per worker will eventually catch up with the countries with high capital per worker. The capital will flow from the rich (higher capital per worker) to the poor country (low capital per worker) as the return from capital (marginal product of capital) is lower in the former than in the latter due to diminishing marginal product of capital.

Let's derive the fundamental equation of capital accumulation of the Solow model.

$$Y = F(K, L)$$
$$Y/L = F(K/L, 1) \qquad \text{[in per unit labor terms]}$$
$$y = f(k)$$

The capital stock of the economy changes in the following way:

$$\Delta K = I - \delta K$$

The change in capital stock is the new investment (I) net of depreciation (δK). If an economy adds 100 units new capital stock and the existing capital stock depreciates by 2 units, then the change in capital stock ΔK is 98 units. We can write down in per capita terms as:

$$\Delta k = i - \delta k$$

We also know that saving is equal to investment, **S=I** in an economy. If the economy saves a constant fraction **s**, then S = **s**. Y. We can again write in per capita terms,

$$\Delta k = sf(k) - \delta k \text{ [using } Y = f(k)]$$

This is the fundamental equation for capital accumulation in Solow model. This is similar to what we have learnt in Harrod-Domar model: $g = s.\ \Delta Y/\Delta K$. In this simple exposition of Solow model, saving rate turns out to be the key to higher level of capital stock and growth.

The above equation shows that capital grows as long as saving (or investment) grows faster than depreciation of capital. When $\Delta k = 0$, capital stock reaches its 'steady state'. At the steady state the economy accumulates just as much capital as it needs to replace the worn out capital. When the economy reaches the steady state, the growth of capital per worker would cease and so will output per worker. While this model also stresses the importance on higher saving and investment similar to Harrod-Domar model, its ingenuity lies in incorporating one critical feature of capital accumulation, which is the diminishing marginal product. As a country grows by accumulating more and more capital stock, its return tends to decrease and this slows down the growth rate. This feature of the model gives rise to the 'convergence' where poorer countries catch up with the richer ones. In real world, we see some countries such as China and India which have been catching up very fast with the developed countries while some other developing countries in Africa have been lagging well behind.

13.4.3 Human and knowledge capital, technology, innovation based explanations of growth

13.4.3.1 Endogenous Growth

According to Solow growth model, an economy (per capita output) cannot grow persistently because diminishing marginal product sets in eventually. Moreover we also observe widening of living standard between the poor and the rich countries. The neoclassical models also cannot explain properly the production of knowledge and technology and their role in continuous advancement of production process and therefore the economic growth.

These oddities of the classical growth models give rise to another strand of sophisticated models of growth known as endogenous growth. This type of models allows diminishing marginal product of capital and at the same time can generate perpetual growth. As discussed above, while factors of production such as physical and human capital may exhibit diminishing return, the frontier of knowledge and technology can expand indefinitely. We observe increasing returns to scale in knowledge and technology creation. One important feature of endogenous growth model is that in this case the factors of growth are determined within the model, unlike the classical models.

The father of endogenous growth theory is Paul Romer who came up with an elegant model of growth in 1986. In his model, he broadened the definition of capital to include 'knowledge capital' which does not necessarily need to follow diminishing return. This work spurred a wide range of research explaining the factors that can lead to perpetual growth, defying diminishing returns. Economists became interested to understand the role of innovations, research and development (R & D), creation of knowledge and technology and their role in economic growth and widening income dispersion between countries. Investment in human capital for innovations is central to the idea of sustained economic growth which we observe in the developed countries.

13.4.3.2 Governance: Role of Institutions

The Harrod-Domar model and Solow model teach us that accumulation of capital is central to economic growth. As the economy builds and acquires more machines, tools, buildings,

roads, etc. these capital stocks help produce more output at a faster rate. But it appears that the fundamental question is: why some countries are able to produce or acquire more capital stock than other countries? Similarly, the endogenous growth theories underscore the importance of creation of knowledge and innovation. It requires that government and private sector invest in human capital and R& D. Again, the same fundamental question arises: why some countries invest more in human capital and R & D than other countries? Quality of political, economic and social institutions play critical role in providing incentives to the private sector to invest in accumulating physical capital, human capital and R&D. Protection of private property, patent law, tax regime and financial regulations are important factors for innovations to take place. Because of differential level of *governance*, two countries with similar physical and human capital as well as same technology can have different levels of national income and economic growth.

Recent works on growth theory and empirics tend to find the historical causes of growth divergence and focus on the role played by ***institutions*** such as property rights, rule of law, etc. The neoclassical and endogenous growth theories shed light on the role of human and physical capital, technology, research and innovation in economic growth. But more fundamental question is why some countries have higher capital and improved technology than other countries. Economists like Daron Acemoglu (2001) argues that it is the earlier institution that makes the difference and the types of colonies have a huge impact on the type of institution a county ended up with. Europeans were more likely to set up extractive institutions where they did not want to settle and high mortality rates (e.g., due to malaria) explain their choice of settlement. In places such as Africa, tropical diseases such as malaria were widespread and so the mortality rates of the European colonists were high. In these places, institutions which protect private property rights and ensure safety and security of life and property never emerged in the colonial era. These initial extractive institutions of several centuries ago determine the low level of institutions today and this creates the divergence in incomes. The logical flow of argument is following:

Settler mortality ➔ Settlement ➔ Early institutions ➔ Current institutions ➔ Current economic performance

Studies suggest that there is a positive correlation between good governance and economic growth. Governance generally implies how responsible, responsive and equitable the government is. Worldwide Governance Indicators (WGI), developed by the World Bank, considers six aspects of governance - voice of accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption.

13.5 Bangladesh economy: A story of steady, robust and resilient growth

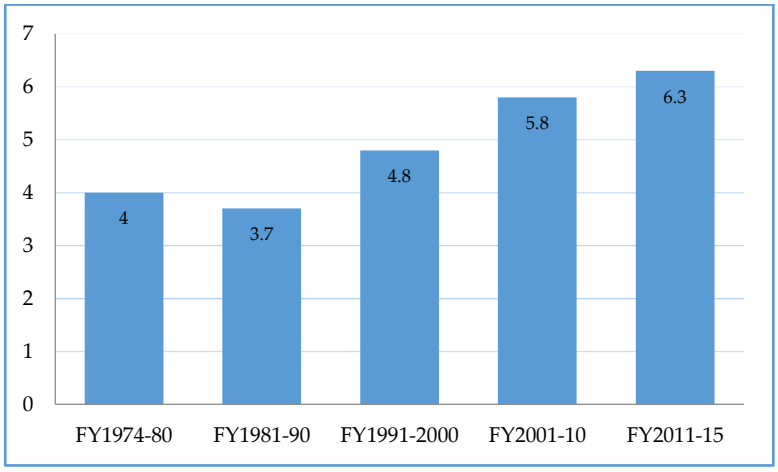
Bangladesh has made a remarkable success in achieving steady and persistent acceleration of growth over the last few decades, with about one percentage point increase in every decade since 1980s. Average real GDP growth over the last five years has been above 6%, which is much higher than average growth rate of all developing countries (4.7%). In FY 2015 per capita income in Bangladesh was USD 1314. Recently in the beginning of FY2015-16 per capita income of Bangladesh has crossed the threshold of USD 1,046 to become a lower-middle income country.

An impressive aspect of the recent history of economic growth of Bangladesh is its resilience – capacity to absorb shocks and move forward. The prolong period of political confrontation in 2012-13 lead to a slowdown in the growth rate of the economy in FY14. Production and distribution chains were disrupted by frequent and long spells of general strikes and country wide blockades; the service and manufacturing sectors were hard hit. But the country bounced back strongly after the general election in January 2014, showing positive signs for all major economic indicators.

On the external front, Bangladesh economy has been able to ward off recent global recession, food price hike, European debt crisis and also the recent slow-down of emerging economies very successfully, thanks to prudent macroeconomic management and also the very structure of the economy. One of the major factors that help Bangladesh economy survive major shocks is that two major engines of growth – remittance and RMG exports were largely insulated from shocks. Remittances are generally counter-cyclical as their inflow increase with economic slowdown of the recipient country. Furthermore, the economic depression of the importing countries has little impact on the demand for RMG from Bangladesh, given its low-value nature of the product.

Figure 15: Decadal real GDP growth rates of Bangladesh

Source: BBS



It is not only the rate of growth but the *quality* of growth that makes Bangladesh a special case. Since the economic growth has primarily been driven by labor intensive manufacturing sector and by sending low skilled workers abroad, the growth is inherently inclusive and pro-poor. The growth elasticity of poverty is about one in absolute value which implies that one percentage increase in real income growth would bring forth about similar percentage decrease in the poverty rate. It indicates that, the growth is an employment generating growth which is both inclusive and poverty reducing. In the 2000-2010 period, growth rather than redistribution was the main driver of poverty reduction. This is also reflected by declining poverty and consumption inequality of the country. In fact, the long term plan documents such as Five Year Plan, Perspective Plan of the Government of Bangladesh place greater emphasis on the quality of growth. Note that the title of the 7th Five Year Plan is "Accelerating Growth, Empowering Citizens" which shows the commitment of the government in ensuring equitable growth. Though the elasticities indicate that growth can take care of poverty reduction by itself, there are spatial pockets of extreme poverty due to geographical exclusion, ecological vulnerability and policy bias that require special attention.

Table 2: Average Decadal Sectoral Growth Rates

	1981-1989	1990-1999	2010-2015
Agriculture	1.8	3.4	3.7
Industry	5.6	7.0	8.8
of which Manufacturing			
Large scale	4.6	7.3	9.3
Small scale	5.4	6.8	9.7
Services	3.8	4.3	6.0
GDP	3.5	4.8	6.2

Source: BBS

Private sector led manufacturing sector has been the major driver of persistent high growth, as the agriculture sector could not transform itself from subsistence to commercialized one, despite remarkable success in achieving self-sufficiency in food grain production.

Manufacturing sector, which accounts for 70% of industry, has been the major force in structural transformation of the economy. It has all along been the dominant component of the industrial sector with its share in GDP increasing from about 10 percent in 1988-89 to nearly 19.45 percent in 2013-14. In fact, it is the astronomical growth of RMG sector, from a few million dollar industry in early 1980s to about 25 billion dollar industry in 2014, which has contributed to the sustained overall economic growth of the economy. This has been the direct result of global Multi Fibre Arrangement (MFA) regime as well as the conducive policies pursued by the government to ensure global competitiveness of the industry. Other manufacturing industries such as jute goods, footwear and leather products, electrical and electronic goods, engineering products and pharmaceuticals, have strong export potentials for driving the economy towards higher growth path.

The vibrant service sector which is very heterogeneous in nature has also become a major source of employment of low skilled workers. The employment in service sector has grown out of the need to absorb manpower which is structurally in excess - a reservoir for labor discharged by the agricultural sector. The service sector in Bangladesh is no longer a 'residual' sector; half of the national income has been generated in this sector for the last few decades.