

Treasury Management in Financial Institutions (TMFI)



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Treasury Management in Financial Institutions

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Foreword

The Institute Of Bankers, Bangladesh (IBB), established in 1973, has been working for developing the professional skills of the employees of all Banks and Financial Institutions operating in Bangladesh. In this regard, IBB conducts the Banking Diploma examination, JAIBB (Junior associate of the Institute Of Bankers, Bangladesh) and DAIBB (Deplomed Associate of the Institute Of Bankers, Bangladesh) usually held twice in a year throughout the country.

The examinations are being conducted under standard syllabus covering various aspects of Banking profession. As banking is ever-evolving discipline, the syllabus for banking diploma examination is also required to be matched with the changing banking conditions. For the same purpose, A committee was formed under the leadership of Dr. Toufic Ahmad Choudhury former Director General, BIBM and comprising of Mr. Md. Ali Hossain Prodhania, Former Managing Director, Bangladesh Krishi Bank, Mr. Abul Kashem Md. Shirin, Managing Director & CEO ,Dutch-Bangla Bank Ltd, Dr. Mohammad Haider Ali Miah, Former Managing Director & CEO, EXIM Bank of Bangladesh Ltd. Dr. Shah Md. Ahsan Habib, Professor, BIBM, Mr. Alamgir Morshed, CEO, IDCOL, Mr. Omar Faruque , CFCC Head, Standard Chartered Bank and Laila Bilkis Ara, Secretary General, IBB for updating and upgrading the syllabus of IBB Banking Diploma examination.

The committee did the splendid job of formulating the new syllabus for both JAIBB and DAIBB, which was later approved by the Academic Council and Chairman of the institute (Honorable Governor, Bangladesh Bank). The same committee has also been entrusted to formulate standard reading materials by the subject matter specialists and practitioners under their (committee members) guidance in order to facilitate the examinees for consulting focused reading materials instead of so many (sometimes also irrelevant) books. This particular reading material on **Treasury Management in Financial Instiuttions (TMFI)** has been prepared and compiled by Mr. Mehdi Zaman. We extend our gratitude and thanks to his for taking the trouble of writing the reading material.

All the reading materials of (both JAIBB and DAIBB) will be gradually uploaded in the IBB e- library Web portal. The examinees/ readers/users are requested to send their opinion/ suggestion on any reading material and we will consider their opinion with great importance. Besides, the IBB will modify update the reading materials from time to time as per requirements of the examinees.

Finally, the Institute Of Bankers, Bangladesh takes this opportunity to express its gratitude to the learned members of IBB Council, the syllabus and examination review committee and reading material preparation committee for preparing syllabus and reading materials for IBB diploma examinations.

Laila Bilkis Ara
Secretary General

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Module A: Introduction to Treasury

1.1 Treasury Management:

Treasury Management can be understood as the planning, organizing and controlling holding, funds and working capital of the enterprise in order to make the best possible use of the funds, maintain firm's liquidity, reduce the overall cost of funds, and mitigate operational and financial risk. Treasury Management includes a firm's collections, disbursements, concentration, investment and funding activities. In larger firms, it may also include financial risk management. Most banks have whole departments devoted to treasury management and supporting their clients' needs in this area. It covers working capital management, currency management, corporate finance and financial risk management.

Simply put, treasury management is the management of all financial affairs of the business such as raising funds for the business from various sources, currency management, cash flows and various strategies and procedures of corporate finance.

The key goal of treasury management is planning, organizing and controlling cash assets to satisfy the financial objectives of the organization. The goal may be to maximize the return on the available cash, or minimize interest cost or mobilize as much cash as possible for corporate ventures.

1.2 Functions of Treasury Management:

Treasury Management aims to ensure that adequate cash is available with the organization, during the outflow of funds. Further, it also contributes to optimum utilization of funds and makes sure that there are no unutilized funds kept in the firm for a very long term. The functions of treasury management are discussed below:

- **Cash Management:** Treasury Management includes cash management, and so it ensures that there are an effective collection and payment system in the organization.
- **Liquidity Management:** An optimum level of liquidity should be maintained in the business, for the better and smooth functioning of the business, i.e. the company must be able to fulfil its financial obligation when they become due for payment, such as payment to suppliers, employees, creditors, etc. And to do so, cash flow analysis and working capital management act as the most important tool for treasury management, to achieve its strategic goals.
- **Availability of funds in adequate quantity and at the right time:** The treasury manager has to ensure that the funds are available with the organization in sufficient quantity, i.e. neither be more nor less, to fulfil the day to day cash requirement for the smooth functioning of the

enterprise. Further, timely availability of funds also smoothens the firm's operations, resulting in the certainty as to the amount of inflows available with the company at a particular point in time.

- **Deployment of funds in adequate quantity and at the right time:** The deployment of funds has to be done in right quantity such as the acquisition of fixed assets, purchase of raw material, payment of expenses like rent, salary, bills, interest and so forth. For this purpose, the treasury manager has to keep an eye on all receipts of funds and the application thereof. Further, the funds must be available at the time of need, which may be different for different firms and also for the purpose for which they are used. The period may differ from a week to month when it comes to acquisition of the fixed assets and two to three days in case of working capital requirement.
- **Optimum utilization of resources:** Treasury Management also aims at ensuring the effective utilization of the firm's resources, to reduce the operating costs and also prevent liquidity shortage in the coming time.
- **Risk Management:** One of the primary objectives of the treasury management is to manage financial risk to allow the enterprise to meet its financial obligations, as they fall due and also ensure predictable performance of the business. It tends to identify, measure, analyze and manage risk in order to mitigate losses that has the potential to affect the company's profitability and growth in any way. Hence, treasury management is accountable for all types of risk that can influence the business entity.

Further, the treasury management intends to maximize return on the funds available with the company, by making such investments which have higher return and low risk.

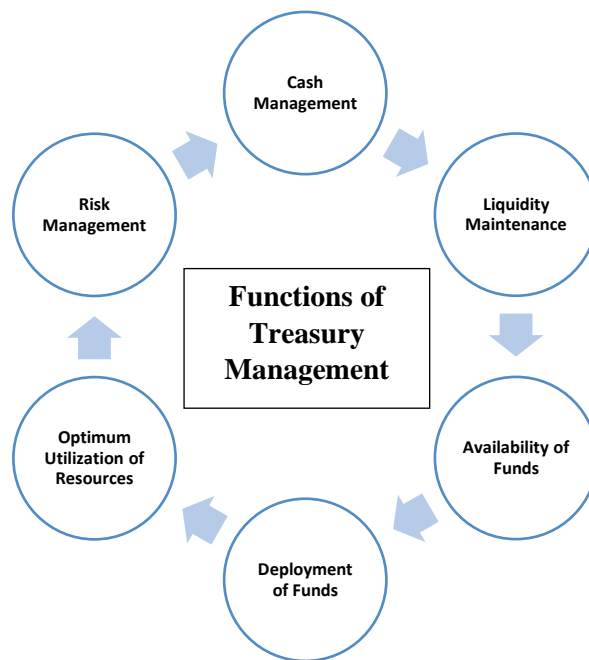


Fig: Functions of Treasury Management

1.3 Meaning and Functions of Integrated Treasury:

A comprehensive strategy for funding the balance sheet and allocating capital across domestic, international, and foreign exchange markets is known as integrated treasury. With this strategy, the bank is able to maximize asset-liability management and take advantage of arbitrage opportunities. In the past, a bank's forex dealing room handled foreign exchange dealings that mostly resulted from merchant transactions (forex purchases from and sales to customers) and cover activities that followed in the interbank market. The domestic treasury and investment operations were separate from a bank's foreign exchange transactions.

Treasury operations were classified as a cost center that was solely responsible for managing reserves (CRR and SLR) and the funds that result from such management. Additionally, the Treasury invested in both government and non-government securities. Due to interest rate deregulation, exchange control liberalization, the growth of the forex market, the introduction of derivative products, and technological advancements in settlement systems and dealing environments, there is a need for integration of foreign exchange dealings and domestic treasury operations. The integrated treasury performs a variety of tasks in addition to its usual activities as a forex dealing room and treasury unit.

1.4 Functions of Integrated Treasury:The major functions of integrated treasury are:

(a) Reserve Management and Investment: It involves:

- (i) Fulfilling CRR/SLR commitments
- (ii) Assembling a roughly balanced investment portfolio to maximize yield and duration

(b) Liquidity and Funds Management: It involves:

- (i) Providing a balanced and well-diversified liability base to fund the various assets on the bank's balance sheet;
- (ii) Analyzing major cash flows resulting from asset-liability transactions; and
- (iii) Providing policy inputs to the bank's strategic planning group on funding mix (currency, tenor, and cost) and yield expected in credit and investment.

(c) Asset Liability Management: ALM calls for determining the optimal size and growth rate of the balance sheet and also price the assets and liabilities in accordance with prescribed guidelines.

(d) Risk Management: Integrated treasury manages all market risks associated with a bank's liabilities and assets. The market risk of liabilities pertains to floating interest rate risks and asset and liability mismatches. Market risk for assets can arise from:

- (i) Negative adjustment to interest rates
- (ii) Increasing levels of disintermediation,
- (iii) Securitization of assets, and
- (iv) Emergence of credit derivatives, etc.

The Treasury would observe the cash inflow impact of changes in asset prices due to changes in interest rates by adhering to prudential exposure limitations while the Credit Department would continue to be in charge of assessing credit risk.

(e) Transfer Pricing: The treasury is responsible for making sure that the bank's money are used as efficiently as possible without sacrificing yield or liquidity. An integrated treasury unit has direct access to numerous markets as well as knowledge of the bank's overall funding requirements (like money market, capital market, forex market, credit market). In order to inform different industry groups and product categories on the best business strategy to employ, the treasury should ideally give benchmark rates after taking on market risk.

(f) Derivative Products: For the purpose of hedging a bank's own exposures, the Treasury can create Interest Rate Swap (IRS) and other currency-based/cross-currency derivative products. It can also offer these products to clients or other banks.

(g) Arbitrage: In order to maximize profit with the least amount of risk, Treasury units of banks engage in arbitrage by simultaneously purchasing and selling the same type of asset in two marketplaces.

(h) Capital Adequacy: This function is concerned with the quality of the assets, and Return on Assets (ROA) is a crucial metric for gauging the effectiveness of the funds that have been allocated. One of the main profit centers is an integrated treasury. Its own Profit and Loss measurements exist. Through proprietary trading, which involves transactions made to profit from changes in market interest and currency rates, it takes on exposures that might not be necessary for ordinary banking.

1.5 Nature of Integration:

At first, there is the integration of geography and infrastructure. The domestic treasury unit and the FX trading rooms are combined and housed in the same location. The dealing/trading rooms that engage in the same trading activity are brought under the same policies, hierarchy, technological platform, and accounting system under horizontal integration. With a shared pool of money and contributions, all current and different trading and arbitrage activities are placed under one control through vertical integration. The combined effect of all unit trades on currency funds. The transactions are linked electronically.

Independent Forex Role	Independent Investment Role	Integrated Role
Merchant Dealing	Funds Management	ALM
Corporate FX Trading	Liquidity CRR/SLR Management	SWAP Management
Proprietary Trading	SLR / Non-SLR Investments	Overseas Borrowing Investment
Derivatives Dealing	Securities Trading	Arbitrage
	Equities Trading	Derivatives Dealing

1.6 Benefits of Integration:

Integration's primary goals are to increase portfolio profitability, risk mitigation, and asset synergy between banking and trading. Trading assets are retained largely for the purpose of making profits on short-term disparities in prices and yields, while banking assets are held primarily for client relationships, consistent income, and statutory duties and are typically held until maturity. The goal is accomplished through effective money management, cost-effective liability sourcing, appropriate transfer pricing, taking advantage of arbitrage opportunities, online and off-line information sharing between money and forex dealers, single point of contact for customers, efficient MIS, improved internal control, risk minimization, and better regulatory compliance.

An integrated treasury serves as a hub for hedging and arbitrage activities. In order to maintain a proactive profit center, it aims to maximize its currency portfolio and allow for unrestricted transfers of

money between other currencies. Banks with integrated treasuries will have the opportunity to develop multi-currency balance sheets and benefit from strategic positioning as a result of the incremental liberalization of capital account convertibility.

1.7 Structure of Integrated Treasury:

The front office, mid office, back office, and audit group staff the treasury branch. The front office is made up of the dealers and traders. They are the first point of contact with other market players during their buying and selling transactions (dealers of other banks, brokers and customers). They answer to the chiefs of respective departments. To take advantage of arbitrage chances, they also communicate with one another. The unit in charge of risk monitoring, measurement, and analysis operates independently of the treasury unit and reports directly to the top Management for oversight. This department tracks daily risk exposures, both individually and collectively, and provides risk assessment to the Asset Liability Committee (ALCO). Accounting, settlement, and reconciliation tasks are handled by the back office. To guarantee conformity to internal/regulatory processes and procedures, the audit group independently examines/audits the treasury department's daily operations.

Arbitrage opportunities are created by pricing differences across various marketplaces for the same class of assets. For instance, borrowing in US dollars, converting that into BDT, purchasing forward insurance to hedge exchange risk, and invest in BDT might all result in arbitrage benefits. But when financial markets operate effectively, asset values and exchange rates are produced that forbid arbitrage.

In Bangladesh, a large number of banks have seized the opportunity to establish their integrated treasury operations, which are supported by infrastructure like the Reuters/Telerate/Bloomberg System, hotlines, Dealing Boards, the Internet, etc., as well as software specifically designed for integrated treasury.

1.8 Money Market:

Simply said, short-term debt instruments are traded on the money market. It involves an ongoing exchange of funds between businesses, governments, banks, and other financial institutions for terms that can range from one night to as long as a year.

A money market is a suitable location for people, banks, businesses, and governments to temporarily store their cash. The goal of money markets is to make it simple and affordable for businesses and governments to access liquid funds. Short-term debt is often issued by businesses to finance operating capital rather than for large-scale projects or capital investments. Money market gains are small, but there are also few dangers involved. Deposits, collateral loans, acceptances, and bills of exchange are all instruments used in the money markets.

There are several different types of money market instruments that are traded in the money market. These are:

1. **Certificate of deposit:** If a company needs to lend out a lot of money, it can use or borrow money against a certificate of deposit. It functions similarly to a fixed deposit, but with better negotiating power and more flexible liquidity conditions.
2. **Commercial Paper:** This money market product functions as a promissory note created by a business or organization to raise short-term capital. It is an unsecured instrument, meaning there is no connected collateral. Because of this, it is frequently utilized by large-cap corporations with a

solid market reputation. Commercial papers often have maturities of 7 days to 1 year, which makes them less expensive than comparable securities sold on the capital market in terms of interest rates.

3. **Treasury bills:** It can only be issued by a nation's central government when necessary funds are needed to fulfill its immediate obligations. These do not pay interest but do allow for capital gains because they can be bought at a discount and paid in full when they mature. Due to the government's backing of Treasury Bills, there is very little risk. For risk-averse or inexperienced investors, they make the best investment tool.
4. **Repurchase Agreements:** Repurchase agreements, or Repos, are short-term borrowing instruments in which the issuer receiving the funds makes a promise to pay it back or repurchase it in the future. Government securities are typically traded under repurchase agreements.
5. **Banker's Acceptance:** In the financial industry, this popular money market product is exchanged. With a signed promise of future repayment, a loan is issued to the designated bank after a banker's acceptance.

Numerous factors, including supply and demand dynamics for various money market products, can affect interest rates in the money markets. Additionally, there are broader factors that influence interest rates across all financial and capital markets. Rose points out that Treasury bills often yield the lowest rate in the money market because they have no default risk and a vibrant secondary market, and that the rates of other instruments seem to follow those of Treasury bills. However, Goodfriend and Whelpley remind us that the federal funds rate is "the basic rate to which all other money market rates are anchored," and that it is both current and expected. This correlation shows how the Federal Reserve uses the federal funds rate to carry out its monetary policies.

1.9 Foreign Exchange Market:

The currency market, commonly referred to as the foreign exchange market, is a marketplace where various individuals from across the world buy and sell various currencies. In the conduct of international trade, this market is extremely important. The currency market benefits businesses and people by allowing them to buy and sell products and services in foreign currencies and by facilitating a constant flow of capital. The key players in the currency markets, including big multinational banks, corporations, governments, and retail traders, work around-the-clock. Members come to the currency market with various goals in mind, and together they increase the market's efficiency and liquidity. These markets, in large part, are what power the vibrant world economies.

It is interesting that the currency market is a network of international markets rather than a single market exchange. Japanese markets are followed by those in Hong Kong, Singapore, India, Bahrain, Europe, the United Kingdom, the United States, Canada, and Australia, all of which operate according to their respective time zones.

Cross-border trade, investment, and financial activities are significantly facilitated by the foreign exchange markets. These marketplaces enable companies conducting foreign exchange transactions to change their existing currency or deposit into the desired currency or deposit. Foreign exchange dealers handle the majority of transactions; on an average day, they deal with nearly a trillion dollars' worth of exchanges involving only U.S. dollars. With growing worldwide economic activity, trade, and investment as well as technology that enables real-time information transmission and trading, the significance of foreign exchange markets has expanded.

A number of factors may influence foreign exchange rates, including the following cited by Rose (1994):

- **Balance of Payments Position:** The foreign currency rate of a nation with a trade imbalance typically experiences downward pressure.
- **Future Currency Value Speculation:** When they spot lucrative possibilities, speculators will purchase or sell currencies.
- **Domestic Political and Economic Circumstances:** Foreign exchange rates often suffer from deteriorating economic conditions and inflation.
- **Intervention by the Central Bank:** To alter the value of their own currency, central banks may buy or sell different currencies.

1.10 Difference between the Money Market& FX Market:

1. The key distinction between the money market and the currency market is that the former is a trading platform for foreign exchange trading, while the latter is a short-term capital lending market with a deadline of one year or less and is a crucial component of the global capital market.
2. The business models on the money market and the foreign exchange market are dissimilar. A spot trading market, a forward trading market, and an adjustment trading market make up the currency market. The short-term credit market, short-term securities market, and discount market are the three segments that make up the money market.
3. The types of currency utilized on the money market and the foreign exchange market are different. A foreign exchange transaction in the currency market always involves dealing with two different currencies. In contrast, a loan transaction on the money market normally only involves one type of currency.
4. The way that each market operates is another distinction between the currency market and the money market. The currency market's purpose is to facilitate the exchange of various currencies and reduce the risk of exchange rate volatility. The money market's primary purpose is to finance both the short-term funding surplus and deficit.
5. Another distinction between the money market and the currency market is how each market operates. The currency market's purpose is to facilitate the exchange of various currencies and reduce the risk of exchange rate volatility. The money market's primary purpose is to finance both the short-term funding surplus and deficit.
6. In the foreign exchange market, banks' earnings derive from the variations in exchange prices that occur while buying and selling foreign currency. The bank makes money when the selling price is greater than the purchase price. In the money market, a bank's short-term capital deposit and lending operation makes money from the spread between the interest rates on deposits and loans. The bank makes money when the lending interest rate is greater than the deposit interest rate.

1.11 Guidelines of Asset Liability Management (ALM):

Due to the asset-liability transition, FIs are typically subject to credit and market risks. The risks, particularly the market risks, associated with the operations of FIs have grown to be complex and significant as a result of the recent liberalization of the financial markets and the increasing integration of domestic markets with external markets. This requires strategic management. FIs must dynamically decide interest rates on a variety of products in their portfolios of obligations and assets, in both domestic and international currencies, as they operate in a relatively unregulated environment. The management of FIs is under pressure to maintain a healthy balance between spreads, profitability, and long-term survival

due to intense rivalry for business involving both assets and liabilities and rising domestic interest rate and foreign exchange rate volatility. These demands necessitate institutionalizing an integrated risk management strategy through systematic and comprehensive methods rather than sporadic activity.

The fact that the FIs are subject to a number of significant risks during the course of their operations—generally categorized as credit risk, market risk, and operational risk—underscores the importance of having efficient risk management systems in FIs.

By improving the standard of their risk management and implementing more extensive ALM practices than they have in the past, the FIs must address these risks in a structured way. By measuring, monitoring, and managing a FI's liquidity, exchange rate, and interest rate risks—risks that must be tightly linked with the FIs' business strategy—the proposed ALM system aims to establish a structured framework for managing market risks. This note lays forth general guidelines for FIs with regard to systems for managing interest rate, exchange rate, and liquidity risks, all of which are a component of the ALM role. The market risk management discipline, or managing business after considering the market risks involved, would be the initial emphasis of the ALM department. A solid risk management system should aim to develop into a tactical device for efficient management of FIs.

The ALM process rests on three pillars:

- **ALM Information System**

- Management Information System
- Information availability, accuracy, adequacy and expediency

- **ALM Organisation**

- Structure and responsibilities
- Level of top management involvement

- **ALM Process**

- Risk parameters
- Risk identification
- Risk measurement
- Risk management
- Risk policies and tolerance levels

1.12 ALM Information System:

A management philosophy that outlines the risk policies and tolerance levels must be used to support ALM. The essential component of the entire ALM activity is the availability of sufficient and reliable information with promptness, so this framework needs to be constructed on a strong methodology with the necessary supporting information system. Information is therefore essential to the ALM process. There are numerous techniques that are widely used to measure hazards. These might be as basic as a gap statement or as complex and data-intensive as risk adjusted profitability measurement techniques. For the purpose of producing reports on the liquidity gap and interest rate gap, the current guidelines would call for a somewhat simpler information structure.

1.13 ALM Organization:

The senior management in the FI must be fully committed to integrating risk management into everyday operations and strategic decision-making in order for the risk management process to be successfully implemented. The Board should be in charge of overall market risk management, select the FI's risk management strategy, and establish upper and lower bounds for liquidity, interest rate, exchange rate, and equity price risks.

The ALCO is a decision-making unit made up of the senior management of the FI, including the CEO, and is in charge of strategic management of interest rate and liquidity issues as well as integrated balance sheet management from a risk-return perspective. While each FI will have to determine the function of its ALCO, its authority, and the decisions that will be made by it, its duties would typically include:

- Articulating the current interest rate view and a view on future direction of interest rate movements and basing its decisions for future business strategy on this view as well as other parameters considered relevant;
- Monitoring the market risk levels of the FI by ensuring adherence to the various risk-limits set by the Board;
- Choosing a business strategy for the FI that is compatible with its interest rate outlook, financial constraints, and predetermined risk management goals on both the assets and liabilities sides. This in turn would comprise:
 - determining the desired maturity profile and mix of the assets and liabilities;
 - product pricing for both - assets as well as liabilities side;
 - deciding the funding strategy i.e. the source and mix of liabilities or sale of assets; the proportion of fixed vs floating rate funds, wholesale vs retail funds, money market vs capital market funding domestic vs foreign currency funding, etc.
- Reviewing the results of and progress in implementation of the decisions made in the previous meetings

Analysis, monitoring, and reporting of the risk profiles to the ALCO should be the responsibility of the ALM Support Groups made up of operating staff. Additionally, the staff should create projections (simulations) that show how various potential changes in market conditions will affect the balance sheet and suggest the necessary steps to stay within FI's internal limitations.

The size of each institution, the mix of businesses, and the complexity of the organization will all affect ALCO's membership. The CEO, CMD, DMD, or ED should be in charge of the Committee in order to guarantee Top Management commitment and prompt response to market dynamics. Though the members of the Committee should include the Chiefs of Investment, Credit, Resources Management or Planning, Funds Management / Treasury (forex and domestic), International Business, and Economic Research, the composition of ALCO may vary among FIs depending on their individual setups and business profiles. For the development of MIS and associated computerization, the Head of the Technology Division should also be invited. Even subcommittees and support groups may exist in some FIs. The ALM system should be implemented under the supervision of the Management Committee of the Board or any other Specific Committee that the Board has established, and its operation should be frequently reviewed.

1.14 ALM Process:

The scope of ALM function can be described as follows:

- Liquidity risk management
- Management of market risks
- Trading risk management

- Funding and capital planning
- Profit planning and growth projection

The mitigation of a broad range of risks is often involved in ALM frameworks, despite the fact that they vary considerably amongst businesses. Interest rate risk and liquidity risk are two of the most frequent hazards that ALM addresses. Risks connected to fluctuating interest rates and how they impact upcoming cash flows are referred to as interest rate risk. The assets and liabilities that financial institutions normally hold are impacted by shifting interest rates. Deposits (assets) and loans are two of the most typical instances (liabilities). Interest rates have an effect on both, therefore when rates are fluctuating there may be an imbalance between assets and obligations.

Risks relating to a financial institution's capacity to meet its current and future cash-flow obligations, commonly known as liquidity, are referred to as liquidity risk. The risk is that it will negatively impact the financial institution's position when it is unable to fulfill its obligations because of a lack of liquidity. Organizations may use ALM methods to boost liquidity in order to meet cash-flow commitments resulting from their liabilities in order to reduce the risk of liquidity.

ALM also reduces risks of other kinds in addition to interest and liquidity hazards. One instance of a risk related with changes in exchange rates is currency risk. A mismatch may occur when assets and obligations are kept in different currencies due to fluctuations in exchange rates.

1.15 Pros and Cons of Asset and Liability Management:

Many firms can gain from implementing ALM frameworks because it's crucial for them to completely comprehend their assets and liabilities. An organization can manage its liabilities strategically to better position itself for upcoming uncertainty, which is one of the advantages of implementing ALM.

An organization can identify and quantify the risks on its balance sheet and lessen the risks brought on by a mismatch between assets and liabilities by using ALM frameworks. Financial organizations can increase efficiency and profitability while lowering risk by strategically aligning assets and liabilities.

The difficulties in putting in place a suitable framework are one of the drawbacks of ALM. There is no universal framework that can be used by all organizations due to the stark disparities between them. Companies would therefore need to create a special ALM framework to record certain objectives, risk levels, and regulatory limitations.

ALM is a long-term plan that incorporates projections and datasets that are prospective. Not all businesses will have easy access to the information, and even then, it needs to be translated into quantitative statistical metrics.

Last but not least, ALM is a coordinated procedure that manages the overall balance sheet of an organization. It calls for extensive departmental cooperation, which can be difficult and time-consuming.

Thus, asset and liability management, at its heart, is a strategy used by financial institutions to mitigate risks brought on by a mismatch between assets and liabilities. The mismatches are typically brought on by modifications to the financial environment, such as shifting interest rates or liquidity needs. By upholding liquidity needs, controlling credit quality, and ensuring adequate operating capital, a whole ALM framework focuses on long-term stability and profitability. ALM is a coordinated process that employs frameworks to control an organization's complete balance sheet, unlike other risk management techniques. Long-term liabilities are reduced and assets are invested as efficiently as possible.

According to the type of risk involved, financial institutions have traditionally managed risks individually. However, it is currently viewed as an obsolete strategy due to the financial landscape's development. Macro-level asset management and risk mitigation are the main focuses of ALM procedures, which cover things like market, liquidity, and credit concerns. ALM is an ongoing process that continuously examines risks, in contrast to traditional risk management techniques, to make sure that a business is staying within their risk tolerance and abiding by regulatory frameworks. ALM procedures are being used by businesses including banks, insurance firms, pension funds, and asset managers throughout the financial industry.

1.16 Macroeconomic Performance Indicators:

Treasury professionals are always influenced and guided by macroeconomic performance and movement of macroeconomic variables such as interest rate, exchange rate, national savings and investment etc. Therefore, a brief discussion on macroeconomic performance, operation of open economy macroeconomics, and macroeconomic accounts would not be out of place here for treasury professionals. Macroeconomic performance of a country can be judged by examining its macroeconomic accounts (national income account, fiscal account, monetary account and external sector account), which contain many macroeconomic variables like gross domestic products (GDP), the unemployment rate, inflation etc.

GDP is the most comprehensive measure of total output of an economy. It is the measure of the market value of final goods and services produced in a country during a year. There are two ways to measure GDP: one, nominal GDP which is measured in actual market prices and second, the real GDP which is calculated in constant or invariant prices. Movement in real GDP is one of best measure of economic performance of a country.

Of all the macroeconomic indicators, unemployment is most directly felt by the individuals. The unemployment rate is the percentage of the labor force that is unemployed. The labor force includes all employed persons and those unemployed individuals who are seeking jobs. It excludes those without work but not looking for jobs. The unemployment rate tends to reflect the state of the business cycle: when output is falling (recession), the demand for labor falls, and the unemployment rate rises.

Macroeconomic performance also hinges on price stability or controlling inflation. The most common measure of the overall price level is the consumer price index, known as CPI. It measures the cost of a fixed basket of goods (including items such as food, shelter, clothing, medical care etc.) bought by the average urban/rural consumer. We consider changes in the overall price levels as the rate of inflation, which denotes the rate of growth of the price level from one year to the next. When prices decline, we call it deflation.

The macroeconomic performance of a country can be influenced by the government through adopting two major macroeconomic policies tools: Fiscal policy and Monetary Policy.

The fiscal policy is concerned with government revenue and expenditures. Government expenditures come in two distinct forms: one, government spending on goods and services, and two, government transfer payment. Govt. expenditures affect the overall level of spending in the economy and thereby, influence level of GDP.

The other part of fiscal policy, government revenues, is involved with government tax and non-tax sources of income. Taxation affects the overall economy in two ways: one, taxes affect people’s income (disposable or spendable income) and second, taxes affect the prices of goods and factors of production.

The second major macroeconomic policy is monetary policy, which central bank conducts through the management of money, credit, and banking system. By changing the money supply, the central bank can influence many financial and economic variables such as interest rates, stock prices, housing prices, and foreign exchange rates. Restricting the money supply leads to higher interest rates and reduced investment, which, in turn, causes a decline in GDP and lower inflation. If the central bank is faced with a business downturn, it can increase the money supply and lower interest rate to stimulate economic activity.

Other than fiscal and monetary policies, countries often seek income policy, concerned with direct control over prices and wages and external sector policy such as trade policy, exchange rate policy etc.

Macroeconomic Performance Indicators and Policy tools have been summarized in the following table:

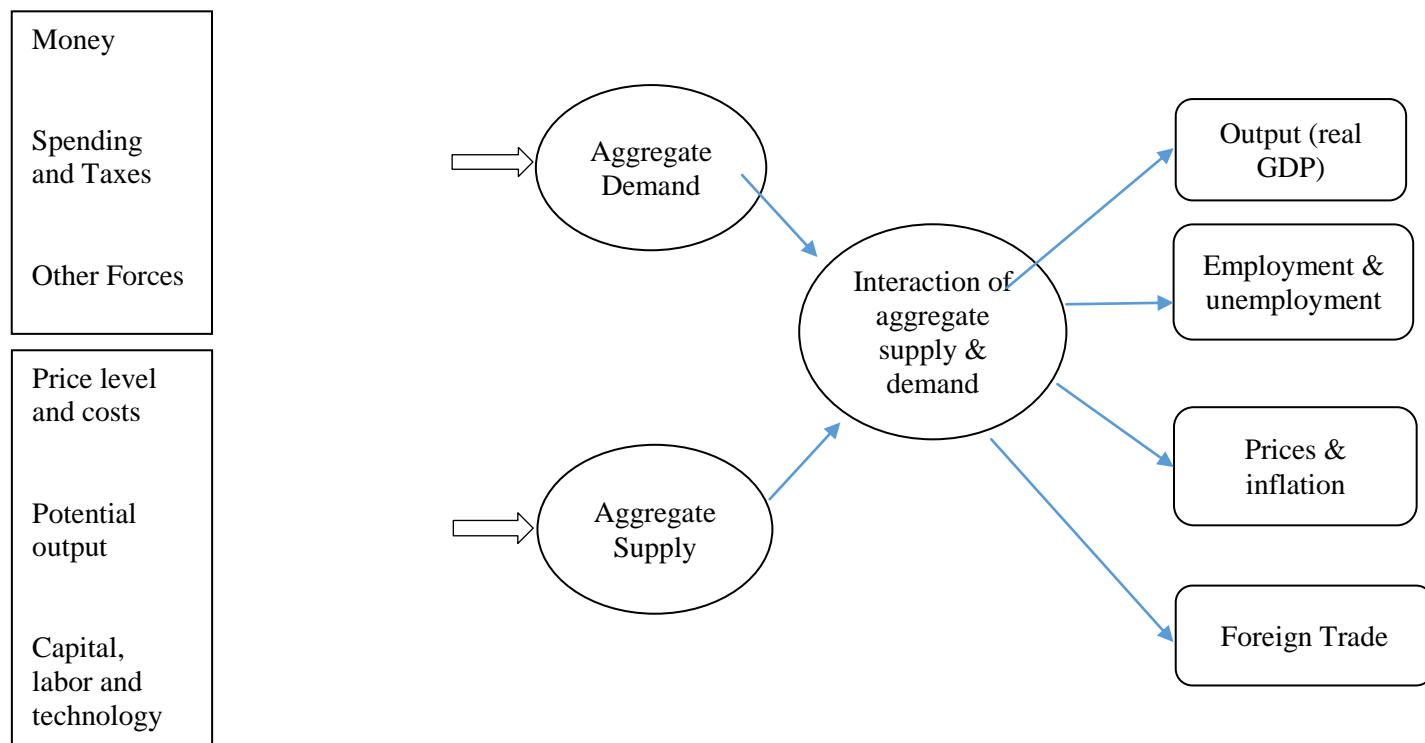
Macroeconomic Performance Indicators	Macroeconomic Policy
Output: High Level and rapid growth	Monetary Policy: Control of money supply affecting interest rates
Employment: High level of employment with low involuntary unemployment	Fiscal Policy: Government expenditure Tax and Nontax revenue
Price-level stability	

The major macroeconomic policies along with other factors and variables affect aggregate demand and aggregate supply, which interacts and determine the levels of outputs, prices and unemployment.

Aggregate demand (AD) refers to total amount that different sectors in an economy are willing to spend in a given period. It (AD) is the sum of spending by consumers, business, government and external sectors. These depend on monetary policy, fiscal policy, level of prices and other factors.

Aggregate supply (AS) refers to total quantity of goods and services that the business sector (of a country) is willing to produce and sell in a given period. AS depends on price level, productive capacity of an economy, and the level of costs.

The following figure shows how aggregate demand and aggregate supply determine the major macroeconomic targets.



The above diagram shows the major factors affecting overall economic activity. On the left are the major variables determining aggregate supply and demand; these include policy variables, like monetary and fiscal policies, along with stocks of capital and labor. In the center, aggregate supply and demand interact as the level of demand beats upon the available resources. The chief outcomes are shown on the right output, employment, the price level, and foreign trade.

1.17 Macroeconomic Theory of Open Economy:

An open economy interacts with other economies in two ways: It buys and sells goods and services in world product markets and it buys and sells capital assets such as stocks and bonds in world financial markets.

Key Macroeconomic variables that describes an open economy's interaction are: net exports, net capital outflow (net foreign investment) and exchange rates.

What forces determine these variables and how these variables are related to one another have been discussed here. However, two important assumptions are to be taken here: one, the economy's GDP is given and (2) price level is also given.

The goal of this model is to highlight those forces that determines the economy's trade balance and exchange rate. The analysis is very simple as it applies the tools of demand and supply to an open economy. Yet, the model is also complicated as it involves looking simultaneously at two related markets:

the market for loanable fund and the market for foreign currency exchange. The market for loanable fund coordinates the economy's savings and investment (including net foreign investment). The market for foreign currency exchange coordinates people who want to exchange domestic currency for the currency of other markets.

Market for Loanable Fund

To understand the market for loanable funds in an open economy, the place to start is the identity as shown below:

$$S = I + NFI$$

Saving = Domestic investment + Net foreign investment

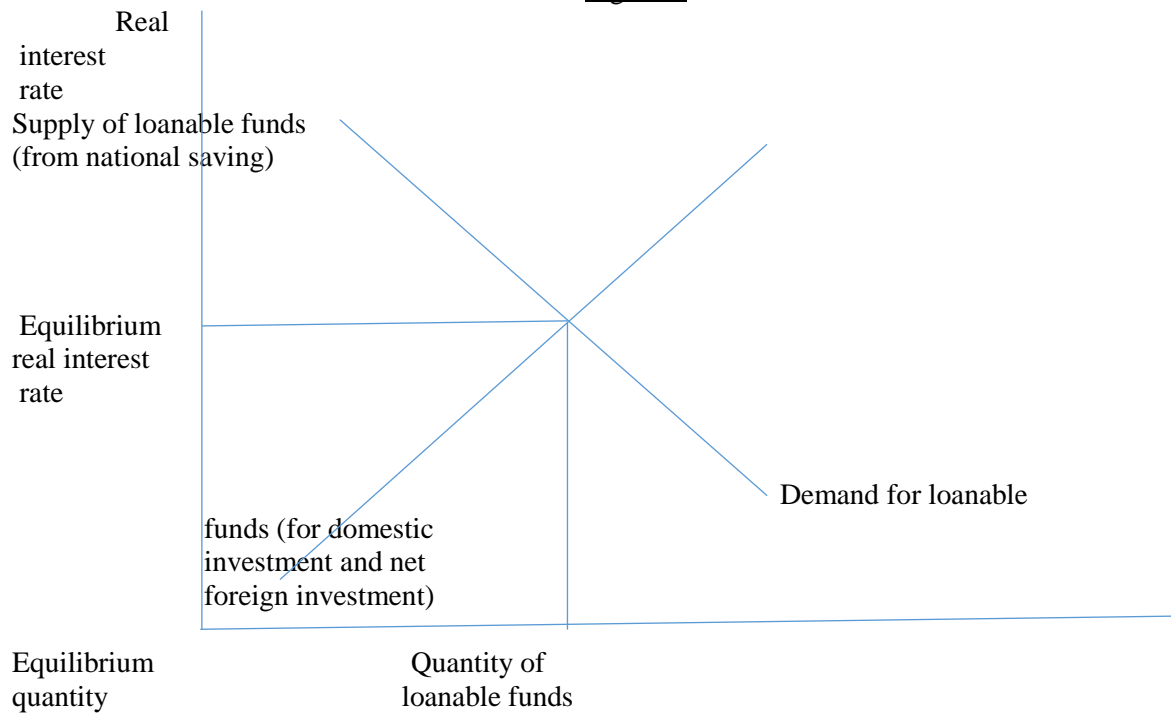
Whenever a nation saves something out of its income, it can use that savings to finance the purchase of domestic capital or to finance the purchase of an asset abroad. The two sides of this identity represent the two sides of the market for loanable funds. The supply of loanable funds comes from national saving (S). The demand for loanable funds comes from domestic investment (I) and net foreign investment (NFI). Note that the purchase of a capital asset adds to the demand for loanable funds, regardless of whether that asset is located at home or abroad. Because net foreign investment can be either positive or negative, it can either add to or subtract from the demand for loanable funds that arises from domestic investment.

In the market for loanable funds, the quantity of loanable funds supplied and the quantity of loanable funds demanded depend on the real interest rate. A higher real interest rate encourages people to save and, therefore, raises the quantity of loanable funds supplied. A higher interest rate also makes borrowing to finance capital projects more costly; thus, it discourages investment and reduces the quantity of loanable funds demanded.

In addition to influencing national saving and domestic investment, the real interest rate in a country affects that country's net foreign investment. Thus an increase in the domestic real interest rate discourages citizens from buying foreign assets and encourages foreigners to buy domestic assets. For both reasons, a high domestic real interest rate reduces national net foreign investment.

We represent the market for loanable funds in the following figure (figure-1). The financial system, the supply curve slopes upwards because a higher interest rate increases the quantity of loanable funds supplied, and the demand curve slopes downwards because a higher interest rate decreases the quantity of loanable funds demanded. The demand side of the market now represents the behavior of both domestic investment and net foreign investment. That is, in an open economy, the demand for loanable funds comes not only from those who want to borrow funds to buy domestic capital goods but also from those who want to borrow funds to buy foreign assets.

Figure-1



The interest rate adjusts to bring the supply of and demand for loanable funds into balance. If the interest rate is below the equilibrium level, the quantity of loanable funds supplied would be less than the quantity demanded. The resulting shortage of loanable funds would push the interest rate upwards. Conversely, if the interest rate is above the equilibrium level, the quantity of loanable funds supplied would exceed the quantity demanded. The surplus of loanable funds supplied would exceed the quantity demanded. The surplus of loanable funds would drive the interest rate downwards. At the equilibrium interest rate, the supply of loanable funds exactly balances the demand. That is, at the equilibrium interest rate, the amount that people want to save exactly balances the desired quantities of domestic investment and net foreign investment.

Market for Foreign Currency Exchange

The second market in our model of the open economy is the market for foreign-currency exchange. Participants in this market trade domestic currencies in exchange for foreign currencies. To understand the market for foreign-currency exchange, we begin with another identity.

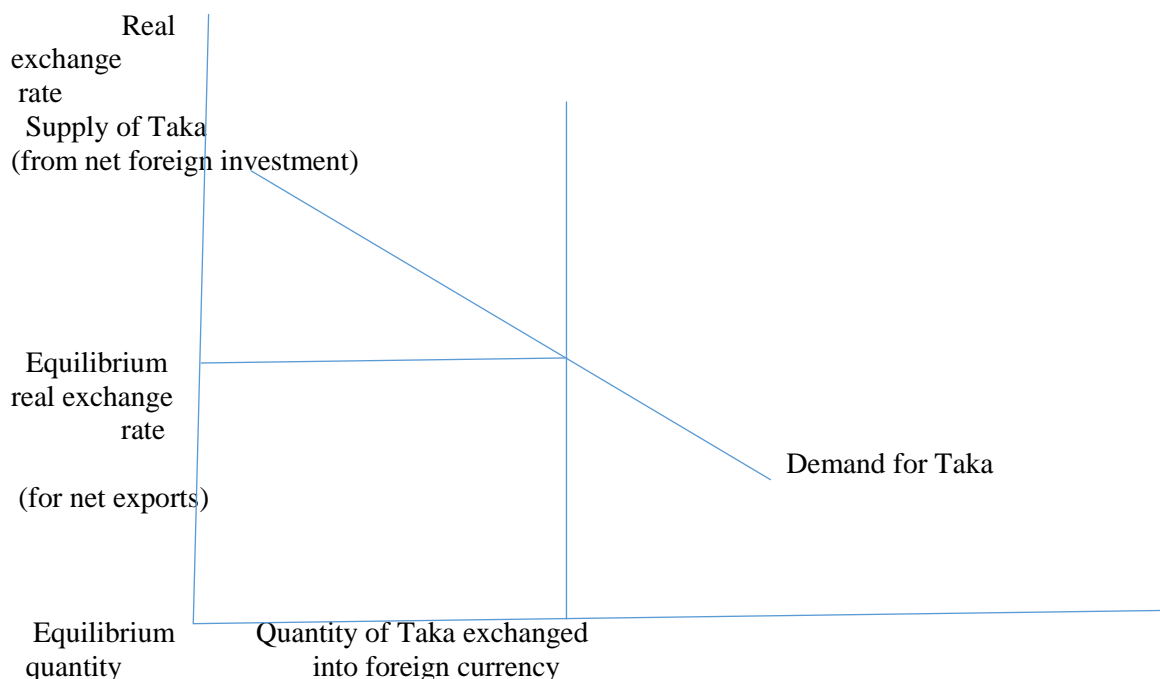
$$NFI = NX$$

Net foreign investment = Net exports

This identity states that the imbalance between the purchases and sale of capital assets abroad (NFI) equals the imbalance between exports and imports of goods and services (NX). When net exports are positive, for instance, foreigners are buying more domestic goods and services than residents are buying foreign goods and services. What are residents doing with the foreign currency they are getting from this net sale of goods and services abroad? They must be using it to add to their holdings of foreign assets. These purchases of assets abroad are reflected in a positive value of net foreign investment.

We can view the two sides of this identity as representing the two sides of the market for foreign-currency exchange. Net foreign investment represents the quantity of domestic currency supplied for the purpose of buying assets abroad. For example, when Bangladesh residents want to buy a Japanese government bond, it needs to change Taka into yen, so it supplies Taka in the market for foreign-currency exchange. Net exports represent the quantity of Taka demanded for the purpose of buying Bangladesh net exports of goods and services. For example, when a Japanese chain store wants to buy garments from Bangladesh, it needs to change its yen into Taka, so it demands Taka in the market for foreign-currency exchange. (This view is a simplification of the way foreign exchange markets actually work. We discuss this in greater detail below)

Figure-2



What is the price that balances the supply and demand in the market for foreign-currency exchange? The answer is the real exchange rate. The real exchange rate is the relative price of domestic and foreign goods and, therefore, is a key determinant of net exports. When the Taka real exchange rate appreciates, Bangladesh goods become more expensive relative to foreign goods, making Bangladesh goods less attractive to consumers both at home and abroad. As a result, exports from Bangladesh fall, and imports into Bangladesh rise. For both reasons, net exports fall. Hence, an appreciation of the real exchange rate reduces the quantity of Taka demanded in the market for foreign-currency exchange.

The figure-2 shows supply and demand in the market for foreign-currency exchange. The demand curve slopes downwards for the reasons already mentioned a higher real exchange rate makes Bangladeshi goods more expensive and reduces the quantity of Taka demanded to buy those goods. The supply curve is vertical because the quantity of Taka supplied for net foreign investment does not depend on the real exchange rate. (net foreign investment depends on the real interest rate. When discussing the market for foreign-currency exchange, we take the real interest rate and net foreign investment as given.)

The real exchange rate adjusts to balance the supply of and demand for Taka just as the price of any good adjusts to balance supply of and demand for that good. If the real exchange rate is below the equilibrium level, the quantity of Taka supplied would be less than the quantity demanded. The resulting shortage of Taka would push the value of the Taka upwards. Conversely, if the real exchange rate is above the equilibrium level, the quantity of Taka supplied would exceed the quantity demanded. The surplus of Taka would drive the value of the Taka downwards. At the equilibrium real exchange rate, the demand for Taka to buy net exports exactly balances the supply of Taka to be exchanged into foreign currency to buy assets abroad.

Lets now consider how these markets are related to each other or how the economy coordinates for important macroeconomic variables: national saving (S), domestic investment (I), net foreign investment (NFI) and net export (NX),

Keeping in mind the following identities:

$$S = I + NFI$$

and

$$NFI = NX$$

In the market for loanable funds, supply comes from national saving, demand comes from domestic investment and net foreign investment, and the real interest rate balances supply and demand. In the market for foreign-currency exchange, supply comes from net foreign investment, demand comes from net exports, and the real exchange rate balances supply and demand.

Net foreign investment is the variable that links these two markets. In the market for loanable funds, net foreign investment is a component of demand. A person who wants to buy an asset abroad must finance this purchase by borrowing in the market for loanable funds. In the market for foreign-currency exchange, net foreign investment is the source of supply. A person who wants to buy an asset in another country must supply Taka in order to exchange them for the currency of that country.

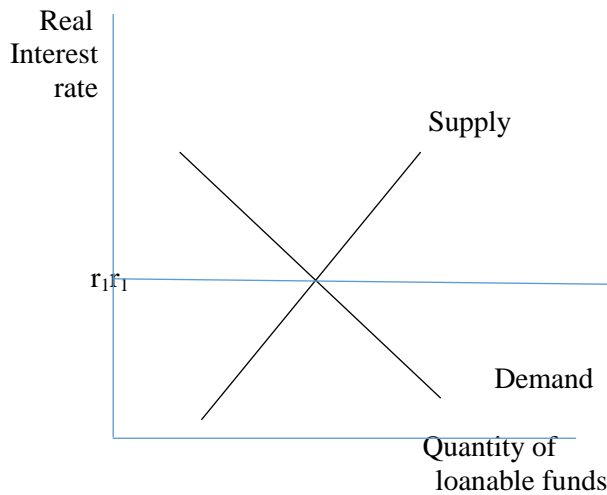
Simultaneous Equilibrium in Two Markets

We can now put all the pieces of our model together in (figure-3). This figure shows how the market for loanable funds and the market for foreign-currency exchange jointly determine the important macroeconomic variables of an open economy.

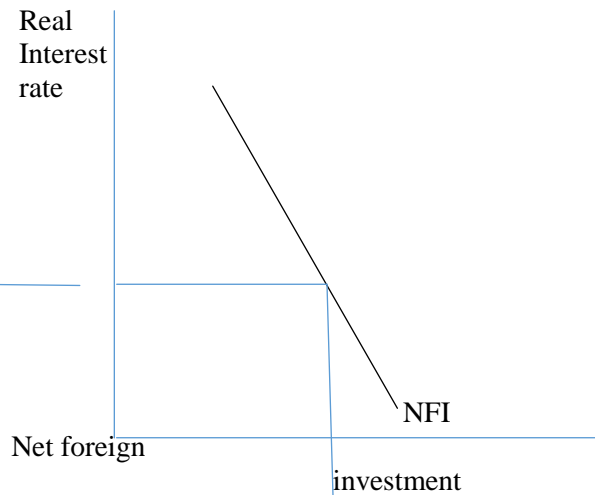
Panel (a) of the figure shows the market for loanable funds. National saving is the source of the supply of loanable funds. Domestic investment and net foreign investment are the sources of the demand for loanable funds. The equilibrium real interest rate (r_1) brings the quantity of loanable funds supplied and the quantity of loanable funds demanded into balance.

Figure-3

(a) Market for Loanable Funds

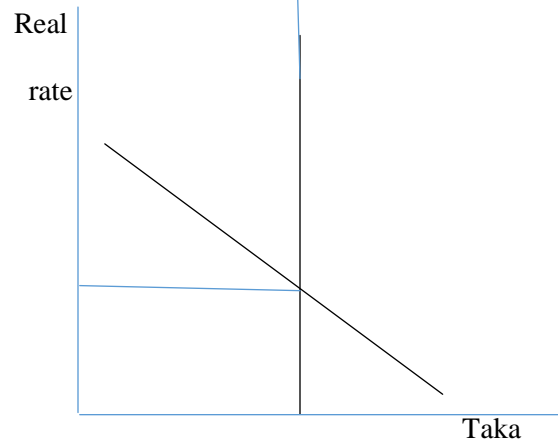


(b) Net Foreign Investment



Exchange
 E_1
 D_1
Quantity of

(c) Market for Foreign Currency Exchange



Panel (b) of the figure shows net foreign investment. It shows how the interest rate from panel (a) determines net foreign investment. A higher interest rate at home makes domestic assets more attractive, and this in turn reduces net foreign investment. Therefore, the net-foreign-investment curve in panel (b) slopes downwards.

Panel (c) of the figure shows the market for foreign-currency exchange. Because net foreign investment must be paid for with foreign currency, the quantity of net foreign investment from panel (b) determines the supply of Taka to be exchanged into foreign currencies. The real exchange rate does not affect net foreign investment, so the supply curve is vertical. The demand for Taka comes from net exports. Because a depreciation of the real exchange rate increases net exports, the demand curve for foreign-currency exchange slopes downwards. The equilibrium real exchange rate (E_1) brings into balance the quantity of Taka supplied and the quantity of Taka demanded in the market for foreign-currency exchange.

The two markets shown in the figure determine two relative prices – the real interest rate and the real exchange rate. The real interest rate determined in panel (a) is the price of goods and services in the present relative to goods and service in the future. The real exchange rate determined in panel (c) is the price of domestic goods and services relative to foreign goods and services. These two relative prices adjust simultaneously to balance supply and demand in these two markets. As they do so, they determine national saving, domestic investment, net foreign investment and net exports. We can use this model to see how all these variables changes when some policy or event causes one of these curves to shift.

1.18 Macroeconomic Accounts:

Macroeconomic Accounts reflect the aggregate values of the macroeconomic activities. There are four major macroeconomic accounts, namely-

1. National Income and Product Accounts
2. Govt. Financial Account
3. Balance of Payment Account
4. Monetary Accounts

1.18.1 National Income and Product Accounts:

The national income and product accounts provide the aggregate values of the final goods and services that are produced in a country during a specified period of time. They are designed to answer some basic questions: what and how much does our economy produce? Which are the producing sectors? How much is saved and invested? How are the shares of income divided among the factors of production: land, labor, capital and organization?

Approaches to National Income and Product Estimation:

There are three ways to estimate the aggregate output of an economy. They are

- Production or value-added method:
- Income method, and
- Expenditure method.

In the **production method**, gross output or sales in real terms including those for exports) of goods and services produced by the private (and public, if any) economic enterprises in various industrial sectors, by the government sector, and by private households, are estimated (including net increases in inventories); then the purchases of all intermediate goods used during the production process (including imported ones) are subtracted to obtain the total domestic value added. Therefore, it is the sum of value added of all producing sectors.

In the **income method**, the aggregate income before taxes received by the factors of production is estimated by adding remunerations of employees and the operating surpluses of all producing units

In the **expenditure method**, final expenditures for private consumption, gross private investment, public consumption, gross public investment, net increase in inventories, and net exports (the difference between exports and imports of goods and nonfactor services) are all added together.

Because these three alternative methods of estimating the value of domestic production rely on different data sources. Statistical discrepancies may occur. However, the methods are consistent in principle and they should produce similar results.

Various Measures of National Income:

- GDP vs. GNP/GNI

Market Value of all final goods and services produced domestically is GDP

$GNP/ GNI = GDP + \text{Net factor income from the rest of the World}$

- Market Price vs. Factor Cost

$GDP \text{ at market price} - \text{Indirect Taxes less Subsidies} = GDP \text{ at factor cost}$

- Gross vs. Net

$NDP = GDP - \text{Depreciation}$

$NNP = GNP - \text{Depreciation}$

1.18.2 Government Financial Accounts:

Government Finance Account records government's revenues and expenditures. One can ascertain the flow of payment between a govt. and rest of the economy during a given period of time out of this account. In other words, this account shows the activities of govt. likely to affect the rest of the economy.

Classification of Govt. Transactions: Govt. transactions are summarized into five groups: revenue, grants, expenditure, net lending and financing.

- Revenue includes all non-repayable receipts, required and unrequired, other than grants from other governments and international institutions. Revenues can be divided into current and capital; the latter includes only receipts from the sale of capital assets. Current revenue embraces all tax revenue and current non-tax revenue. Taxes are compulsory, unrequired, non-repayable contributions exacted for public purposes. Non-tax revenue includes receipts from property income, fees and charges, non-industrial sales, and the operating surpluses of departmental enterprises.
- Grants are defined as unrequired, non-repayable, non-compulsory receipts from other governments or international institutions.
- Expenditure consists of all non-repayable payments by government, whether required or unrequired and whether for current or capital purposes. Only required payments contribute directly to production, consumption and capital formation, while unrequired expenditures or transfers redistribute the effective demand among the different sectors of the economy. A distinction between current and capital expenditure is necessary to measure government capital formation and savings.
- Net Lending (or lending minus repayments) consists of all transactions in claims upon other sectors that are undertaken for purposes of public policy other than financial management. It consists of loans by government and their repayment as well as purchase and sale of equity.
- Financing is equal to the balance of revenue, grants expenditure and net lending. It covers all transactions involving government's holding of currency and deposits, government liabilities, and any financial assets held by the government for the purpose of financial management rather

than public policy. Financing is divided into financing obtained from residents and financing obtained from non-residents. It is further classified by type of debt holder (e.g. commercial banks) and by type of debt instrument (e.g. treasury bills).

Performance of Govt. Financial Account:

The performances of GFA may be reflected by two measures: Overall Balance and Current Account Balance.

- Overall Balance is defined as the balance of revenue, grants, expenditure and net lending:

$$\text{Overall Deficit/Surplus} = (\text{Current Revenue} + \text{Capital Revenue} + \text{Grants}) - (\text{Current Expenditure} + \text{Capital Expenditure} + \text{Net Lending})$$

The overall budget balance is often used as a summary measure of the stance of fiscal policy: an overall deficit indicative of an expansionary fiscal policy, while an overall surplus is indicative of a contractionary impact.

- The second concept of balance is current account surplus / deficit, defined as the difference between current revenue and current expenditure. With some qualifications, this concept can be used as a measure of Govt. sector savings.

1.18.3 Balance of Payment Accounts:

Balance of Payment Account records the international economic transactions of a country with the rest of the world during a particular period of time.

Transactions are to be recorded when the real resources or financial items involved undergo a legal change of ownership which is taken to be the time the parties concerned enter the transactions in their books. Transactions should be valued at market prices.

Classification of Items of BOP Account:

The items or components of BOP A/C are grouped into two broad categories- Current and Capital Account.

- **Current Account transactions** are divided into those involving goods, services, incomes and unrequited transfers. These include visible exports and imports, shipment, travel, transportation, investment income, private and official unilateral transfer (involving no quid pro quo) etc.
- **Capital Account** covers transactions in financial assets and liabilities. In addition, it incorporates supplementary information on total changes in reserve holdings, together with counterpart entries that affect those changes not due to transactions. In order to facilitate analysis, capital transactions are broken down by using several criteria: type of capital (represents direct and portfolio investment, other capital and reserves), length of maturity and assets and liabilities. Reserves (official) are composed of the monetary gold, SDR allocation in IMF, Reserve position in

the IMF, use of IMF credit and existing claims on non-residents. For the most part reserves are held by the central authorities, although funds are also held by deposit money banks but subject to effective control by the Govt. are also considered international reserves.

Analytical Framework for External Sector: A major purpose of BOP A/C is to provide an indication of whether there exists an external imbalance and there is need for policy adjustment in order to rectify such an imbalance. The following concepts are useful for the above purpose.

The narrowest definition of payments imbalance is related to the **Trade Balance (TB)**, indicating the difference between exports and imports on an FOB basis.

The Current Account Balance (CAB) is represented by transactions on goods, services, and income plus unrequited transfer. It shows the net change in financial assets arising from an economy's real transactions. This corresponds to current surplus or deficit in the rest of the world sector of the national accounts.

The Basic Balance (BB) tries to indicate the longer-run BOP position by placing "below the line" transactions that are likely to be reversed in the short-run (such as short-term capital flow, changes in official reserve and errors and commissions). Long-term capital flows are included "above the line", in addition to current account items.

An Overall Balance (OB) is commonly considered as a measure of BOP "performance". It places all current account items, capital movements and errors and omissions "above the line", and changes in reserves "below the line". Thus a surplus in overall balance represents a country's increase in reserves and a deficit in overall balance represents decrease in reserves.

The above concepts are represented by following equations:

$$(X-M)+T+LTC+STC+\Delta R+E=0$$

Where, X = Export, M = Import, T= Transfer, LTC= Long-term Capital,

STC= Short Term Capital, R = Reserve, E = Error and Δ = Change

$$\text{Thus, } TB = (X-M) = -(T+LTC+STC+R\Delta+E)$$

$$CAB = (X-M) + T = -(LTC+STC+R+E\Delta)$$

$$BB = (X-M) + T + LTC = -(STC + \Delta + E)$$

$$OB = (X-M) + T + LTC + STC + E = -R\Delta$$

1.18.4 Monetary Accounts:

The monetary and financial data of an economy are represented at three levels:

- The first level contains the accounts of the Monetary Authorities (MA). The accounts of the Monetary Authorities are especially important as they provide timely information on the basic determinants of money supply.
- The second level consolidates the data for the MA and Deposit Money Banks (DMB) into the monetary survey which provides a statistical measure of money credit, and of the net foreign assets of the monetary system.

- The third and most consolidated level, combines Other Financial Institutions (OFI) and monetary survey into the financial survey, in order to measure overall private sector liquidity.

The First Level- The Monetary Authorities:

The monetary authority’s balance sheet consolidates and presents the accounts of the central bank and other institutions that create reserve money or hold the rational reserves of gold, foreign exchange, and special drawing rights (SDRs). Generally, these functions are carried out by the central bank, but there are many countries where the treasury issues coins, and some countries where the treasury holds the official reserves of gold and foreign exchange.

The main items on the asset side are:

- Foreign assets include gold, foreign bank notes, deposits in foreign exchange held abroad, investment in the debt instruments of other countries, SDRs, and the member's reserve position in the International Monetary Fund.
- Claims on the public sector are subdivided into claims on government, claims on official entities and claims on nonfinancial public enterprises and other financial institutions.
- Claims on deposit money banks are usually in the form of rediscounts and advances.

The main items on the liability side are:

- Reserve money sometimes called high-powered money. This item is very important in a two-tier banking system because it serves as a basis for multiple expansion of credit by deposit money banks, it consists of currency in circulation and liabilities to deposit money banks.
- The other important items on the liability side are: Foreign liabilities, Central Govt. deposits, capital Accounts and other items (Net)

Asset	Liabilities
<ul style="list-style-type: none"> • Foreign Asset • Claims on Central Govt. • Claims on other Official Entities • Claims on DMBs 	<ul style="list-style-type: none"> • Reserve Money <ul style="list-style-type: none"> ▪ Currency Outside Banks ▪ Bank Reserves • Foreign Liabilities • Central Govt. Deposits • Capital Accounts

Figure: A typical Central Bank’s Balance Sheet

The balance sheet of DMBs includes all banks and similar institutions that have appreciable liabilities in the form of deposits transferable by cheques or otherwise usable in making payments. A consolidated balance sheet of DMBs is shown below:

Asset	Liabilities
<ul style="list-style-type: none"> • Reserve • Foreign Assets • Claims on Govt. • Claims on other Official Entities • Claims on Private Sector • Claims on Non-monetary Financial Institutions 	<ul style="list-style-type: none"> • Demand Deposits • Time and Savings Deposits • Foreign Liabilities • Govt. Deposits • Credit from Central Bank • Capital Accounts • Other Items (Net)

Figure: A consolidated Balance Sheet of DMBs

The Second Level- The Monetary Survey:

A major purpose of the monetary survey is to present the financial aggregates that are the most important for both monetary analysis and monetary policy. To this end, the balance sheet data from all the deposit money banks and the monetary authorities are consolidated into a few categories of major interest to economists and policymakers.

The term "money", which appears on the liability side of the monetary survey, is variously defined both in theory and in practice, According to a definition widely accepted by economists, it comprises all currency and deposits in circulation, i.e. in the hands of the private sector and official entities. Deposits are that part of money which may be transferred by check and is, therefore, used as a means of payment. However, in certain institutional arrangements, other deposits with a high rate of turnover, such as, savings deposits, may be included in money. Money, however defined, is shown as a liability in the monetary survey because currency is a liability of the monetary authorities and demand deposits liabilities of deposit money banks.

"**Quasi-money**" is another liability of banks. It includes all deposits with the monetary system that are not utilized directly as a means of payment and that usually have a lower rate of turnover. This generally means time and savings deposits with the banking system and foreign exchange deposits held by residents. Government deposits are not included in either money or quasi-money, because they do not constrain expenditure decisions of the government,

A standard format of Monetary Survey is shown below:

Asset	Liabilities
<ul style="list-style-type: none"> • Foreign Asset (Net) • Domestic Credit <ul style="list-style-type: none"> - Claims on Govt. (Net) - Claims on OFE - Claims on Private Sector - Claims on NMFIs 	<ul style="list-style-type: none"> • Money • Quasi Money • Capital Account • Other Items (Net)

Practice Questions:

1. Write short notes on the following topics:
 - a. Integrated Treasury
 - b. Money Market
 - c. FX Market
 - d. Macroeconomic Equilibrium
 - e. Quasi-money
2. What is Treasury Management? What are the functions of treasury management?
3. Describe about the nature and the benefits of integrated treasury.
4. What are the common money market instruments? Describe briefly.
5. Distinguish between the money market and FX market.
6. What are the advantages and disadvantages of asset liability management?
7. What are the major objectives of macroeconomics? Write a brief definition of each of these objectives. Explain carefully why each objective is important.
8. If the CPI were 300 in 2020 and 315 in 2021, what would the inflation rate be for 2021?
9. What is balance of payment account? Write a brief note on BoP account.
10. Describe the types of government transactions.

Module B: Money Market

2.1 What is Money?

Money is anything that is generally acceptable as a means of payment in the settlement of all transactions, including debt. General acceptability as a means of payment or as a medium of exchange is the unique feature of money. What makes money is the belief held by everyone that it will be accepted as such by all others in the economy. General acceptability as the common means of payment is the sine qua non or the differentia of money.

Money, commonly defined, comprises coins and paper currency and demand deposits of banks.

2.1.1 Functions of Money:

The functions of money have been well summed up in a couplet:

Money is a matter of functions four,

A medium, a measure, a standard, a store.

1. Money as a Medium of Exchange: The primary and unique function of money is that of acting as a medium of exchange. A characteristic that will help separate money from other (near-money or non-money) assets. It is this function alone which can help identify money as money. All other attributes or functions of money are derived from this primary function. But they do not help distinguish money uniquely from other assets.

The use of money as a common medium of exchange has facilitated exchange greatly. Without money, exchange will involve a direct barter of goods and services for goods and services. There must occur a double coincidence of wants. This would involve tremendous waste of time and resources in search effort and in making bargains. The use of money as medium of exchange avoids much of this waste by economizing on the use of scarce real resources in carrying out exchanges. This is said to promote

transactions efficiency in exchange. In addition, the use of money also promotes allocation efficiency by making it possible to exploit potential gains from specialization in trade and production and emergence of specialized markets (dealers) in every type of goods and services. Without money, in certain spheres of economic activity, it will be difficult to organize exchange at all, and hence production.

2. Money as a Unit of Account: Money customarily serves as a common unit of account or measure of value in terms of which the values of all goods and services are expressed. This makes possible meaningful accounting systems. It has been truly said that it has been possible for economics to grow as a science, because it analyses social behavior concerned with the production, exchange, distribution and consumption of goods and services whose values can be measured in a common unit, money. Prices are only values per unit of goods and services expressed in terms of money. These prices, being expressed in a common unit, can be directly compared with each other and the ratio of exchange between any pair of goods easily computed. In the absence of money as a common denominator, the number of exchange ratios among goods will be several times larger than the number of money prices.

3. Money as a Standard of Deferred Payment: Money also serves as a standard or unit in terms of which deferred or future payments are stated. This applies to payments of interest, rents, salaries, pensions, insurance premium etc. In a money-using system, the bulk of deferred payments are stipulated in money terms.

Large fluctuations in the value of money (i.e., inflation or deflation of prices) make money not only a poor measure of value, but also a poor standard of deferred payment. This makes monetary management for the stable value of money socially very important.

4. Money as a Store of Value: Money also serves as a store of value, i.e., members of the public can hold their wealth in the form of money. This function is derived from the use of money as a medium of exchange in a two-fold manner. First, the use of money as a medium of exchange decomposed a single barter transaction into two separate transactions of purchase and sale. Under barter, purchase and sale are necessarily simultaneous operations. The use of money necessarily separates the two transactions in time. This will require that the medium of exchange also serve as a store of value. There are other assets of all kinds which also serve as store of value and compete with money in this capacity. But money is unique as a store of value in that it alone is perfectly liquid. That is, it alone serves as a generally acceptable means of payment. The fluctuations in the value of money that affect its functions as a measure of value and as a standard of deferred payment also influence its role as a store of value.

2.1.2 Kinds of Money:

Money has had several incarnations. In Bangladesh, money consists of coins, paper currency, and deposit money. Coins are not full-bodied, but only token money, because the intrinsic (metallic) value of token coins is less than their face value.

Currency notes are merely pieces of paper that have no intrinsic value of their own. They are not convertible into anything of value at a fixed rate. The issuing authority does not stand ready to buy them back against gold or silver or full-bodied gold or silver coins of equal value at a pre-determined price. Thus, all paper currency is inconvertible. The legend carried on the face of a currency note of (say) ten taka that 'I promise to pay the bearer the sum of ten taka' (signed by the Governor, BB) is a carry-over from the past when currency notes were convertible into full-bodied silver rupees. Now it simply means that note can be converted into other notes or token coins of equal value.

Deposit money is not like coins or currency notes that can be passed on from hand to hand for a transfer of purchasing power. Deposits are only entries in the ledgers of banks to the credit of their holders. We are treating only demand deposits of banks on which cheques can be drawn as money. The cheques are an instrument through which these deposits can be transferred from the payer to the payee. Only when the ownership of these deposits has been so transferred is the medium-of-exchange or the means-of-payment function of these deposits completed. The transfer is completed by debiting the amount of the cheque to the account of the drawer of the cheque and crediting it to the account of the drawee. This transfer is a simple affair if both the drawer and the drawee of the cheque are account holders in the same bank (branch). It involves the use of a specially-organized clearing arrangement, when the drawer and the drawee belong to two different banks.

A clearing-house is an association of banks operating in a particular locality. It serves as a meeting place for the representatives of member banks at appointed hours on each working day to settle payments of cheques and other transfer orders on each other by their customers. This is done by cancellation of equal amounts of credits and debits of each bank against every other bank, taken singly and settling the balance by drawing a cheque of the appropriate amount on its account with the clearing house or the BB in favor of the surplus bank. In the case of out-of-town cheques on other banks, a similar process works. The local branch of the drawee's bank takes over from its counterpart in another place. For an out-of-town cheque on another branch of the same bank, collection of the amount of a cheque is effected through a process of internal clearing.

The clearing-house facility is of great importance for the successful working of any banking system and of the use of bank money as a medium of exchange. Clearing arrangements economize greatly the use of cash. Bank clearings facilitate transfers of funds quickly, safely, and at low cost. The advantages accrue to the users of cheques. They encourage the use of bank money in place of currency. For businesses specially, quick clearings are very important as they affect the day-to-day cash-flow or liquidity positions of the cheque-using firms.

The clearing arrangement of banks is central to the working of any payments system that uses deposit (bank) money. Checking deposits serve as means of payment only when they are transferred from one depositor to another.

All the three components of present-day money have one feature in common. All of them are fiduciary (credit) money: money that circulates as money on the basis of the trust commanded by its issuers. This illustrates very well the truth of the statement that money is what the public believes to be money.' The essential property of money is that it should be generally acceptable as means of payment. The use of fiduciary money is highly economical: it releases precious metal embodied in coins under full-bodied metallic standards for non-monetary uses. All metallic standards were wasteful.

Another useful distinction is between (a) legal tender or fiat money and (b) non-legal tender or credit money proper. Coins and currency notes are fiat money. They serve as money on the fiat (order) of the government. Being legal tender means that, under the law of the land, the money in question must be accepted or cannot be refused in settlement of payments of all kinds. This is not true of demand deposits of banks, which are fiduciary money proper, as they are accepted as money on trust. They are not legal tender. A payee can legally refuse to accept payment in demand deposits (made through a cheque), and insist on payment in cash. This is because there is no guarantee that a cheque will be honored at the issuer's bank.

Legal tender money may be limited or unlimited legal tender. Small coins are usually limited legal tender. That is, they are legal tender for payments upto only a certain maximum amount. Beyond this amount, for a single payment, they cease to be legal tender. Usually currency notes are unlimited legal tender.

2.2 The Payment System:

The payments system is the set of institutional arrangements through which purchasing power is transferred from one transactor in exchange to another. For efficient exchange, a common medium of exchange or means of payment is necessary. The payment system is organized around the use of money. An efficient organization of the monetary system is the sine qua non of an efficient payments system.

An efficient payment system should permit all kinds of payments to be made with utmost convenience, expeditiously, safely and at very low costs to the economy and the transactors.

For making small local payments (mostly arising in retail trade and daily wage payments), currency has proved to be the best means of payment. For making large and out-of-town payments, the use of checking deposits and bank drafts is more popular. For faster payments, telegraphic transfers of money are also made. Other modes of payment used are money orders and postal orders sold by post offices and Juiodis of indigenous bankers. For making foreign payments, banks again come into the picture. Thus the banking system plays a dominant role in the organization and running of the payments system. The spread of banking in the country is important not only for the mobilization of savings and for allocation of credit but also as a dominant component of the payments system.

Given the public's demand for each kind of means of payment, an efficient payments system must meet this demand in full. Interestingly, the importance of the smooth functioning of the payments system is recognized only when such a system is disrupted. The speed with which payments are completed is also important. Speedy payments make for more efficient utilization of funds and thereby of resources. As a result, the speed (or rate) of production also goes up. This kind of intangible benefit of an efficient payment system is generally not well appreciated.

The organization and running of the payments system involves costs - costs to transactors and to the economy. The more efficient the payments system, the lower the cost of transfer of funds per. The gain of lower costs accrue to the whole economy.

There is another kind of cost of maintaining the payments system which the economy as a whole incurs. This concerns the production and maintenance of currency. In regimes of full-bodied metallic currency such costs were quite high. The paper currency system, in this sense, is much more economical.

2.3 Demand for Money:

John Maynard Keynes, in his theory of demand for money, which he called liquidity preference theory, asked the question, why do individuals hold money? He postulated that there are three motives behind the demand for money:

- i) The transaction motive,
- ii) The precautionary motive, and
- iii) The speculative motive.

i) Transactions Motive: Individuals are assumed to hold money because it is a medium of exchange that can be used to carry out current everyday transactions. Keynes emphasized that this component of the

demand for money is primarily determined by the level of people's transactions. The transactions component of the demand for money is proportional to income.

ii) Precautionary Motive: Besides holding money to carry out current transactions, people hold additional money as a cushion against unexpected needs. Precautionary money balances come in handy if you are hit with an unexpected bill, say for major car repair or hospitalization. Keynes believed that the amount of precautionary money balances people want to hold is determined primarily by the level of transactions they expect to make in the future and that these transactions are proportional to income. Therefore, he postulated that the demand for precautionary money balances is proportional to income.

iii) Speculative Motive: Keynes did not end his theory with the transaction and precautionary motives, rather he added that money can be used as a store of wealth and called this motive for holding money as the speculative motive. Keynes, however, looked carefully at the factors that influence the decisions regarding how much money to hold as a store of wealth. Unlike classical (Cambridge) economists, Keynes believed that interest rates have an important role to play here and he concluded that as interest rate rises. The speculative demand for money falls and vice versa.

2.4 Measures of Money Supply:

Money is something measurable. The total stock of moneys of various kinds at a particular point of time can be computed. A whole time series of money supply can be constructed. This will show the time behavior of money supply.

We must note two things about any measure of money supply. Firstly, the supply of money refers to its stock at any point of time. Money is a stock variable in contrast with a flow variable. It is the change in the stock of money (say) per year which is a flow.

Secondly, the stock of money always refers to the stock of money held by the public. This is always smaller than the total stock of money in existence. The term public is defined to include all economic units (households, firms and institutions) except the producers of money (such as the government and the banking system). For the most common definition of money, the government means the govt. of Bangladesh and the banking system means the BB plus all banks which accept demand deposits. This means that the word public is inclusive of all local authorities, non-bank financial institutions, and non-departmental public-sector and even the foreign central banks and governments and the International Monetary Fund who hold a part of Bangladesh money in Bangladesh in the form of 'deposits with the BB'. In other words, in the standard measures of money, money held by the government and the banking system is not included.

The primary reason for measuring the stock of money in this way is that this separates the producers or the suppliers of money from the holders or the demanders of it. For both monetary analysis and policy formulation, such a separation is essential.

A single measure of money supply defined as the sum of currency and demand deposits, both held by the public, we call it the narrow measure of money supply (M_1). A 'broader' measure of money supply (M_2) is defined empirically as money narrowly defined plus the time deposits of banks held by the public.

2.5 Classification of Bank Liabilities:

In monetary analysis, only a two-fold classification of bank deposits into (a) demand deposits or demand liabilities and (b) time deposits or time liabilities are made.

Demand Liabilities: Demand deposits or liabilities are defined as deposits payable on demand through cheque or otherwise. It is only demand deposits which serve as a medium of exchange. They are the obligations that a bank must fulfill immediately. Demand Liabilities include current deposits, the demand liabilities portion of savings bank deposits, margins held against letters of credit/guarantees, unclaimed deposits, credit balances in the Cash Credit account, deposits held as security for advances that are payable on demand, and balances in past-due fixed deposits, cash certificates, and cumulative/recurring deposits.

Time Liabilities: All other deposits which are not payable on demand and on which cheques cannot be drawn have fixed term to maturity. They are, therefore, called time deposits or time liabilities. They are the debts that a bank must pay off after a certain amount of time. Time Liabilities include fixed deposits, cash certificates, cumulative and recurring deposits, staff security deposits, margin held against letters of credit if not repayable immediately, deposits maintained as security for advances that are not repayable immediately, and gold deposits.

For the purpose of maintenance of CRR and SLR, demand and time liabilities should include all on-balance sheet liabilities excluding the items listed below:

- a) Paid up capital and reserves;
- b) Loans taken from BB;
- c) Credit Balance in Profit and Loss account;
- d) Inter-bank items;
- e) Repo, Special Repo and any kind of Liquidity Support taken from BB.

Banks are advised to approach BB for any doubt in reckoning a particular liability as demand or time liability for CRR and SLR computation.

2.6 List of Demand and Time Liabilities:

The following list includes several demand and temporal liabilities that can be taken into account when calculating the necessary CRR and SLR. The things on the list apply to both conventional and Islamic banking and are of a general character.

1. Demand Liabilities:

- (a) Demand Deposits (General)
 - i) All Current Accounts except from banks.
 - ii) All Cash Credit Accounts (Credit Balances)
 - iii) Demand Portion of savings bank Accounts.
 - iv) Overdue Fixed Deposits accounts.
 - v) Call Deposits accounts other than from banks (on Demand)
 - vi) Unclaimed balance accounts.
 - vii) Interest accrued on above accounts.

viii) All other Deposits payable to public on demand e.g.

1. Outstanding Bills.
2. Payment Orders.
3. Telegraphic Transfers & M.T.
4. Outstanding Drafts.
5. Drafts payable Account.
6. Demand Drafts.
7. Hajj Deposits.
8. Bonus scheme Remittances Payable.
9. Branch Remittances Payable.
10. Bills Payable.
11. Certificates Payable.

ix) Foreign Currency Deposit account

x) Unsold balance of NFCB account.

xi) Convertible Taka account.

(b) Other Demand Liabilities.

i) Margin on L/ cs.

ii) Margin on Guaranties.

iii) Lockers Key Security Deposits.

iv) Unclaimed Dividend/ Dividend Payable

v) Credit Balance and adjustment account.

vi) Security Deposit accounts (amount deposited by Supplier of stationery and furniture etc. as security).

vii) Sundry Deposits accounts.

viii) Any other miscellaneous deposits payable on demand.

2. Time Liabilities:

(a) Time Deposits (General).

i) Fixed Deposits from Customers other than from banks.

ii) Special Notice Deposits other than those from other banks.

iii) Time portion of the savings bank deposits.

- iv) Short term Deposit accounts.
- v) Recurring Deposits
- vi) Interest accrued on all above accounts.

(b) Other Time Liabilities.

- i) Employees' Provident Fund Accounts.
- ii) Staff Pension Fund.
- iii) Employees' Security Deposits.
- iv) Staff Guarantee or Security Fund.
- v) Contribution towards Insurance Fund.
- vi) Any other miscellaneous liabilities payable on notice or after a specified period.
- vii) Margin account- Foreign Currency.
- viii) Liabilities towards Foreign banks/ Correspondence bank.
- ix) Bi-lateral trade liabilities.

2.7 Cash Reserve Ratio (CRR):

Cash reserve ratio (CRR) is the amount of money that the scheduled banks will have to have in deposit with the central bank of the country at all times. If the central bank increases the CRR, then the scheduled banks will have a lesser amount available in their disposal. CRR is the amount that the bank has, which cannot be invested anywhere or given as loans to the borrowers. Every scheduled bank is required to keep a cash balance with BB that cannot be less than the percentage of its total demand and time obligations that BB may from time to time specify by notification in the official Gazette. In accordance with its monetary policy goals, BB may additionally specify the process for maintaining a cash reserve. At present, the required CRR is 4% on bi-weekly average basis of the average total demand and time liabilities (ATDTL) with a provision of minimum 3.5% on daily basis of the same ATDTL. Banks are advised to follow the circular issued by Monetary Policy Department of BB in this regard. CRR is one of the most important tools for the Bangladesh Bank and is used mostly in controlling inflation/deflation and liquidity in the economy. Bangladesh Bank being the supreme banking body in Bangladesh and has all the rights to modify the CRR at any given time.

The cash reserve ratio is particularly useful in dealing with the rate of inflation/deflation and liquidity in the country. If the central bank is of the opinion that there is too much liquidity in the economy, it will increase the CRR. This reduces the banks' lending ability as they would be left with a lesser amount which can be used to issue loans and make investments. When this happens, the spending would be reduced and thereby liquidity and inflation in the economy drops. If the central bank sees that there is a liquidity crunch, then it would reduce the CRR. This move would leave banks with more money at disposal. This will result in the appreciation of the banks' lending power, and thereby, more borrowers can avail loans. It will help in inflating the prices to some extent as people would have more money in their hand for spending. Therefore, CRR is an extremely powerful tool in the hands of BB, which can dictate the terms in the economy.

Components of Cash Reserve:

At present, banks are allowed to maintain cash reserve with local currency (Taka) only. The day end balances of the Taka current accounts maintained with different offices of BB will be aggregated to compute the maintained cash reserve of the day. The balance so maintained shall be un-encumbered in all aspect. The encumbered (lien against discounting facility, etc. and capital lien in case of foreign banks) portion of the balance will be deducted while computing both the maintained amount and excess of cash reserve.

Banks failing to maintain CRR, is liable to pay a penalty to the Bangladesh Bank as per guideline. If a bank fails to maintain the prescribed minimum CRR for a particular day, it has to pay a penalty of 5% above the bank rate on the deficient/ shortfall amount for that particular day. This is also applicable for bi-weekly CRR. That is, bank has to pay a penalty of 5% above the bank rate on the shortfall amount.

2.8 Statutory Liquidity Ratio (SLR):

Statutory Liquidity Ratio or SLR is the minimum percentage of deposits that a commercial bank has to maintain in the form of liquid cash, gold or other securities. It is basically the reserve requirement that banks are expected to keep before offering credit to customers. The SLR is fixed by the BB and is a form of control over the credit growth in Bangladesh. The government uses the SLR to regulate inflation and fuel growth. Increasing the SLR will control inflation in the economy while decreasing the statutory liquidity rate will cause growth in the economy.

Every scheduled bank has to maintain assets in cash or gold or in the form of un-encumbered approved securities the market value of which shall not be less than such portion of its total demand and time liabilities as prescribed by BB from time to time. BB may also prescribe the procedure of determination of assets and liabilities and percentages of maintainable assets in different classes. At present, the required SLR is 13% daily for conventional banks and 5.5% daily for Islamic Shari'ah based banks and Islamic Shari'ah based banking of conventional banks of their average total demand and time liabilities. Banks are advised to follow the circular issued by Monetary Policy Department of BB from time to time in this regard.

The SLR is fixed for the below mentioned reasons:

- To monitor the growth of bank credit.
- To guarantee commercial banks' solvency.
- To compel banks to buy bonds and other types of government securities.
- To stimulate demand and growth; this is accomplished by lowering the SLR to provide liquidity at commercial banks.

The minimum rate at which a bank can lend money to its customers is determined in large part by the SLR. This minimum amount is called the base rate. The Central Bank and other banks can become more transparent as a result. In order to limit bank credit, the SLR requirement is raised when inflation is high. On the other hand, during a recession, SLR requirement is lowered to increase bank credit.

If a bank fails to maintain the prescribed SLR, it is liable to pay a penalty to the Bangladesh Bank. Penalty will be charged at the prevailing Special Repo Rate on the amount by which the SLR falls short daily.

(i) Components eligible for calculation of Statutory Liquidity Reserve:

The eligible components for maintaining Statutory Liquidity Reserve are cash in tills (both local and foreign currency), gold, daily excess reserve (excess of Cash Reserve) maintained with BB, balance maintained with the agent bank of BB and un-encumbered approved securities, credit balance in Foreign Currency Clearing Account maintained with BB.

Daily excess of Cash Reserve (if any) will be calculated using the following formula:

Daily excess of Cash Reserve = (Day-end balance of un-encumbered cash maintained in Taka current accounts with BB – Required cash reserve on Bi-weekly average basis).

(ii) Guidelines for use of Foreign Currency from Foreign Currency Clearing Account for SLR purpose:

Banks may use foreign currency from Foreign Currency Clearing Account maintained with BB for SLR purpose as long as there is credit balance in the account. However, no interest will be paid on the used portion of foreign currency. Forex Reserve and Treasury Management Department (FRTMD) of BB will credit interest on the balance held in the account as usual. After getting the certification from Department of Off-site supervision (DOS) regarding the actual amount of foreign currency used for SLR purpose, FRTMD will adjust (if required) the interest amount. Banks should take utmost care while reporting the use of foreign currency in DB-5fc statement as any misreporting regarding the amount of foreign currency used for SLR purpose will attract a penalty two times of the amount of interest already credited for the misreported amount along with reversal of the interest credited.

2.9 Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) for Offshore Banking Operation:

Banks having Offshore Banking Operation (OBO) shall be required to maintain Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR) for the liabilities arising from the operation.

1) Liabilities of OBO:

Banks have to reckon the following components of demand and time liabilities for the calculation of required cash reserve and statutory liquidity reserve for OBO:

- i. Customer Deposit;
- ii. Deposit from Banks (Outside Bangladesh);
- iii. Borrowing from Banks (Outside Bangladesh);
- iv. Deposit from Financial Institutions (Outside Bangladesh);
- v. Borrowing from Financial Institutions (Outside Bangladesh);
- vi. Other payable Liabilities (excluding domestic intra-bank and interbank OBO to OBO transactions)

2) Use of Foreign Currency for the maintenance of CRR:

Banks may maintain entire CRR for both DBO and OBO in Bangladeshi Taka (BDT). If desired, banks may use, partly or fully for the whole bi-week, available credit balance from FC Clearing Account (equivalent to BDT at the rate published by BB) maintained with Bangladesh Bank (BB) to meet the daily minimum required cash reserve stemming from OBO only. In this case, to meet the average CRR for bi-week, the rest amount of cash reserve shall have to be met with BDT. The foreign currency to be used shall have to be unencumbered in every aspect.

3) Use of Nostro Account credit balance for the maintenance of SLR:

Banks may maintain entire SLR for both DBO and OBO in the eligible components as described by BB. Moreover, if desired banks may also use credit balance of Nostro Accounts (equivalent to BDT at the rate published by BB; the recognized currencies are USD, GBP, EURO, YEN, CAD and CNY, maintained with correspondence banks to fulfill the SLR requirement stemming from OBO only.

4) Calculation of daily Excess Reserve (ER):

The Calculation of daily Excess Reserve (ER) for banks having no OBO will remain the same as provided above. For banks having both DBO and OBO, the amount of daily excess reserve will be determined using the following formulas:

Unencumbered Current A/C Balance with BB - Bi-weekly Req. cash for DBO = X (i)

Bi-weekly Req. cash reserve for OBO - Unencumbered FC used (equivalent to BDT) for the maintenance of daily cash reserve from FC Clearing a/c with BB = Y (ii)

From (i) and (ii) above -

- a) if $X = 0$ or $X = -ve$ than $ER = 0$
- b) if $X = +ve$, $Y = +ve$, and $X > Y$ than $ER = X - Y$
- c) if $X = +ve$, $Y = +ve$ and $X < Y$ than $ER = 0$

Banks may use foreign currency (equivalent to BDT at the rate published by BB) from Foreign Currency Clearing Account maintained with BB for CRR (only to fulfill the requirement against OBO) and SLR purpose as long as there is credit balance in the account. However, no interest will be paid on the used portion of foreign currency. Forex Reserve and Treasury Management Department (FRTMD) of BB will credit interest on the balance held in the account as usual. After getting the certification from Department of Off-site supervision (DOS) regarding the actual amount of foreign currency used for CRR (only for requirement against OBO) and SLR purpose, FRTMD will adjust (if required) the interest amount. Banks should take utmost care while reporting the use of foreign currency in DB-5FC statement as any misreporting regarding the amount of foreign currency used for CRR and SLR purpose will attract a penalty two times of the amount of interest already credited for the misreported amount along with reversal of the interest credited.

2.10 Inter Bank Money Market Participants:

The participants in interbank money market are:

- a) Scheduled Banks;
- b) Financial institutions;
- c) Institutions specifically authorized for participating in call money market;

Thus who have current accounts and/or settlement accounts with Bangladesh Bank (BB), altogether they are called the “market participants”.

2.11 Money Market Products:

The money market is a segment of the financial markets for assets having original maturities of one year or less that are used for short-term borrowing, lending, purchasing, and selling. Money market trading is wholesale in nature and conducted over the counter. Banks, Non-Bank Financial Institutions, insurance providers, and the central bank make up the majority of market participants. To meet the banking book, trading book, and legislative needs of the bank, the Treasury front office participates in the market with MM products.

The following is a list of the typical products sold in the money market. Rates listed thereon must reflect market dynamics and adhere to all risk limitations and wholesale borrowing and lending guidelines.

- **Call money /Overnight Deal:**Call money refers to deposits or borrowings made overnight that mature automatically the next working day. It is a short-term loan that can be repaid immediately and is utilized for interbank trades. Call money is a crucial element of the money market. It has a number of unique qualities, including being a vehicle for managing funds for a very little period of time, an easy transaction to reverse, and a way to manage the balance sheet. Dealing in call money gives banks the chance to make interest on their excess cash.
- **Short Notice Money:**It refers to transactions involving money that last longer than overnight but less than 14 days (maturity of 2 days to 14 days). Both call money and short notice money are short-term loans between financial institutions, hence they are comparable. When the lender calls to collect call money, it must be paid back quickly. Instead, short notice loans are repaid up to 14 days after the lender gives notice. Along with call money and trailing cash on the balance sheet, short notice money is regarded as a highly liquid asset.
- **Term Money:**It is the borrowing/lending of funds for periods from 15 days up to 1 year at an agreed interest rate among the banks and NBFIs.
- **Repo/Reverse Repo:**Repurchase agreements are contracts between two banks or a bank and the central bank. Banks provide assets like Treasury Bills and Treasury Bonds in exchange for overnight loans from other banks or the central bank. Additionally, it is agreed that these securities will be repurchased at maturity for a fixed price. Banks receive the funds they require for various operations in this manner, and the central bank receives the security. This is usually a less than one-week short-term credit facility set up by selling securities to another market player with the promise to buy them back at a predetermined price on a fixed date. Only surplus securities that are above SLR can be used for a repo.

Repos and reverse repos are the same transaction, but depending on which side of the transaction you're on, they are termed differently. It is a repurchase agreement for the party who first sold the security (and has agreed to buy it again in the future).It is a reverse repurchase agreement, or reverse repo, for the party that first purchased the securities (and has agreed to sell in the future).

Even if the repo's goal is to borrow money, it is not strictly a loan because ownership of the assets involved really changes hands between the parties, not the other way around. Nevertheless, these are really brief transactions with a repurchase guarantee. Because a collection of securities, usually U.S. government bonds, act as collateral for the short-term loan agreement, repo and reverse repo agreements are referred to as collateralized lending. Repo agreements are therefore typically listed as loans in the debt or deficit column on financial statements and balance sheets.

- **Government Security:** A tradable asset issued by a sovereign government is a government security. It accepts the government's debt responsibility. These securities come in two varieties: short-term (sometimes referred to as "treasury bills," with initial maturities of less than a year) and long-term (usually called Government bonds or dated securities with original maturity of one year or more). Given that it was issued by a sovereign government, investing in it carries zero risk. Since the yield is set by the market, one can obtain an appealing rate of interest. Since these bonds are tradable in the secondary market, one can obtain instant liquidity by selling them in the market. In the case of foreign investment, all interest and maturity payments are entirely refundable. One can get the best services from Central Bank of Bangladesh which maintain fully automated scriptless depository system named Market Infrastructure (MI) Module. Major G-Securities in Bangladesh are: a. Treasury Bills (T-Bills) b. Bangladesh Government Treasury Bond (BGTB).
 - **Government T-bills:** Government treasury bills mature in one year or less. Like zero-coupon bonds, they do not pay interest prior to maturity; instead they are sold at a discount of the par value to create a positive yield to maturity and redeemed at the face value at maturity. T-Bills are commonly issued with maturity dates of 91 days, 182 days and 364 days and are tradable in both wholesale and retail market. Price is determined by the market. They are issued in scriptless form. 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.
 - **Government T-Bonds:** Government treasury bonds have the longest maturity, from two years to twenty years. They have a coupon payment every six months and are tradable in both wholesale and retail market. They are risk free fixed coupon bearing debt instrument. Maturities are available within 2-20 years. It carries half yearly coupon payment and the principal is repaid on maturity. The yield is determined by the market. They are tradable instrument in the secondary market and also issued in scriptless form. 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.
 - **BB-bills:** In addition to scheduled regular sales of T-Bills, BB also sells instruments called 'Bangladesh Bank bills' on an irregular basis which are also tradable in the market.
- **Commercial Paper:** Commercial paper is an unsecured promissory note with a specified maturity of no more than 270 days. Large corporations issue these notes to raise money to satisfy short-term debt commitments, and the only security they have is the issuing bank's or company's pledge to pay the face value of the note at the note's maturity date. They are not currently available for trading on our market.
- **SWAP:** A simultaneous exchange of identical amounts of one currency for another with two separate value dates is known as a foreign exchange swap in the USD/BDT and other cross currency pairs (normally spot to forward). That is Swap is the term for when two parties exchange one financial instrument for another. According to the terms of the contract, this exchange happens at a specific time. Swaps are not exchange-oriented and are exchanged over the counter; typically, banks handle the dealing. Swaps can be used to protect against a variety of risks, such as interest rate risk and

currency risk. The two most popular types of swaps traded in the market are currency swaps and interest rate swaps.

2.12 Case Study on Money Market Liquidity in Bangladesh: Near Past- Present-Near Future:

Since Bangladesh is a growing country, historically we always had a deficit budget. Subsequently, the government borrows fund to replenish the deficit from the banking system/non-banking system which ultimately affects the money market liquidity.

A method can be used to gauge the money market liquidity every month based on central bank published data which includes a deposit in DMBs from others, deposit from inter-bank & government, borrowing from the government and central bank, Total loans & advance, Excess reserve, Excess investment in SLR, Currency in tills of DMBs, NSD, money outside of the banking sector. Inflow and outflow from capital and fixed assets are excluded for the simplicity of the calculation.

So, money market liquidity can be thought as:

$$\text{Money Market Liquidity}_m = \{(\text{Deposit in DMBs} - \text{Maintained CRR} - \text{maintained SLR} - \text{Loan and advance}) + (\text{Deposit from Inter-bank \& Government} + \text{Borrowing from Government} + \text{borrowing from Central Bank}) + (\text{Excess CRR} + \text{Excess investment in SLR}) + \text{FCY Clearing Balance} - (\text{monthly change in net Government borrowing from banking system})\}_m$$

Here, m stands for any particular month.

In a liquidity crisis, banks and NBFIs will be able to take REPO, Special Repo, and ALS by leaning or locking excess securities with Central Bank.

In January 2020 money market liquidity was BDT 21,484.39 crore which was BDT 9,069.54 crore less than the previous month and this reduction can be explained by the net borrowing from the banking sectors, depositing surplus fund to the public exchequer, etc.

Impact of COVID 19 in banking industry liquidity: The government has announced BDT 1.00 trillion stimulus package to combat against economic crisis caused by the coronavirus pandemic. The sector-wise stimulus packages and its liquidity effect in the banking system are mentioned below:

Package Name	Short Description	Amount in BDT crore	Tenor	Liquidity provided by
Financial Stimulus Fund	Only applicable to exported related companies' salaries and wages. This fund is allocated from the government budget.	5,000	2 years with 6 month grace period	Central Bank
Working Capital under Stimulus Package	This is a government subsidy and will apply to the affected industry and service sector as a working capital loan.	30,000	3 Years	50% refinance will be provided by Central Bank.
Pre-shipment credit refinance scheme	This fund will be provided from BB own funding for pre-shipment credit only.	5,000	3 Years	Central Bank
Special Stimulus refinance scheme for agriculture.	This fund will be provided from BB own funding for agricultural credit only.	5,000	1Year, with a grace period of 6 months.	Central Bank
Special Working Capital facility for CMSME sector under Financial Incentive package	This loan is applicable for Micro, SME-S, SME-M, women entrepreneurs, etc.	20,000	3 Years	50% refinance will be provided by Central Bank.
EDF	EDF loans to ADs will be charged by Bangladesh Bank at 1.00% pa, while ADs will charge interest to manufacturer-exporters at 2.00% pa; for disbursements until further instructions	12,250 (USD 1.50 billion)	-	Central Bank
Additional Package	Four state entities: Palli Shanchay Bank, Probashi Kalyan Bank, Karmasangsthan Bank, and Palli Karma-Sahayak Foundation, or PKSF.	2,000	-	Government
Additional Package	stimulus package to assist migrant workers, unemployed youth and rural population	2,000	-	Government
Additional Package	a scheme to provide financial assistance to 5.0 million vulnerable families who will each receive a one-time grant of Tk 2,500 through mobile banking services	1,250	-	Government
Others	-	17,500	-	Government
	Total	100,000	-	-

Table: Summary of various stimulus packages amount. Source: Bangladesh bank and newspaper.

BDT 77,250 crore will be channeled through the central bank of which BDT 30,000 crore will be provided as refinance and for BDT 47,250 crore, banks can apply for one-year Repo facility. For this reason, banks must have enough SLR securities. In January 2020, Excess investment in SLR was BDT 61,345.20 crore. In this case, banks might be used their currency in till or FCY in Central Bank account as an SLR component.

The rest of the amount of stimulus packages, additional borrowing BDT 22,750 crore, the government might borrow from the banking system since the revenue collection will collapse due to the pandemic situation and investment cap in the NSD.

Due to slashing CRR rate by 1.50%, additional BDT 18,151 crore will increase in banking sector liquidity.

From the Money Market Liquidity calculation table, January 2020 end available liquidity is BDT 21,484.39 crore.

Particulars	BDT in Crore
Total Stimulus Packages	100,000.00
Less: Available liquidity as of Jan 2020	21,484.39
Less: Liquidity from CRR slashing	18,151.00
Less: Refinance	30,000.00
Total Required Liquidity(a)	30,364.61
Creation of additional liquidity	
Slashing CRR by another 1.50% (b)	18,151.00
Central Bank one Year BS SWAP USD 1.44 billion(c)	12,213.61
Gap d=(a-b-c)	-

Table: Calculation of required fund to accommodate stimulus packages and sources of funding

In this connection, available banking sector liquidity is close to BDT 21,484.39 crore, and if we successfully accommodates total stimulus packages then BDT 30,364.61 crore additional liquidity requires considering other things remain constant.

Based on the January 2020 data, it seems that the banking system is somehow okay to manage liquidity in this pandemic situation though all schedules banks are supposed to depend on the central bank liquidity window. This heavy dependency on central bank liquidity window will be reduced if the schedules banks liquidate their high-quality liquid assets or excess SLR investment reduced from the current level at maturity(the second one solely depends on bank to bank inter strategy and risk appetite), other things remain constant. This situation will aggravate when banks will move toward to full utilization of stimulus packages.

If the government borrows on a large scale then the interest rate of Government securities will show an upturn until reducing heavy dependency on liquidity support from the central.

It will be more severe if the currency outside the banking system increases more rapidly and the use of tills currency as SLR components at a large-scale might hamper the banks to keep a commitment with its customers.

Money Market Needs Additional Liquidity from Central Bank: The central bank is the lender of last resort. In a pandemic situation, the central bank may take the following steps to ensure enough liquidity in the banking sector.

- Special monitoring needed to monitor the utilization of stimulus packages.
- Providing long term (one to three years) unconditional Repo facility at a concession rate. In this case, Repo for pure trading purposes may arise which will automatically be adjusted by the market forces.
- Long term (overnight to one year) SWAP might help to increase the local currency liquidity and FCY base of the central bank. There is a chance that the market will establish a new reference rate for money market liquidity. January 2020 end, the FCY clearing balance was USD 1.44

billion. Central Bank can provide one year BS SWAP USD 1.44 billion which will inject BDT 12,213.61 crore liquidity. Certainly, the USD liquidity crisis arises then time to time Central Bank can lend USD to reduce the USD shortage in the banking sector.

- CRR and CB REPO rate, ALS can be reduced by another 1.50%. This will create BDT 18,151.00 crore additional liquidity in the banking sector based on January 2020 data, other things remain constant.

We believe the central bank has more big data access and will take the right steps before any casualties in banking sectors. All scheduled banks should make short term business strategy and investment in high-quality liquid assets to face any unwanted challenges. ALCO must take care of banks immediate potential outflows and investment in HQLA/liquid assets meticulously. The government budget should be expansionary, and the necessary steps should be taken to channel money from currency outside the banking system to the banking system.

Central Bank must be vigilant and give utmost effort to keep banking sector liquid at any cost, otherwise, we may be going to a higher interest rate regime or/and all trust will be evaporated from the banking sector by the heat of COVID-19.

2.13 Practice Questions:

1. Write short notes on the following topics:
 - a. The Payment System
 - b. Demand for Money
 - c. Liabilities of Offshore Banking Operation
 - d. Govt. Security
 - e. Repo-Reverse Repo
2. What is money? What are the functions of money?
3. Describe the two types of bank liabilities with examples.
4. What is CRR and what are the components of cash reserve.
5. What is SLR? Why and how is it maintained?
6. Briefly describe the products of money market.

Module C: Foreign Exchange Management

3.1 Foreign Exchange (Forex):

Foreign exchange is the act of exchanging one currency for another (forex or FX). For instance, one can swap US dollars for euros. Foreign exchange transactions can be carried out on the foreign exchange market, often known as the forex market. With trillions of dollars transacting hands every day, the currency market is the largest and most liquid market in the entire globe. There is no centralized location. Instead, the forex market is an electronic network of organizations, banks, brokers, and individual traders (mostly trading through brokers or banks). Thus in a nutshell:

- Foreign exchange refers to a global market for converting various national currencies (forex or FX).
- With trillions of dollars changing hands every day, foreign exchange venues make up the largest securities market in the world in terms of nominal value. Foreign exchange trading uses currency pairs that are compared to one another.
- Futures and forwards are additional FX market trading options.

The market determines the value of most currencies, which is commonly referred to as an exchange rate. Your foreign exchange requirements can be met by merely exchanging one currency for another at a nearby bank. Currency trading on the foreign exchange market is an additional choice. For instance, an investor can stake money on the possibility that a central bank will ease or tighten monetary policy as well as the strength of one currency vs another.

Currency pairs, such as USD/CAD, EUR/USD, or USD/JPY, are listed when exchanging currencies. These represent the U.S. dollar (USD) versus the Canadian dollar (CAD), the euro (EUR) versus the USD, and the USD versus the Japanese yen (JPY). There will also be a price associated with each pair, such as 1.2893. If this price was associated with the USD/CAD pair, it means that it costs 1.2893 CAD to buy one USD. If the price increases to 1.3045, then it now costs 1.3045 CAD to buy one USD. The USD has increased in value (CAD decrease) because it now costs more CAD to buy one USD.

In the forex market, currencies trade in lots, called micro, mini, and standard lots. A micro lot is 1,000 worth of a given currency, a mini lot is 10,000, and a standard lot is 100,000. This is different than when you go to a bank and want \$450 exchanged for your trip. When trading in the electronic forex market, trades take place in set blocks of currency, but you can trade as many blocks as you like. For example, you can trade nine micro lots (9,000), four mini lots (40,000), or 50 standard lots (5,000,000).

The scale of the foreign exchange market is one of the factors that sets it apart. Overall, the FX market has a large trading volume. For instance, the Bank for International Settlements, which is held by 63 central banks, handles monetary and financial matters, claims that activity on foreign exchange markets averaged \$6.6 trillion per day in April 2019. The top five trading centers are London, New York, Singapore, Hong Kong, and Tokyo.

3.2 Trading in the Foreign Exchange Market:

Every day of the week, 24 hours a day, there are open markets in major financial capitals throughout the globe. This suggests that currency trades are available 24/7. The foreign exchange market isn't precisely a one-stop shop. There are numerous alternatives available to investors for how they want to execute their forex trades. You can use a number of financial institutions or dealers, each of which uses a range of

electronic networks. In the past, the concept of foreign exchange attracted the interest of governments, major enterprises, and hedge funds alike. However, trading currencies in the present era is as easy as clicking a mouse; access is no longer a barrier, therefore everyone can do it. Customers have the ability to open accounts and convert currencies whenever and however they want through several financial institutions.

Buying or selling a particular country's currency fundamentally constitutes trading on the foreign exchange market. However, no money is really passed from one hand to another. Imagine a Japanese tourist visiting Times Square in New York City, which is different from what happens at a money exchange kiosk. They might be exchanging their (physical) yen for genuine U.S. dollars to utilize as trip money (and might be charged a commission fee for doing so). Nevertheless, in the world of electronic markets, traders frequently take a position in a certain currency in the hope that there will be some upward movement and strength in the currency they are buying (or weakness if they are selling), so they may make profit.

3.3 Differences in the Forex Markets:

Foreign currency and other markets differ from one another in a few significant ways. Investors are not subject to the same rigorous standards or norms as those in the stock, futures, or options markets since there are less regulations than there are in those markets. This indicates that there are no central organizations or clearing institutions that oversee the currency market. Trading doesn't take place on a traditional exchange, so you won't pay the same fees or commissions as you would on another market.

There are no limitations on when you can and cannot trade, either. Because the market is open every day of the year, you can trade at any time. Lastly, due to the market's extreme liquidity, you can enter and depart at any time, as well as purchase as much currency as you can.

3.3.1 The Spot Market:

Spot for most currencies is two business days, the U.S. dollar against the Canadian dollar is the main exception, which settles on the following business day. In two business days, other pairs settle. Spot for the majority of currencies is two business days. Other partners reach agreements in two business days. When there are several holidays, like Easter or Christmas, spot transactions may take up to six days to settle.

The price is decided on the transaction date even when money is exchanged on the value date. Spot trading can be quite volatile. Movement in the immediate term is dominated by technical trading, which stresses the direction and speed of movement. People who focus on the technical are often referred to as chartists. Long-term currency swings are determined by fundamental factors like relative interest rates and economic growth.

According to a BIS foreign exchange report from April 2019, the dollar is the currency that is traded the most. The euro, yen, pound, and Australian dollar are the most popular currencies to pair with the US dollar. 4 crosses refers to trading combinations that do not include the dollar. The two most common crosses are the euro and the yen.

3.3.2 The Forward Market:

A forward trade is one that settles further in the future than spot. The forward price is the spot rate plus or minus the forward points, which represent the difference in interest rates between the two

currencies. While they can endure longer, they typically mature in less than a year. Similar to a spot transaction, the price is set on the transaction day, but the money is actually exchanged on the maturity day. For the benefit of the counterparties, a forward contract is made. They may be for any amount and be paid on any day that is neither a weekend nor a national holiday.

3.3.3 The Futures Market:

A futures transaction is similar to a forward in that it settles later than a spot deal, but is for standard size and settlement date and is traded on a commodities market. Producers and suppliers of commodities use futures contracts to try to reduce market volatility. With an investor who is willing to accept the risk and profit of a volatile market, these manufacturers and suppliers negotiate contracts. These financial instruments are bought and sold at a price that is decided at the time of the transaction on futures markets or futures exchanges for delivery at a predetermined future date. Aside from agricultural contracts, futures markets are also used to buy, sell, and hedging financial products like interest rate futures. Futures contracts, unlike other issued securities, can be created or "produced" as long as open interest increases. Futures markets are larger than commodity markets and are an essential part of the financial system (and typically grow when the outlook for the stock market is uncertain).

For example, a coffee farm sells green coffee beans to a roaster for \$5 per pound and the roaster sells those beans for \$10 per pound after they have been roasted, and both are successful at that price, they will both want to maintain that price. If the price of coffee goes below a predetermined amount, the investor agrees to pay the coffee grower the difference. If coffee prices increase over a particular point, the investor retains profits. The investor pays the difference and the roaster receives the coffee at the agreed-upon price if the cost of green coffee is higher than what was agreed upon for the roaster. If the cost of green coffee is less than the agreed price, the roaster pays the same amount and the investor obtains the profit.

Example of Foreign Exchange

As the economy of the Eurozone weakens, a trader believes that the European Central Bank (ECB) would loosen its monetary policy in the upcoming months. As a result, the trader makes a wager that the euro will lose value relative to the dollar and sells €100,000 worth of currency short at a rate of 1.15. The ECB sends forth signs that it may certainly loosen monetary policy during the coming weeks. As a result, the euro's value relative to the dollar drops to 1.10 at that time. The trader makes a \$5,000 profit as a result.

The trader earned \$115,000 for the short sell by shorting €100,000. It only cost the trader \$110,000 to buy the euro again after the trader covered their short position when the euro dropped. The profit is the sum of the money collected from the short sale and the purchase made to make up the shortfall. It would have resulted in a loss if the euro had grown stronger against the dollar.

The daily trading volume on the foreign exchange market exceeds that on the stock and bond markets by a large margin due to its high liquidity. The Bank for International Settlements (BIS) said that the average daily trading volume on foreign exchange markets in 2019 was \$6.6 trillion. On the other hand, as of December 31, 2021, the notional value of all U.S. equity markets was roughly \$393 billion. London, New York, Singapore, Hong Kong, and Tokyo are the biggest forex trading hubs.

When you trade on the forex market, you essentially buy one country's currency while simultaneously selling another country's currency. However, there is no actual transfer of cash from one hand to another. Typically, traders take a position in a certain currency in the hopes that there will be some strength in that currency relative to the other currency they are buying (or weakness if they are selling) so they may

benefit. Trading currencies is as simple as clicking a mouse in the modern world of computerized marketplaces.

Other markets and foreign exchange differ from one another in a few significant ways. Because there are no clearing houses or other centralized authority to oversee the forex market, investors are not subject to the same tight regulations or limitations as those in the stock, futures, or options markets. Second, there are no fees or commissions that are associated with marketplaces in other businesses that use traditional exchanges. There is no set trading hour, with the exception of the weekends, so you can trade whenever you choose. Last but not least, its liquidity makes it more accessible for trade.

3.4 Foreign Exchange Rate Calculations and Uses:

The rate at which one currency can be exchanged for another between countries or economic zones is known as an exchange rate. It is crucial in determining the dynamics of commerce and capital flow since it is used to calculate the worth of various currencies in comparison to one another. Quotes for exchange rates between two currencies are given. How many Canadian dollars (CAD), for instance, are needed to exchange one US dollar (USD)? The exchange rate as of late August 2020 is 1.31, which shows that CAD 1.31 is received if exchanging USD 1.00.

Exchange rates are defined as the price that one nation or economic zone's currency can be exchanged for another currency. The rates are impacted by two factors:

- The domestic currency value
- The foreign currency value

3.4.1 Reasons for Exchange Rates Fluctuation:

Exchange rates are a good indicator of many economic variables and causes, and they can alter for a number of reasons. The following are a few causes of exchange rate fluctuations:

1. Interest Rates: Changes in interest rates have an effect on the value of currencies and exchange rates. Assuming other factors remain constant, a country's domestic interest rate will increase demand for its domestic currency because more foreign investors will seek out investments at the higher rate, putting more foreign money into the domestic currency. But in actuality, inflationary pressures counterbalance it.

2. Inflation Rates: Variations in inflation rates have an impact on currency values and exchange rates. The demand for a nation's own currency will decline if its inflation rate is higher because its currency depreciates substantially more quickly than that of other countries, assuming all other factors are equal.

3. Government Debt: Government debt is the total amount owed by the federal government. Debt influences currency value and exchange rates because a country with higher debt is less likely to draw foreign investment, which in turn leads to inflation. It exerts downward pressure on the native currency by lowering its value in exchange rates.

4. Political Stability: The value of a country's currency and exchange rates are impacted by its level of political stability since a country with more political upheaval is less likely to attract foreign investment. When there is political upheaval, investors are more vulnerable because they worry about whether their money will be protected by moral corporate practices or a strong judicial system.

5. Export or Import Activities: Currency exchange rates are influenced by a country's net exports or imports. If a local nation exports more items than it imports, its currency will be more in demand, which will raise its exchange rate in reference to other foreign currencies.

6. Recession: Economic downturns make a country less desirable to foreign investors. First of all, it's because there is a bigger risk involved when investing in a nation with a gloomy economic outlook. Second, interest rates frequently decline during recessions, which reduces the demand for local currency abroad.

7. Speculation: In order to profit from their expectation, investors would demand more of a currency if they believe it will increase for whatever reason. It may cause a sudden increase in the demand for domestic currencies relative to the demand for foreign currencies.

8. Special Considerations: When determining exchange rates, there are other unique concerns. For instance, different "safe-haven" currencies are perceived to be stable and attract foreign capital when the future for the global economy is uncertain. They include the US dollar, euro, Japanese yen, and Swiss franc, among others. Another distinguishing characteristic of the U.S. dollar is that it is the global reserve currency for governments, which increases the base demand of the dollar relative to other currencies.

3.4.2 Types of Foreign Exchange Rates: Exchange rate sheet shows conversion rates of different currencies. Treasury department is responsible for publishing exchange rate sheets. Different types of foreign exchange rates with their uses are briefly described here:

1. TT & OD:

Telegraphic Transfer (TT) and On Demand (OD) are two remittance options that banks provide to make it simpler for consumers and businesses to make payments. Whether you're making an international purchase or sending money to a child studying abroad, Telegraphic Transfer is the best tool for quickly and securely moving foreign currency internationally. Benefits of TT include:

- Quick and secure approach because funds are transferred instantly and straight into an account;
- Easily traceable in the event of loss.

When bought or sold, demand drafts, foreign cheques, and other items are subject to the on-demand rate. Sending money overseas using this method is more economical, and the funds are cleared through our correspondents in key cities throughout the globe.

When selling foreign currency to retail consumers against BDT for FTT, FDD, and traveler's cheques, you should follow the TT & OD rate as a general rule. Treasury may reveal specific selling prices for students who are pursuing an international education. The equivalent amount in USD (or another currency) may be transferred via FTT if a certain currency is missing from the rate sheet. Recommendations for conversion rates will be given by Treasury based on the present state of the world market.

2. B.C. Rate:

The bills for collection rate is applied to sales transactions against import papers whether or not the transaction is covered by a letter of credit and regardless of whether the remittance is made by TT, draft, or bill of exchange. For import payments paid with FC margin, excess margin, retention quotas (ERQ), and from BB refinancing, the mid-rate for the applicable currency may be applied. If a currency exchange is necessary, the dealing room will give you the rate depending on the current foreign exchange market.

3. TT Clean Rate:

The rate will be 1.00 taka less than the BC rate. Since funds have already been credited, foreign currency purchases made by retail customers against BDT for incoming TT should be guided by the TT Clean rate for that currency. Given that this entails a collection mechanism, the retail FDD should be influenced by the TT Doc rate.

4. TT Doc Rate:

As compared to BC, this will be 1.10 taka less. This rate is applicable to FCY purchase transactions made against BDT in which supporting documentation (such as an invoice, bill of lading, bill of exchange, etc.) is required and the bank is reimbursed for handling costs. Encashment of foreign currency from FCY accounts, margin, excess margin, and retention quotas will benefit from TT clean or TT Doc rates depending on the nature of the account and transaction.

5. OD Sight Export Bill Rate:

Invoices for purchases or negotiated sight exports are charged at this rate. Due to the delay between paying the exporter and receiving foreign currency in the NOSTRO account, interest is deducted from TT rates. Because the interest amount is added to the exchange rate, this rate is lower than the TT clean buying rate. The export usance rates for various tenors are also included in the rate sheet for USD/BDT pairs. As required, the dealing room will offer usage rates for more currency pairings.

6. OD Transfer Rate:

For transactions involving the purchase of personal cheques, Pay Orders, drafts, traveler's cheques, etc., OD buying rates are provided. The bank pays for the instrument right away, but the money is repaid at the international center after a few days once the drawee pays for the draft documents.

7. Cash Foreign Currency Rate:

This exchange rate is applicable for buying and selling of cash notes of US Dollar, Euro and Great Britain Pound. The banknotes are sold from counters of branches and consumer banking division may impose commission/charges.

8. Standard Mid Rates:

This rate is used to revalue the bank's assets and liabilities held in foreign currencies. The weighted average USD/BDT rate from the previous day's interbank transactions is used to calculate the USD/BDT mid-rate. The typical mid-rates for other currency pairs are determined using the New York closing rates. For crediting the same FCY to ERQ, margin, excess margin, FCY account, etc. as required by core banking software, mid-rate is appropriate. Once more, mid-rate payments will come from accounts with margin, extra margin, ERQ, or FCY. Using information from the real-time foreign currency market, Dealing Room will let you know the exchange rate for any conversions between FCYs.

9. Indicative Rates:

These exchange rates are not for transactions and only for estimation. An investor who requests it from a market maker will receive an indicative quote, which is a reasonable estimation of the currency's current market price. The word indicative is used because this rate cannot be dealt on.

10. Card Payment Rates:

This rate is applied for BDT payments against credit card outstanding in USD.

11. Forward Rates:

The forward purchasing and selling rate set by the bank is applied to commercial and corporate transactions where BDT is the quoted currency. A merchant or corporate customer may receive a customized forward rate from the dealing room depending on the state of the market. Forward rates with trading room will also be provided upon request for a variety of term structures. Forward rates can be made available for both genuine export and import activities as well as cross-currency transactions by strictly following central bank regulations.

12. NFCD/RFCD Rates:

NFCD (Non Resident Foreign Currency Deposit) Account is an interest bearing time deposit account for Non Resident Bangladeshis which can be opened with foreign currency for a period of 1/3/6/12 months. The accounts are in the nature of term deposits maturing after one month, three months, six months and one year with option for auto renew. The accounts can be maintained in US dollar, pound sterling, Euro. Accounts may be opened against remittances in other convertible currencies after conversion of those. On the other hand, RFCD (Resident Foreign Currency Deposit) is a Deposit account for resident Bangladeshis which can be opened with foreign currency brought at the time of their return from abroad. Only Resident Bangladeshis can open this account. Interest rates for NFCD/ RFCD accounts of different tenors are also provided in the exchange rate sheets.

13. LIBOR rates:

The largest banks in the world use LIBOR as their benchmark interest rate for lending money to one another. The major multinational banks are questioned by the Intercontinental Exchange, which manages LIBOR, about the rates they would charge other banks for short-term loans. The rate is determined using the Waterfall Methodology, a standardized, transaction-based, tiered, data-driven approach. LIBOR is no longer considered as a trustworthy benchmark rate as a result of manipulation, debate, and methodological criticism. The Secured Overnight Financing Rate (SOFR), which will replace LIBOR on June 30, 2023, will be phased out starting in 2021. The exchange rate sheet includes the SOFR and LIBOR rates from the previous day.

3.5 Foreign Exchange Quote Conventions:

For the typical person, forex quotations can be pretty complicated. These quotations can be delivered in multiple ways, but it requires some education and experience to realize this. Additionally, it takes some getting used to before someone can swiftly understand these quotes and make snap judgments based on them. The two different forms of Forex quotations and the abbreviations that are used in them will be explained here. The currency in question's acronym is used in every quotation from the foreign exchange market.

The International Standards Organization has developed standard currency keys or currency codes (ISO). All throughout the world, transactions use these keys. The key is made up of 3 alphabets. The first two alphabets of the key denote the country to which the currency belongs whereas the third alphabet of the key is the first alphabet of the currency. Hence, United States dollar is referred to as the USD, Indian Rupee is referred to as INR, Great Britain Pound is referred to as GBP and the Japanese Yen is abbreviated as JPY. The exceptions to this rule would be currencies like Euro which is abbreviated as EUR and most importantly the Swiss Franc which is abbreviated as CHF.

Direct Quotation: This approach expresses the quote in terms of local money. This means that the exchange rate describes the relationship between one unit of the local currency and the foreign currency. What would result from an exchange of one unit of the local currency for how many units of the foreign currency? The price quotation method is another name for this approach.

Consequently, if the value of the local currency rises, less of it would need to be swapped. In contrast, a drop in value would make it necessary to convert a significant amount of local currency. As a result, it can be claimed that the quotation rate and the value of the local currency are inversely related. In the case of a straight quotation, the value of the local currency is taken to be 1. The price given explains how many units of foreign currency can be converted into one unit of local currency.

Example: An example of direct quotation would be USD/JPY: 143.15/18

This quote suggests that roughly 143 units of Japanese Yen can be exchanged for 1 unit of United States Dollar. The two rates provided are bid and ask rates i.e. the different rates at which the market maker is willing to buy and sell the currency. The direct quote method is one of the most widely used quotation methods across the world. This is the norm for quoting Forex prices and is assumed de facto until another method has been explicitly mentioned.

Indirect Quotation: The direct quotation approach is the antithesis of this approach. This approach expresses the quote in terms of foreign money. In light of this, the rate is based on one unit of foreign currency. The amount of domestic currency needed to purchase one unit of a foreign currency is then expressed. This quotation is occasionally also given in terms of 100 foreign currency units. The quantity quotation method is another name for this approach. The quoted rate for this approach has a direct relationship with the local rate because it is expressed in terms of foreign currency. The value of the home currency rises if the quote does, and vice versa.

Example: An example of indirect quotation would be: EUR/USD: 0.875/79. In this case, the first currency i.e. EUR is the domestic currency. Therefore, the indirect quote refers to approximately 0.875 EUR being exchanged for 1 unit of USD. Once again the two rates provided are the bid ask rate i.e. the two different rates at which market makers are willing to buy and sell the currency.

The usage of indirect currency quotation is extremely rare. It is only in the Commonwealth countries like United Kingdom and Australia that the indirect quotation method is used as a result of convention.

The Unique Case of the United States Dollar:

By tradition, the majority of quotations that refer to the US dollar include a straight reference for the currency. This is due to the fact that the majority of nations are seeking to acquire the global reserve currency. As a result, any currency pair that include the US dollar will often start with USD/XXX, where XXX stands for the variable counter currency. As a result, even though the local currency in India is the Indian Rupee, quotes for INR and USD are always written as USD/INR. It wouldn't be wrong to give an INR/USD price. But that is not how the foreign exchange market operates. The Euro and Dollar pair, where the Euro is still considered to be the domestic currency, is a remarkable exception to the aforementioned norm.

Therefore any Forex quotation can be interpreted in different ways based on the type of quotation that is being provided, where it is being provided and various other market conventions and norms.

3.6 Advantages and Disadvantages of Forex Market:

Advantages of Forex Market: The biggest financial market in the world is the forex market because it provides some advantages to its participants. Some of the major advantages offered are as follows:

1. **Flexibility:** Markets for foreign exchange give dealers a lot of flexibility. This is so because the quantity of money that can be used for trade is not limited. In addition, there is hardly any market regulation. This makes for an extremely flexible environment for traders, especially given that the market is open 24/7. Even those who work normal jobs can participate in forex trading on the weekends and at night. If they are trading on the stock or bond markets or in their own nations, they cannot do the same, though! This is why part-time traders like Forex since it offers a flexible schedule that interferes the least with their full-time jobs.
2. **Transparency:** The Forex market spans many time zones and is extremely large. In spite of this, information about the Forex markets is simple to find. Furthermore, no nation or central bank has the power to corner the market or manipulate prices for an extended length of time. Due to the delay in transmitting information, some entities may have short-term benefits. This benefit, however, cannot be maintained over the long term. The size of the forex market also contributes to its efficiency and fairness.
3. **Trading Options:** There are many different trading alternatives available to traders on the forex markets. Trading is possible in thousands of currency pairs. Additionally, they have the option of engaging in spot trade or concluding a long-term arrangement. To fulfill the interests of Forex traders, futures agreements are also offered in a variety of quantities and maturities. As a result, the forex market offers choices for investors of all financial levels and levels of risk appetite. The fact that there is a significant volume of trading on the forex markets must also be considered. The Forex market is the market where the most trading takes place globally. This is why Forex offers traders unparalleled liquidity, allowing them to join and exit the market at any time in a matter of seconds.
4. **Transaction Costs:** Unlike other markets, the forex market offers a setting with low transaction costs. The transaction costs of trading in Forex are incredibly low when measured in percentage terms compared to dealing in other marketplaces. This is mostly due to the fact that dealers control a big portion of the Forex market and offer a two-way quote after setting aside a spread to cover their own risks. In the forex markets, pure play brokerage is quite low.
5. **Leverage:** Of all the marketplaces for financial assets, the forex market offers the largest leverage. Investors can trade the market and leverage their initial investment up to 20–30 times thanks to the arrangements in the Forex markets! Profits and gains are boosted by this. As a result, even though Forex market moves are typically minor, traders still wind up making or losing a sizable sum of money as a result of leverage.

Disadvantages of Forex Market: It would be a biased evaluation of the Forex markets if attention was paid only to the advantages while ignoring the disadvantages. Therefore, in the interest of full disclosure, some of the disadvantages have been listed below:

1. **Counterparty Risks:** An international market is the forex market. Because it involves the sovereignty of many different countries' currencies, the regulation of the Forex market is therefore a complex subject. As a result, there is a situation where there is little regulation of the forex market. As a result, there is no centralized exchange that ensures trades will be executed without danger. As a result, when investors or traders join into deals, they must also be aware of the default risk that they are facing, that is, the risk that the counterparty may not have the

intention or capacity to fulfill the contracts. Therefore, a rigorous evaluation of counterparty risks is necessary while trading forex, as is the development of mitigation strategies.

2. **Leverage Risks:** The most leverage is offered by forex markets. Risk is inherently implied by the phrase leverage, and a gearing ratio of 20 to 30 times suggests a lot of risk! Given that there are no restrictions on the amount of movement that may occur in the Forex market in a given day, it is feasible that someone who placed highly leveraged bets could lose all of their investment in a matter of minutes. Because they are less aware of the risk that leverage entails, novice investors are more likely to commit such errors.
3. **Operational Risks:** Operations management for forex trading is challenging. This is because, unlike the Forex market, people do not labor constantly. Algorithms must therefore be used by traders to safeguard the value of their investments while they are gone. As an alternative, global corporations have trading desks all over the world. That can only be accomplished, though, if trading is done on a very big scale. Therefore, the Forex markets could result in a big loss of value during the evenings or on the weekends if a person lacks the resources or the expertise to manage their positions while they are away. The Forex market serves a variety of investors with various risk tolerances.

3.7 Assessment Risk to Exposures:

Foreign exchange risk, also known as exchange rate risk, is the risk of financial impact due to exchange rate fluctuations. In simpler terms, foreign exchange risk is the risk that a business' financial performance or financial position will be impacted by changes in the exchange rates between currencies.

The three types of foreign exchange risk include transaction risk, economic risk, and translation risk. Foreign exchange risk is a major risk to consider for exporters/importers and businesses that trade in international markets.

A corporation runs the risk when it conducts financial transactions or keeps financial records in a currency other than that of its primary location. For instance, a Canadian company that conducts business in China and declares its financial statements in Canadian dollars is subject to foreign exchange risk since it receives financial transactions in Chinese yuan. To be included on the company's financial accounts, the financial transactions, which are received in Chinese yuan, must be converted to Canadian dollars. The term "foreign exchange risk" refers to changes in the exchange rate between the Chinese yuan (a foreign currency) and the Canadian dollar (a local currency). The appreciation or depreciation of the base currency, the appreciation or depreciation of the foreign currency, or a combination of the two can all result in foreign exchange risk. It is a significant danger that importers, exporters, and companies that conduct business internationally should take into account.

Types of Foreign Exchange Risk: The three types of foreign exchange risk include:

1. Transaction risk: The risk a business takes on while doing financial transactions across borders is known as transaction risk. The exchange rate fluctuation that occurs prior to transaction settlement is the risk. Essentially, transaction risk is caused by the interval between a transaction and its settlement. Forward contracts and options can be used to reduce transaction risk.

As an illustration, a Canadian business with operations in China wants to deposit CNY 600 in profit into its Canadian account. If the currency rate was 1 CAD for 6 CNY at the time of the transaction and it drops to 1 CAD for 7 CNY before settlement, the expected receipt would be CAD100 (CNY600/6) rather than CAD86 (CNY600/7).

2. Economic risk: The risk that an organization's market value will be impacted by inevitable exposure to exchange rate swings is known as economic risk, often referred to as forecast risk. Macroeconomic factors like geopolitical instability and/or governmental rules frequently result in this kind of risk.

For instance, local furniture importers could pose a financial risk to a Canadian furniture company that sells locally, particularly if the Canadian dollar unexpectedly gains strength.

3. Translation risk: The risk posed by a firm with a local headquarters that conducts business in a foreign country but reports its financial performance in that country's currency is known as translation risk, also known as translation exposure. When a corporation keeps a larger percentage of its assets, liabilities, or stock in a foreign currency, the risk of translation is higher.

Translation risk arises, for instance, when a parent firm that reports in Canadian dollars manages a Chinese subsidiary and converts the latter's financial performance, which is reported in Chinese yuan, into Canadian dollars.

Examples of Foreign Exchange Risk:

Question 1: Recently, Company A, based in Canada, and Company B, based in Europe, entered into a deal for Company A to buy 10 cutting-edge pieces of machinery.

The cost each piece of equipment is €10,000, and the euro (€) and Canadian dollar (\$) exchange rates are 1:1. Company A, based in Canada, recently entered into an agreement to purchase 10 advanced pieces of machinery from Company B, which is based in Europe. The price per machinery is €10,000, and the exchange rate between the euro (€) and the Canadian dollar (\$) is 1:1. A week later, when Company A commits to purchasing the 10 pieces of machinery, the exchange rate between the euro and Canadian dollar changes to 1:1.2. Is it an example of transaction risk, economic risk, or translation risk?

Answer: The above is an example of transaction risk, as the time delay between transaction and settlement caused Company A to need to pay more, in Canadian dollars, for the pieces of machinery.

Question 2: Company A, based in Canada, reports its financial statements in Canadian dollars but conducts business in U.S. dollars. In other words, the company makes financial transactions in United States dollars but reports in Canadian dollars. The exchange rate between the Canadian dollar and the US dollar was 1:1 when the company reported its Q1 financial results. However, it is now 1:1.2 when the company reported its Q2 financial results. Is it an example of transaction risk, economic risk, or translation risk?

Answer: The above is an example of translation risk. The company's financial performance from Q1 to Q2 is negatively impacted due to the translation from the U.S. dollar to the Canadian dollar.

3.8 Foreign Exchange Trading:

Currency trading may be challenging and risky. There are various levels of regulation in the interbank market, and forex instruments are not standardized. Forex trading is mostly uncontrolled in various regions of the world. Banks from all across the world trade with one another in the interbank market. In order to keep themselves as safe as possible, the banks have internal procedures in place to identify and accept sovereign risk as well as credit risk. This kind of regulation is implemented by the industry for the benefit of each participating bank. The market-pricing process is based on supply and demand because each of the participating institutions creates offers and bids for a specific currency. Rogue traders find it challenging to affect the value of a currency because of the system's massive transaction flows. Investors that have access to interbank dealing can benefit from this system's contribution to market transparency.

The majority of small retail forex traders work with very unimportant, largely unregulated forex brokers/dealers, who occasionally requote rates and occasionally even trade against their own clients. Government and business regulation may exist depending on where the dealer is located, although these protections differ from country to country. The majority of retail investors should take the time to research a forex dealer to determine if it is governed in a nation with loose regulations and oversight, such as the United States or the United Kingdom (where dealers are subject to more regulation), or in another jurisdiction. Finding out what kind of account protections are offered in the event of a market crisis or the insolvency of a dealer is also a smart idea.

Trading forex is similar to equity trading. Here are some steps on the forex trading journey:

1. Learn about forex: Despite not being difficult, forex trading is a unique project that calls for specific understanding. For instance, the drivers for currency price movement are different from those for equity markets, and the leverage ratio for FX trades is higher than for shares. The fundamentals of forex trading are covered in a number of online courses for beginners.

2. Set up a brokerage account: You will need a forex trading account at a brokerage to get started with forex trading. Commissions are not assessed by forex brokers. Instead, they profit on the differences in price between the purchasing and selling prices, or spreads (also known as pips). Setting up a micro forex trading account with minimum capital requirements is a smart option for novice traders. These accounts contain flexible trading restrictions that let brokers set trade minimums as low as 1,000 units of a given currency. A regular account lot is equivalent to 100,000 currency units for context's sake. You can find your trading style and increase your comfort level with forex trading with the aid of a tiny forex account.

3. Develop a trading strategy: Although timing and market prediction are not always achievable, having a trading plan will help you establish broad principles and a road map for trading. The reality of your circumstances and money serves as the foundation for a sound trading plan. It considers the amount of money you are willing to invest in trading and, consequently, the level of risk you can withstand without losing all of your investment. Keep in mind that forex trading typically occurs in a high-leverage setting. For those who are prepared to take a chance, it also offers greater rewards.

4. Always be on top of your numbers: Always review your positions at the end of the day once you start trading. A daily accounting of trades is already offered by the majority of trading software. Make sure you have enough money in your account to execute future trades and that there are no open positions that need to be filled.

5. Cultivate emotional equilibrium: Beginner forex trading is difficult since there are a lot of unknowns and emotional ups and downs. Should you have kept your position open a little bit longer to reap greater profits? How did you miss the news that your portfolio's overall value had decreased due to low gross domestic product (GDP) figures? Such unresolved issues can cause you to get confused if you let them consume your thoughts. Because of this, it's crucial to maintain emotional stability through wins and losses in your trading and to avoid getting carried away by your trading positions. Maintain discipline when it comes to closing out your investments.

Basic Forex Trading Strategies:

A long trade and a short trade are the two most fundamental types of forex transactions. In a long trade, the trader wagers that the value of the currency will rise in the future, which will allow them to make profit. A short trade is a wager that the price of the currency pair will drop in the future. To fine-tune their

approach to trading, traders can also use technical analysis-based trading methods like breakout and moving average.

Depending on the duration and numbers for trading, trading strategies can be categorized into four further types:

1. Positions in a scalp trade are held for only a few seconds or minutes at most, and the profit margins are capped at a certain number of pip values. Such deals are meant to be cumulative, which means that tiny profits made in each trade add up to a respectable sum at the end of the day or period of time. They are unable to tolerate high levels of volatility and depend on the predictability of price movements. As a result, traders sometimes limit their trades to the most liquid pairings and during the busiest trading periods of the day.
2. Day trades are short-term transactions in which open positions are held and closed out on the same day. A day trade can last for hours or minutes. To optimize their profits, day traders need to be proficient in technical analysis and familiar with key technical indicators. Day trades depend on small gains throughout the day, just like scalp trades do.
3. The trader in a swing trade keeps the position open for more than a day; they might keep it open for days or even weeks. Swing trades can be helpful during significant government announcements or periods of economic turmoil. Swing trades don't need to be constantly monitoring the markets throughout the day because they have a larger time frame. Swing traders should be able to assess economic and political changes and their effects on currency movement in addition to technical analysis.
4. In a position deal, the trader keeps the currency for a long time—months or even years—before selling it. Given that it offers a rational foundation for the trade, this kind of transaction necessitates greater proficiency in basic analysis.

3.9 Forex Terminologies:

Forex account: A forex account is used to make currency trades. Depending on the lot size, there can be three types of forex accounts:

- i) **Micro forex accounts:** Accounts that allow you to trade up to \$1,000 worth of currencies in one lot.
- ii) **Mini forex accounts:** Accounts that allow you to trade up to \$10,000 worth of currencies in one lot.
- iii) **Standard forex accounts:** Accounts that allow you to trade up to \$100,000 worth of currencies in one lot.

Remember that the trading limit for each lot includes margin money used for leverage. This means that the broker can provide you with capital in a predetermined ratio. For example, they may put up \$100 for every \$1 that you put up for trading, meaning that you will only need to use \$10 from your own funds to trade currencies worth \$1,000.

Bid and Ask: A two-way price quotation that represents the best possible price at which a security can be sold and bought at a specific moment is referred to as "bid and ask" (also known as "bid and offer"). A buyer's maximum price that they are willing to pay for a share of stock or other security is represented by the bid price. The least amount a seller will accept for the identical security is represented by the ask price. When a seller is prepared to sell for the highest price or when a buyer is prepared to accept the best offer on the market, a trade or transaction happens. The difference between bid and ask prices, or the spread, is a key indicator of the liquidity of the asset. In general, the smaller the spread, the better the

liquidity. The ask price is generally greater than the bid price. While bid prices are generally lower than ask prices, in instances when demand is great, bid prices can be higher than ask prices.

Bear market: A bear market is one where currency prices are falling. Bear markets, which denote a downward tendency in the market, are the outcome of poor economic fundamentals or disastrous occurrences like a financial crisis or a natural disaster.

Bull market: In a bull market, all currencies' prices are rising. Bull markets, which denote a market upward tendency, are brought on by news that is positive for the world economy.

Contract for difference: With the use of a derivative known as a contract for difference (CFD), traders can speculate on changes in currency prices without actually holding the underlying asset. A trader betting on the future price of a currency pair will purchase CFDs for that pair, and a trader betting on the pair's future price will sell CFDs for that pair. Due to the use of leverage in forex trading, a CFD trade gone wrong can result in significant losses.

Leverage: Utilizing borrowed money to multiply returns is known as leverage. High leverages are a hallmark of the forex market, and traders frequently employ these leverages to strengthen their positions. For example: To wager against the EUR in a trade against the JPY, a trader might contribute only \$1,000 of their own funds and borrow \$9,000 from their broker. The trader stands to make large profits if the trade is successful because they have only used a little amount of their own money. On the other hand, a high-leverage environment increases downside risks and can bring about substantial losses. If the trade swings the other way in the previous illustration, the trader's losses will increase.

Lot size: Lots are the standard unit of currency trading. The regular, mini, micro, and nano lot sizes are the four most prevalent ones. The money is sold in lots of 100,000 units as standard. Micro lot sizes are made up of 1,000 units, while mini lot sizes are 10,000 units. Some brokers also provide traders with nano lot sizes of currencies, which are worth 100 units of the currency. The entire trade's gains or losses are significantly influenced by the lot size selection. The earnings (or losses), on the other hand, increase with the size of the lot.

Margin: The funds set aside in an account for a currency exchange are known as margin. Margin money enables the trader to reassure the broker that they will remain solvent and able to pay their debts even if the trade does not go as planned. Over time, the balances of the trader and the customer determine how much margin is required. For trades on currency markets, margin is combined with leverage (described above).

Pip: A pip stands for "price interest point" or "percentage in point." It is the smallest four-decimal place price movement ever made in currency markets. 0.0001 is the same as one pip. One cent is equal to 100 pip, and one dollar is equal to 10,000 pip. The typical lot size that a broker offers can affect the pip value. Each pip in a \$100,000 standard lot will be worth \$10. Small price changes, measured in pip increments, can have a disproportionately large impact on a deal because currency markets employ substantial leverage for trading.

Spread: The difference between the bid and ask price of a currency is known as spread. Instead of charging commissions, forex traders profit on spreads. The spread's size is controlled by a variety of factors. The magnitude of your trade, the demand for the currency, and its volatility are a few of them.

Sniping and hunting: Sniping and hunting is the buying and selling of currencies at or around pre-set locations in an effort to maximize earnings. The only way to catch brokers that engage in this technique is to network with other traders and look for trends of such conduct.

3.10 The Cessation of USD LIBOR:

Regulators in the US and the UK recently reminded banks and other businesses they oversee in stern language that the London interbank offered rate for the US dollar (USD LIBOR) may soon be abolished or deemed unrepresentative. After December 31, 2021, all non-USD LIBOR tenors and the one-week and two-month USD LIBOR will stop being published. After June 30, 2023, the three-month, six-month, and one-year USD LIBOR will no longer be published.

Regulators issued warnings to firms not to take on new LIBOR exposure except in extremely specific circumstances in advance of the benchmark's discontinuation. These declarations make it abundantly clear that entities and other market participants should already be well away from the benchmark if they have engaged in (or continue to engage in) loans, floating-rate notes, securitizations, supplier contracts, and/or other financial instruments that reference USD LIBOR. This requirement has recently been emphasized by actions taken by other regulators, regulator-sponsored organizations like the Alternative Reference Rates Committee (ARRC), and trade organizations.

Businesses who have not made proper preparations for the move away from LIBOR run the danger of having negative effects on themselves, their borrowers, investors, customers, and counterparties.

Federal prudential regulators in the United States, such as the Federal Reserve Board of Governors, the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC), released supervisory guidance on November 30, 2020, urging banks to stop issuing new USD LIBOR by the end of 2021. The U.S. prudential regulators reiterated their December 31, 2021, cutoff date for new USD LIBOR issuances in a follow-up joint statement they released on October 20, 2021. They added that there would be safety and soundness problems if new USD LIBOR contracts, including derivatives, were entered into after that date.

The most recent joint statement made it clear that even if contracts that draw on an already-existing, legally-enforceable agreement—such as a committed credit facility—create more LIBOR exposure or lengthen the term of an existing LIBOR contract, prudential regulators do not view those contracts as new issuances. The prudential authorities' expectation that new or revised LIBOR contracts should include strong and clearly specified fallbacks was also included in the joint statement, along with suggestions for businesses evaluating the propriety of alternative reference rates used in place of LIBOR.

The United Kingdom Financial Conduct Authority (UK FCA) published a number of documents on November 16, 2021, establishing the following:

- Institutions under the UK FCA's supervision will not be permitted to use certain LIBORs from January 1, 2022, including sterling and USD LIBORs and
- With the exception of cleared derivatives, the UK FCA will permit the interim use of "synthetic" sterling and yen LIBOR rates in all legacy contracts based on those rates that are still in effect as of December 31, 2022.

If a significant number of contracts referencing USD LIBOR in the one-month, three-month, and six-month tenors are still outstanding after June 30, 2023, the UK FCA might consider allowing similar legacy use of a synthetic form of USD LIBOR. However, this has not yet been determined.

The UK FCA's and the U.S. prudential regulators' prohibition on the use of LIBOR after December 31, 2021, is subject to some exceptions. One of these is around market-making in support of client activity related to USD LIBOR transactions executed before January 1, 2022. Another is for transactions that reduce or hedge USD LIBOR exposure on contracts entered into before January 1, 2022.

The "risk-free rates" based on historical data averaged over time are the LIBOR fallbacks that regulators often prefer. This is the Secured Overnight Financing Rate for the US dollar (SOFR). The risk of rate manipulation that LIBOR encountered, which resulted in bank criminal settlements in 2012, is intended to be eliminated by these risk-free rates. Given the decline in interbank lending that has served as LIBOR's foundation since the financial crisis, they also more accurately represent genuine market rates.

But since no one alternative rate is required, a wide range of possibilities have been devised to act as standards for unsecured bank lending. In addition to current unsecured lending rates like the prime rate, these include the American Financial Exchange's American Interbank Offer Rate (AMERIBOR), Bloomberg's Short-term Bank Yield Index (BSBY), and the ICE Benchmark Administration's ICE Bank Yield Index (BYI).

Despite this, authorities strongly favor SOFR, especially when it comes to using it as the backup rate for open LIBOR holdings, or so-called "legacy contracts." To ensure that the transition is finished by the end of this month, regulators have established milestones for the organizations under their control. They have stated that regulatory enforcement may result from improper transition process participation.

The Commodity Futures Trading Commission (CFTC), through its Market Rate Advisory Committee (MRAC), has taken steps to encourage the markets to switch from LIBOR to SOFR in light of the development of LIBOR substitutes and the slower-than-anticipated pace of LIBOR's demise.

The MRAC approved the "SOFR First" market best practice on July 13, 2021. The goal of SOFR First is to assist market players in reducing their reliance on USD LIBOR.

Entities are advised by SOFR First to finish a four-phase process by December 31. The first and second phases, which dealt with brokers substituting currency swaps that reference LIBOR and linear swaps for swaps that reference SOFR, were finished on July 26 and September 21, respectively. On November 8, 2021, the third phase, which dealt with replacing several non-linear derivatives, such as caps, collars, and floors, was finished. It is still uncertain whether the final SOFR First phase will apply to exchange-traded derivatives (such futures) that use LIBOR.

3.11 Secured Overnight Financing Rate (SOFR):

Despite the barrage of emails, articles, and media reports warning of this shift, many treasury teams are still far from being ready for the end of LIBOR. By now, every corporate treasurer ought to be aware that the demise of the London Interbank Offered Rate (LIBOR) affects more than just banks and investment companies.

The changeover will have an effect on any business that has issued floating-rate debt based on LIBOR, used swaps or futures contracts to manage risk, or obtained loans with LIBOR-based interest rates. For the remainder of this year, treasurers, CFOs, CEOs, and boards should place a high priority on navigating the path to a new interest rate benchmark.

When evaluating the financial success of a business, treasurers frequently need to look both forward and backward. It makes sense to adopt the same strategy when learning the specifics of how the LIBOR transition will take place.

More than \$200 trillion worth of financial products are supported by LIBOR. In the wake of the world financial crisis, the departure from the benchmark started. The Financial Conduct Authority (FCA) of the United Kingdom (UK) officially decided in 2017 that by the end of 2021, LIBOR would no longer be a representative benchmark rate and that all LIBOR settings would no longer be given by its

administrators. Most of the transition has gone according to plan, with the exception of a few U.S. dollar (USD)-denominated rates scheduled to be completely phased out by the end of this year.

The Alternative Reference Rate Committee (ARRC), a group of market participants gathered by the Federal Reserve and the New York Fed to help assure a successful transition from USD LIBOR to a more reliable reference rate, is leading the LIBOR transition in the United States. The Secured Overnight Financing Rate (SOFR) was suggested as an alternative by the ARRC.

The SOFR is a transaction-based rate that assesses the cost of overnight borrowing on transactions secured by US Treasury securities. A forward-term component (as in one-month, three-month, and six-month LIBOR) and a dynamic credit spread are two essential elements of LIBOR that SOFR lacks because it is purely based on secured overnight rates. The adjustment is challenging because of these disparities.

For various kinds of financial products, the ARRC provided best-practice suggestions for completing the switch from LIBOR to SOFR in May 2020. The ARRC advises against using LIBOR going forward for any originations or securitizations of commercial loans (specifically, for any originating after June 30, 2021).

Although some businesses and banks are ready, many are still behind. Some people are also voicing their concerns with the conversion, particularly as a "term SOFR" did not materialize within the first anticipated time frame. The problem is that the overnight rate needs to be converted to a term counterpart before banks and their corporate clients can use SOFR as the benchmark index for a loan.

Currently, banks and treasurers have two options for solving this issue. The "in arrears" technique, which bases the interest rate for each day of the contract on the compounded interest of the preceding days within the contract period, is the first way for computing SOFR. The obvious problem with this strategy is that borrowers who use the "in arrears" technique don't know their true interest rate until the conclusion of the interest period, as opposed to knowing it before the interest-accruing period starts. The "in advance" method, which determines SOFR by compounding a historical rate prior to the contract's interest period, is the second way.

These alternatives for determining the SOFR standard are a significant factor in what has been worrying corporate treasurers about the LIBOR transition, according to anecdotal comments in my conversations with Bloomberg's corporate clients. The ARRC has recommended using the "in arrears" method for bilateral and syndicated loans and the "in advance" method for intercompany financing since mid-2020. However, this strategy produces a contradiction that treasurers must resolve. For treasurers accustomed to the clarity LIBOR has offered for more than 40 years, it also makes it challenging to predict borrowing prices with a high degree of certainty in advance.

Many treasurers are also concerned about the lack of clarity on how mechanically SOFR will function in their systems. They want to know: How expensive and time-consuming will the deployment of the different SOFR versions be? Will all of our systems need to be redesigned? How much retraining will be necessary for our staff?

Three Ways to Assuage Treasurers' Transitional Fears:

One can scarcely blame corporate treasury teams for feeling bewildered as the change approaches its endgame with all these complications. We advise treasurers to undertake the below three steps to make the procedure simpler:

1. Examine all of your LIBOR exposures—along with any supporting documentation:

To ensure a smooth LIBOR transfer, it is important to learn as much as you can about your company's exposure. Now is the moment to begin this procedure, if you haven't already. Exposures may occur in a wide variety of expected—and unexpected—places, including bonds, swaps, and mortgages.

Treasury teams must examine the supporting documentation for these financial instruments, which is also crucial. Go through the indentures looking for bonds. Examine the small print of the contract carefully for swaps. There are several ways that each instrument includes LIBOR, and some are simpler to adjust than others.

For instance, if you have an interest rate swap that is centrally cleared, the clearinghouse may unilaterally switch the benchmark rate from LIBOR to SOFR or another replacement. However, altering a floating-rate loan or an over-the-counter derivative may need the consent of the loan's counterparty or numerous bondholders.

Pay close attention to the "fallback language" in the underlying securities contract during this procedure, which describes how rates and payments will be determined if LIBOR stops being published. Some contracts, particularly those not written in accordance with standards established by organizations like the ISDA or the LSTA, are ambiguous regarding how this operates or contain no provisions at all. By manually searching through the texts, you can find this language. Alternatively, you might save time by looking through a centralized database of security fallback clauses.

2. Choose the cost of your go-forward financing:

The idea that treasurers have no other options is one of the most common ones. Although authorities have suggested SOFR as a LIBOR successor, they have also stated that market players are allowed to adopt substitutes as long as they are based on reliable transaction data and follow international norms such as the IOSCO's Principles for Financial Benchmarks.

Financial services companies have been developing potential SOFR substitutes that incorporate data from similar financial instruments that banks use to fund their operations, such as commercial paper, certificates of deposit, bank deposits, and short-term corporate bank bonds, while preserving LIBOR's positive characteristics, such as the term structure and credit risk components.

Bloomberg's Short-Term Bank Yield Index (BSBY), which aims to gauge the typical yields at which major banks obtain unsecured wholesale US borrowing, is one of these options. The dynamic BSBY index reflects the marginal funding cost for banks across five different tenors and includes a credit-sensitive component (overnight, one month, three months, six months, and 12 months).

Treasurers should assess the costs of the alternatives, taking into account the spreads associated with each rate, before deciding on a LIBOR replacement. The benchmark a company uses should be effective to execute and simple to communicate to the management team. It should also match the profile of the organization's LIBOR exposures.

3. Keep in constant communication with one another:

It's probable that treasurers will be expected to lead the LIBOR transition for their organization, but it's crucial to remember that a variety of internal and external stakeholders will be essential to the transition's success.

The internal stakeholders of the organization must first and foremost be in agreement. This necessitates close collaboration with the senior management group, which includes the CEO, as well as with the compliance, legal, IT, operations, and investor relations divisions. Additionally, the marketing and customer/client teams should be included to the list of internal stakeholders who need to be involved if any of the company's products depend on LIBOR, such as mortgage loans.

Turn your focus to external stakeholders once you have created an inclusive environment within the organization. Your company's financial counterparties, such as banks, financial advisors, and exchanges, will be easily accessible to you as treasurer. Make sure that everyone is informed of your intentions and giving you the assistance you require.

Additionally, be certain to fully disclose to your investors any risks the organization may experience as a result of the shift. Additionally, inform clients and consumers of any changes that may have an impact on them.

The year 2021 was one of economic and financial market revolution. However, treasurers' 2021 business problems cannot simply include the LIBOR shift as another concern. If not handled properly, moving to a new benchmark could pose massive risks for your business. But if done right, it could help you pivot to 2022 on confident financial footing.

3.12 Case Study 1:

Transaction Volume Analysis in BD Foreign Exchange Market from 2015 to September 2020: Foreign exchange transactions include all conversions of currencies which may be done by a traveler on an airport kiosk or billion-dollar payments made by financial institutions and governments. The growth in globalization has led to a massive increase in a number of foreign exchange transactions in the recent years.

The following types of foreign exchange transactions are happened in Bangladeshi FX markets

Spot transactions: This method of transaction is the fastest way to exchange currencies. Spot transaction refers to the exchange or settlement of the currencies by the buyer and seller within two days of the deal without a signed contract. The Spot Exchange Rate is the prevailing exchange rate in the market.

Forward transactions: Forward transactions are future transactions when the buyer and seller enter into an agreement of purchase and sale of currency after 90 days. The agreement is framed on the basis of a fixed exchange rate for a definite date in the future. The rate at which the deal is fixed is termed as Forward Exchange Rate.

Swap transactions: A simultaneous lending and borrowing of two different currencies between two investors are referred to as swap transaction. One investor borrows a currency and repays in the form of a second currency to the second investor. Swap transactions are done to pay off obligations without suffering a foreign exchange risk.

Yearly total volume from 2015 to September 2020 in BD FX market are mentioned below. Only USD transactions are considered in this analysis.

Year	Inter-Bank USD/BDT Spot	Inter-Bank USD/BDT Swap	Inter-Bank USD/BDT Forward	BB USD/BDT Spot
2015	7,013.39	11,274.83	844.90	3,259.00
2016	10,430.95	11,336.80	1,252.00	3,513.10
2017	12,009.62	10,622.70	879.10	694.00
2018	16,952.23	12,317.75	1,379.15	2,088.00
2019	12,097.30	11,367.10	558.09	1,408.60
Sep-20	14,762.47	15,007.49	260.10	3,615.00
Average	2,430.90	1,116.56	307.86	1,032.75

Table: yearly FX transaction volume in BD FX Market in USD Million. Source: BAFEDA

Central Bank USD/BDT spot transactions define both buy and sell transaction with counter-parties.

Yearly average transaction volumes are USD 2.43 trillion for inter-bank USD/BDT spot transaction, USD 1.11 trillion for Inter-Bank USD/BDT Swap, USD 0.31 trillion for Inter-Bank USD/BDT Forward and USD 1.03 trillion for BB (Central Bank) USD/BDT Spot.

Case Study 2:

Impact of Budget Deficit FY 2022-23 on Money Market and Debt Market of Bangladesh:

From June 20 to August 21, the Central bank bought total USD 8.06 billion from the interbank markets. As a result BDT 69,342 Crore BDT was injected into the money market. Again, From August 21 to June 22, the Central bank sold USD 7.34 billion which reduced BDT 66,066 crore taka from the interbank. The central bank probably uses sterilized intervention to increase the devolvement over the Central bank in Treasury bill-bond auctions keeping the money supply unchanged. Then, the upcoming monetary policy will fix that how much M2 supply should maintain to curb inflation and the amount of devolvement the central bank can do over itself.

3.13 Practice Questions:

1. Write short notes on the following topics:
 - a. NFCD/RFCD Rates
 - b. Direct Quotation
 - c. Indirect Quotation
 - d. Bid-Ask Rate
 - e. SOFR
 - f. LIBOR Rate
2. Define exchange rate? What are the reasons for exchange rate fluctuations?
3. Describe the types of foreign exchange rates with examples.
4. Explain the advantages and disadvantages of forex markets.
5. What are the steps involved in forex trading? Describe briefly.
6. Explain the basic forex trading strategies.
7. What are the major foreign exchange risks? Explain with examples.
8. Describe forward and futures market with examples.

Module D: Asset Liability Management

4.1 Liquidity Management: In order to ensure that a company or bank can access cash when and where it is needed, a set of procedures, strategies, and auxiliary mechanisms and instruments are referred to as liquidity management. Understanding the need for cash, creating criteria for investments that are appropriate, choosing the correct investment options, and improving the effectiveness and transparency of the cash position are all parts of liquidity management. Every treasury and finance department is built on the foundation of liquidity management. As has been shown so frequently in the past, those who ignore a firm's cash flow do so at their peril. Liquidity management is essentially the basic idea of having access to readily available cash to finance short-term investments, pay off debts, and make purchases of goods and services.

The ability of finance and treasury managers to analyze the balance sheet of the company and turn money that is invested in longer-term projects into cash that the company can use in its day-to-day operations is essential for liquidity planning. Managers will keep an eye on the liquidity ratio, which compares a company's most liquid assets—those that can be rapidly and readily turned into cash—with its short-term liabilities, or commitments that are due in the near future.

The importance of liquidity management cannot be understated. Liquidity risk can cause a number of issues and drag a company into poor health, despite treasurers and finance department managers' ongoing efforts to minimize it. The company might be forced to sell illiquid assets quickly, which could result in a situation where it is forced to accept less than the fair value of those assets, should it find itself unable to meet short-term cash obligations or cash equivalent obligations as set out in contractual terms with depositors and borrowers. The secret to effective liquidity risk management is avoiding such a circumstance. Businesses all across the world use a range of various approaches to help reduce liquidity risks and support liquidity planning.

Tools of Liquidity Management:

Liquidity management, to put it simply, is the plan that any firm uses to maximize, optimize, and protect its liquidity. Full insight into spend, cash, liabilities, and financial resources, not simply the overall financial picture, is a sign of excellent liquidity management. Finance teams also need to see every transaction and cash flow, every rule that affects financial obligations, and every payment to every supplier in order to make the best judgments possible at the correct moment. In accordance with Basel III, BB has released separate guidance notes on LCR and NSFR. These ratios show the direction of ALM through measurement and management of liquidity. The liquidity gap and these parameters should be at the heart of managing and measuring liquidity.

4.2 Liquidity Coverage Ratio (LCR):

LCR or Liquidity Coverage Ratio is a new liquidity standard introduced by the BCBS. This standard is built on the methodologies of traditional liquidity coverage ratio used by banks to assess exposure to contingent liquidity events. The minimum acceptable value of this ratio is 100 percent.

The calculation of the LCR requires three important quantities to be defined:

- A. Total value of stock of high quality liquid assets
- B. Total cash outflows, next 30 days (stressed scenario)

C. Total cash inflows, next 30 days (stressed scenario)

LCR requirement is met if A is greater than B – C; i.e. if high quality liquid assets exceed net cash outflows under the stressed scenario. (To make the metric even more conservative, C is capped at 75 percent of B.) Thus the equation of LCR is:

$$\text{LCR} = \frac{\text{Stock of high quality liquid assets}}{\text{Total net cash outflows over the next 30 calendar days}} \geq 100\%$$

Here, Stock of high quality assets = A and

Total net cash outflow over the next 30 calendar days = B – C, where C is maximum 75% of B.

4.3 Net Stable Funding Ratio (NSFR):

NSFR or Net Stable Funding Ratio is another new standard introduced by the BCBS. The NSFR aims to limit over-reliance on short-term wholesale funding during times of abundant market liquidity and encourage better assessment of liquidity risk across all on- and off-balance sheet items. The minimum acceptable value of this ratio is 100 percent, indicating that available stable funding (ASF) should be at least equal to required stable funding (RSF).

The calculation of the NSFR requires two quantities to be defined:

A. available stable funding (ASF) and

B. required stable funding (RSF).

NSFR is met if ASF exceeds RSF, i.e. if $\text{ASF}/\text{RSF} > 1$ or 100%.

The Equation of NSFR is as follows:

$$\text{NSFR} = \frac{\text{Available amount of stable funding (ASF)}}{\text{Required amount of stable funding (RSF)}} > 100\%$$

4.4 Leverage Ratio:

A minimum Tier 1 leverage ratio of 3% is being prescribed by BB both at solo and consolidated level. Banks have to maintain leverage ratio on quarterly basis. The ratio is defined as-

$$\text{Leverage Ratio} = \frac{\text{Tier 1 Capital}^*}{\text{Total Exposure}^*}$$

[*after related deductions]

4.5 Advance to Deposit Ratio (ADR):

Although commonly known as Advance to Deposit Ratio, actually the ratio is determined by putting Advance in numerator and Liabilities (excluding capital) in denominator. The ratio should be fixed in such a manner so that there will be no unnecessary liquidity pressure on the bank in any point of time. Considering the regulatory liquidity requirements (CRR and SLR), the maximum value of the ratio shall

be derived using the formula $[100\% - CRR^* - SLR^*]$. Depending upon the capital base, liquidity condition, NPL status etc. and above all the maintenance of LCR & NSFR, the board may decide adding highest 4.5% and 2%** (for conventional banks and Shariah based banks respectively) with the result of the above formula to fix a suitable AD ratio.

The formula for calculating AD ratio is as follows-

$ADR = \frac{\text{Total Loans and Advances or Investment (for Shariah based banks)}}{\text{(Total Time and Demand Liabilities + Interbank deposit surplus*)}}$

*Interbank deposit surplus = Deposit from other banks - Deposit with other banks (if -ve then 0)

Bank should follow the instruction of BB regarding deduction of some items to calculate total loans and advances or Investment while calculating ADR.

ADR for Islamic banking operation of conventional banks:

Conventional banks having Islamic banking business have to calculate and maintain ADR separately for conventional banking and Islamic banking operation. ADR for Islamic banking operation is same as that of Islamic Shariah based banks.

It is important to adjust AD ratio limit with changing condition of banks' assets and liabilities. The Management of the bank should inform the board regarding AD ratio in every meeting so that the board may take quick decision necessary to adjust the ratio.

[Note:

1. ** depends on SLR fixed by BB from time to time
2. * CRR = bi-weekly rate as decided by BB from time to time.
3. * SLR = as decided by BB from time to time.]

4.6 Wholesale Borrowing Guidelines (WBG):

The aim of wholesale borrowing (WB) guidelines is to set a limit for borrowed fund. The limit should be set in absolute amount based on bank's eligible capital (Tier-1 plus Tier-2) capital and considering liquidity needs due to maturity mismatch, borrowing capacity of the bank and historic market liquidity.

WB covers call borrowing, Short Notice Deposit from banks and financial institutions, placement received with maturity less than 12 months, commercial papers/similar instruments and overdrawn Nostro-accounts. The WB Limit should be capped at 80% (for Non PD banks) and 100% (for PD banks) of bank's eligible capital on fortnightly average basis with maximum two deviations (not more than 90% and 110% of the eligible capital for Non PD and PD banks respectively) in a particular fortnight. The eligible capital determined under Basel III for any quarter will be applicable as eligible capital until it is determined for the next quarter.

The above limit shall be considered as an aggregate limit for banks having dual businesses (i.e. both conventional and Islamic banking operation).

4.7 Structural Liquidity Profile (SLP):

The structural liquidity profile of a bank provides information regarding maturity transformation of assets and liabilities in a simple manner. The negative liquidity GAP (if exist), derived by considering assets and

liabilities both in local and foreign currencies, may be taken as a preliminary signal for the need of maturity adjustment of assets and liabilities in different time buckets. The Maximum Cumulative Outflow ratio may be considered as an important benchmark in this regard.

Maximum Cumulative Outflow (MCO):

MCO reflects the maximum cumulative outflow against total assets in a maturity bucket. MCO upto one month bucket should not be greater than the sum of daily minimum CRR plus SLR. For example, at the present rate of CRR and SLR, the MCO should be 16.50% (3.50% CRR+13.00% SLR) for conventional banks. The Shariah based banks, due to higher ADR and Short nature of their investment are also allowed MCO at the same level. MCO in the other maturity buckets should be prudently fixed by the BODs (ALCO in case of foreign banks) depending on bank's business strategy. The board should take utmost care in setting these ratios as they have significant impact on bank's business strategy.

The formula for determining maximum cumulative outflow in one month bucket is-

$$MCO = \frac{\text{Total outflow upto one month} + \text{Total OBS upto one month}}{\text{Total inflows} + \text{Net nostro account balance} + \text{Available foreign currency balance with BB}}$$

Conventional banks having islamic banking operation should prepare combined SLP and MCO for better understanding of the overall position of the bank.

4.8 Liquidity Contingency Plan / Contingency Funding Plan (CFP):

A contingency funding plan needs to be approved by the BODs (ALCO in case of foreign banks). A contingency funding plan needs to be prepared keeping in mind that enough liquidity is available to meet the funding requirements in a liquidity crisis situation.

4.8.1 Essential characteristics of a CFP:

An acceptable CFP should have some essential characteristics:

- The CFP should identify financial resources (source of cash) for contingent demands and evaluate their sufficiency. All backup facilities should be listed, along with usage guidelines and potential scenarios where the bank might use them. In order to make sure that there are no unforeseen obstacles or difficulties in the event that the bank needs to use its contingency lines, management should periodically test all of the sources of its contingency financing strategy. Management needs to be aware of the numerous restrictions, like notification requirements, that can limit access to alternative funding sources.
- The CFP should distinguish between bank-specific and general market liquidity situations, and have appropriate responses to each situation.
- The CFP should define responsibilities and decision-making authority so that all personnel understand their role during a problem situation.
- The CFP should identify the sequence that the bank will mobilize and commit key sources of funds for contingent needs. The degree of uncertainty as to the magnitude, timing, and availability of recourses may call for different priorities in different situations.
- The CFP should address implementation issues such as procedures the bank should use to obtain emergency funds or release funds from one use to transfer to another. It must ensure that there are no constraints, such as blanket liens on all collateral, which may limit availability of other liquidity sources.

- The CFP should identify other actions necessary in the event of an unexpected contingency.
- The CFP should assess the potential for funding erosion (magnitude and rate of outflow) by source of funds under different scenarios.
- The CFP should assess the potential liquidity risk posed by other activities, such as asset sales and securitization programs.

The contingency funding plan needs to be prepared by the Treasury Department. The Plan needs to be reviewed/ updated by ALCO and approved by the BODs (ALCO for foreign banks) of the bank at least annually or more frequently.

4.8.2 Elements of a typical CFP:

Every bank ought to have a current contingency finance strategy. The strategy should include steps to guarantee that the bank can react to a crisis or particular issue in the local market. The contingency funding plan outlines steps that should be followed to handle a liquidity crisis as well as the trigger events that could result in one. A typical CFP includes the following elements:

1. Trigger Events:

Trigger events could include breach in liquidity guidelines/ ratios for certain consecutive reporting dates, not being able to meet stress cash flows, unsubstantiated rumors, difficulty in either capital or funding, market-wise stress, etc. as appropriate.

2. Contingency Management Team (CMT):

Bank should have a specific contingency management team consisting of ALCO members. The MD/CEO may include any other relevant personnel as deemed appropriate.

3. Purpose of the Contingency Management team:

The purpose of the CMT is to investigate cause and magnitude of the crisis, assess steps to prevent occurrence/ escalation, understand expected duration of the crisis, assess market sentiment, and decide on remedial action to mitigate effects of the crisis.

4. Details of Action Plan:

This would include information and sources of information/ reports, review of funding sources and liabilities, plan for asset disposal/ liquidation, plan for communication, liquidity management plan, etc. It is important to clearly specify the responsible persons for each of the action items identified. This will ensure that the tasks/ activities during a crisis situation are undertaken smoothly.

5. Critical Contact Information:

Contact numbers of critical internal persons as well as central bank/ interbank contacts need to be included in the Contingency Management Plan. This will ensure that in times of a crisis, the numbers should be handy.

6. Brief Summary of Regulations, and Contingency Liquidity Sources:

This will include information on CRR/ SLR and other regulatory liquidity requirements, liquidity facilities offered by central bank, and a quantification of the liquidity that may be assumed to be available from different sources.

Planning Liquidity in Times of Uncertainty:

The Association for Financial Professionals (AFP) and Invesco are sponsoring the 2022 AFP Liquidity Survey, which aims to evaluate existing and emerging trends in businesses' cash and short-term investment holdings, investment policies, and strategies in light of the present economic climate. The poll had close to 300 responses from treasury professionals.

Here is what they had to say in five key areas:

1. Allocation of Short-Term Investments:

We discovered that most firms today keep 55% of their short-term investments in bank deposits, which is a 3 percentage point increase from the previous year. Is it feasible that the coronavirus epidemic is to blame for this? Absolutely, as businesses have spent the last two years or more concentrating on liquidity planning.

In order for treasurers to navigate the uncertainties brought on by Covid, bank connections have been crucial. When interest rates reached zero in the spring of 2020 and businesses had to use their available liquidity, this process began. The Federal Reserve then started hiking interest rates earlier this year when the US inflation rate rose to relatively high levels, including two increases of 75 basis points (bps). The majority of investment options remained to have low yields, which made it difficult for businesses to abandon bank accounts.

Where do most firms place the majority of their short-term investment balances? In accordance with our poll, an average of 81 percent of respondents are allocating them to liquid and safe investment options such as bank deposits, money market funds (MMFs), and US Treasury securities. Since AFP started keeping track of the data, this is the biggest amount ever recorded. In fact, 93 percent of those who responded said that the organization's banking partners was the main factor in determining where to store deposits.

2. Setting up Portfolios in Advance of Expected Rate Increases:

For the first time since 2018, the Federal Reserve increased its target for the federal funds rate on March 16, 2022, as stated by the Federal Reserve: "... [the] implications for the U.S. economy are highly uncertain, but in the near term, the invasion and related events are likely to create upward pressure on inflation and weigh on economic activity." The Federal Reserve raised the federal funds rate by 0.75 percent in June and again in July, which is the greatest rate of increase since 1994. The Fed is anticipated to keep raising rates until inflation starts to decline.

How are organizations preparing for these anticipated rate increases? According to the AFP survey:

- 57% are managing the duration of their portfolios
- 34% are shortening the duration of their assets
- 19% are reviewing positive real yields among permitted investments
- 16% are diversifying investments/asset classes within their investment policy
- 15% are monitoring credit spreads to capture value within their investment policy
- 7% are considering inflation-protected securities and floating-rate notes

Anecdotal evidence suggests that treasurers will continue to maintain their bank deposits. However, at the same time, they are assessing their banking relationships to understand how their earnings credit rate and deposit rate will benefit from the increases in market rates.

3. Safety Is Number One:

Safety continues to be the most-valued short-term investment objective for 63 percent of organizations, which is 1 percentage point higher than last year. This is not at all surprising, given the uncertainty in the economy.

4. Growing Popularity of ESG Investments:

According to this year's poll, 25% of firms now take environmental, social, and corporate governance (ESG) factors into account when making investment decisions. That percentage was 17% the previous year. This 8 percentage point rise is primarily the result of treasurers moving from the "unsure" response category to the "yes" response category.

Why have treasury experts grown more convinced of the value of ESG investing? A growth in MMFs with an ESG focus could be one cause. These funds have been waiving their fees in an effort to encourage institutional investors.

The top-yielding ESG money market funds as of this writing are premier funds with a significant share of financial institutions in their portfolios across several asset classes. It's important to keep in mind that many MMFs have underlying holdings that meet the ESG criteria; as a result, even if their name hasn't changed to reflect the focus, they are now regarded as ESG-focused.

5. Preparing for the End of LIBOR:

The LIBOR will expire on June 30, 2023, which is just around the corner. How well-prepared are businesses? Only 26% of those surveyed claimed that their companies have preparations in place to get operating cash and investment portfolios ready for the deadline. This is significantly more than the 15% of respondents from the previous year who indicated that they were ready. Even so, it doesn't seem like finance experts are very concerned about LIBOR's departure. Instead, they are concerned with supporting the resilience of their organizations after COVID.

Most businesses are in a state of learning and discovery as LIBOR comes to an end. The Secured Overnight Financing Rate (SOFR) and new global reference rates in the investment landscape may be signs that more firms are getting ready for the transition as the deadline approaches.

4.9 ALCO:

The Asset and Liability Management Committee (ALCO) is responsible for balance sheet risk management. Managing the assets and liabilities to ensure maximum level of structural balance sheet stability and optimum profitability is an important responsibility of the ALCO.

4.9.1 Formation & Responsibilities of ALCO:

The CEO/Managing Director of the bank shall be the chairman of ALCO. Head of Treasury shall work as the member secretary of ALCO. The committee shall be constituted as follows:

- Chief Executive Officer / Managing Director
- Head of Retail banking and/or General banking
- Head of Treasury
- Head of Corporate Banking

- Head of Finance/Chief Financial Officer/Head of Central accounts / Head of FAD
- Head of SME/International Division/Commercial Customers
- Head of Risk Management Department (RMD)

Conventional banks having Islamic banking business shall include the Head of Islamic banking as a member of the ALCO committee. Banks having Off-shore Banking shall also include representative (as a member) from the Off-shore Banking Unit (OBU). The head of ALM desk should be a permanent invitee of the ALCO meeting. The Chairperson of ALCO may invite any other related person (maximum 2) in any meeting.

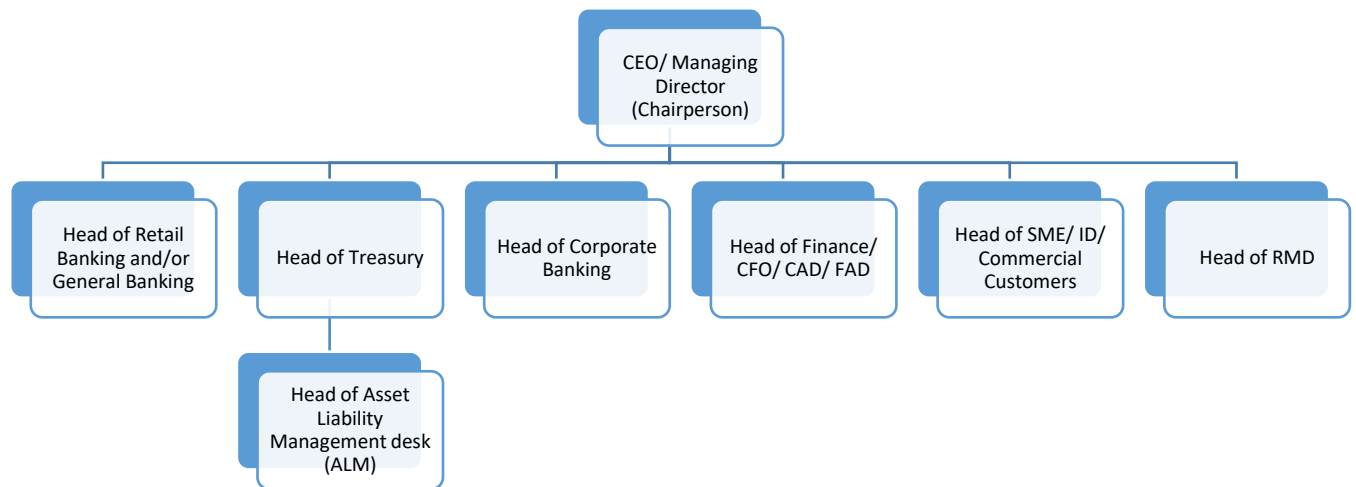


Fig. Organizational Structure of ALCO

The major responsibilities of ALCO are defined as follows:

- Ensure that bank’s measurement and reporting systems accurately convey the degrees of liquidity and market risk
- Monitor the structure and composition of bank’s assets and liabilities and identify balance sheet management issues that are leading to underperformance
- Decide on the major aspects of balance sheet structure, such as maturity and currency mix of assets and liabilities, mix of wholesale versus retail funding, deposit mix etc
- Decide on how to respond to significant, actual and expected increases and decreases in required funding
- Review maturity profile and mix of assets and liabilities
- Articulate interest rate view of the bank and decide on balance sheet strategy
- Approve and periodically review the transfer pricing policy of the bank
- Evaluate market risk involved in launching of new products
- Review deposit-pricing strategy, and
- Review contingency funding plan for the bank

Balance sheet risk management is not limited to collection of data only. ALCO is required to understand the implications of the numbers generated from analyses and formulate appropriate responses and strategies for the bank.

4.9.2 ALCO Meeting: The committee shall sit at least once in a month to discuss various aspects of ALM. The presence of all the members or his/her representative (in case of the absence of the member) is mandatory in every meeting.

The key agenda (includes islamic banking operation of conventional banks and also the operation of OBU) of ALCO meetings should be at least, but not limited to, the following:

(i) Review of actions taken in previous ALCO and the status of implementation

(ii) Review of monthly changes in various key parameters

(iii) Overall fund position including loanable funds, maintenance of CRR and SLR, LCR and NSFR position, Structural Liquidity Profile, etc.

(iv) Asset position:

-concentration

-quality

(v) Liability position:

-deposit mix

-market situation

-concentration

-cost of fund

(vi) Foreign exchange related asset and liability position:

-forward agreement

-net Foreign exchange liability

-OBU position: assets and liabilities

-SWAP position

-Sight L/C

(vii) Economic and Market Status and Outlook

(viii) Liquidity Risk related to the Balance Sheet

(ix) Review of the price / interest rate structure:

-interest rate risk in banking book

-interest rate risk in trading book

-equity price risk

(x) Off-balance sheet position:

- Unused portion of lines of credit (undrawn commitments)
- Acceptances
- Guarantees
- Maturity profile of other L/Cs

(xi) Capital Market Investment position: Solo and Consolidated basis.

(xii) Investment in associates

(xiii) Leverage Ratio

(xiv) Stress Test, VaR (Value at Risk) analysis, Gap Analysis and others with proper interpretation.

(xv) Actions to be taken by whom and by when

4.9.3 ALM Desk: Treasury Department unless otherwise stated, essentially means the "Treasury Front Office" and "Head of Treasury" refers the head of this department of a bank. The prime responsibility of Asset and liability Management (ALM) is on this Department, specifically its ALM desk.

The Treasury Department is solely responsible for maintaining the liquidity position of the bank. There should be a specific policy (approved by the BODs of local banks) requiring other departments to take necessary clearance (documented) from the Treasury Department regarding availability of fund before sanctioning of any new facility (above a minimum amount of funded and non-funded) to a customer. For other loan facilities (below the minimum amount mentioned before) clearance for the bulk amount (may be based on projection) is also necessary from the treasury department.

Key Roles and Responsibilities of the ALM Desk: The ALM desk is responsible for day to day management of the market risk and liquidity risk of the bank. The broad responsibilities of the ALM desk are as follows:

1. To oversee the growth and sustainability of assets and the liabilities.
2. To manage and oversee the overall activities of Money Market.
3. To manage liquidity and market risk of the bank.
4. To understand the market dynamics i.e. competition, potential target markets etc. for expansion of the business.
5. To Provide inputs regarding market views and to suggest proper balance sheet movement (expand or shrink) to cope with the changing situation in the market or in the economy.
6. To keep records of ALCO meetings, to monitor the implementation status of the action taken in ALCO meetings etc.

4.9.4 ALCO Paper: An ALCO paper, covering all the above issues must be presented in every meeting of ALCO. The Treasury Department will be responsible to present the paper incorporating all necessary information, analysis and suggestions from the related Departments including its own opinion, if necessary, on the related issues. A separate observation from RMD regarding market and liquidity risk

shall also be included in the ALCO paper. The decision taken against each issue should be carefully noted and preserved for a reasonable time (not less than 3 years).

Contents of the ALCO Paper: The following are the key elements that an ALCO paper should contain and need ALCO's oversight on.

1. **Confirmation of Minutes of last meeting:** This section contains formal confirmation of the last ALCO meeting minutes.
2. **Review of the action items of the previous meetings:** This section contains detailed discussion on the progress on the action item and review deadline if appropriate.
3. **Review of Economy and Markets:** This section may start with the review of key global economic developments. Specific reference to countries whose economies have direct bearing on Bangladesh's economy (exports, imports, remittances, etc.) is important. The section may go on with an update of the local economy and interbank market. On the economy items that may be included are: GDP growth, inflation, credit growth, govt. borrowing, export, import, remittance, FX Reserve and current account balance. On markets, items that may be included are: movement of interbank market liquidity, call money rates, term money rates, govt. securities yield. Also a comparison of interest rate offered by comparable banks can be important.
The idea of this section is to identify the key elements in the context of global and local economy and the impact they might/ would likely to have on the business of the bank in Bangladesh. ALCO uses this information for making decision regarding the bank's business.
4. **Review of Balance Sheet and Liquidity Limits:** This section presents the structural balance sheet limits and their utilization - AD ratio, Commitments, LCR, NSFR, Loan and Deposit Concentrations (if applicable), etc. It is important to observe the last few months' trends to get a better perspective. Items which are not at acceptable levels are reviewed further in details and corrective actions proposed. The section also presents the short term liquidity management limits and their utilization – Wholesale Borrowing Limits, VaR, etc. Observation of the last few months trend is important to get a better perspective.
5. **Review of the Status of Regulatory Compliance:** This section lists the various regulatory liquidity requirements (CRR, SLR, Capital Adequacy, etc.) and compliance with those.
6. **Top 10 Depositors List:** This section lists the top 10 depositors of the bank and their share of the total deposits. The data can be looked at currency wise, tenor-wise, and the share of each of the depositors as percentage of total deposits. The trend of the past few months will give important perspective. Maturity bucketing for each of the depositors (call, 1 week, 1 month, etc.) may be helpful. This helps the bank to have a greater visibility on where the deposit concentrations are coming from. It is important to track the behavior of these deposits and take measures so as to avoid any untoward liquidity issues.
7. **Top 10 Borrowers List:** This section lists the top 10 borrowers and looks using the same set of parameters as for the top 10 depositors.
8. **Capital Maintenance:** This section includes details and composition of the capital maintained by the bank in relation to the minimum capital requirement. This can be compared to future expected capital requirement (e.g. due to asset growth forecasted, dividend payout, etc). It is also important to look at the Return on Risk Weighted Assets of the bank – again the trend of the past few months give good perspective – so as to understand how efficiently the bank is deploying its capital.
9. **Details of Loans and Deposits Movement:** Segment-wise (retail, corporate, etc.), product-wise (current account, savings, SND, etc.) and currency wise (if of significance) AD ratio movements for the last few periods can be included in this section.

- 10. Loans and Deposit Projections:** It is important that monthly projections of loans and deposits for the year/ for the next 3-6 months are presented to ALCO by the respective businesses. The information is used by ALCO to understand future liquidity requirements and strategies accordingly. In this respect, it is also important to review the historical projection accuracy to understand the level of adjustments that can be qualitatively applied to the current projections. The projections should be given both for FCY and LCY as this is more meaningful. If deemed important, ALCO can also seek segment-wise projections (e.g. retail, corporate, etc.) in addition to total loans deposit projections from the respective department/division/business.
- 11. Trend of Lending Rates and Deposit Rates:** This section includes the trend of the lending and deposit rates. Product-wise, segment-wise, and currency-wise breakdown of the rates is important.

All the departments should be liable to provide necessary information, analysis and suggestions regarding the issues related with them within a stipulated time to the Treasury Department. The Treasury Department ensures that these are incorporated in the ALCO Paper.

4.10 Structure & Functions of Front Office, Mid Office & Back Office:

Treasury Department unless otherwise stated, essentially means the "Treasury Front Office" and "Head of Treasury" refers to the head of this department. At present the treasury functions are performed by three distinct office under separate supervision such as front office, back office and mid-office. Treasury Front Office, Back Office and Mid Office shall be established with separate reporting lines within the bank. Irrespective of the size, nature of business, all treasury functions require to have clear demarcation between dealing and settlement/support functions i.e. the "treasury" that would be involved only in dealing activities and the "treasury support unit" (commonly known as the treasury back-office) that would be responsible for all related support functions including settlement of all transactions. This is required for control reasons i.e. different persons/departments should be responsible for the dealing and the settlement, measurement, reporting, etc. In order to monitor and manage the organization's risks arising from treasury activities in a more detailed level, there shall be an additional unit named as the "treasury mid-office". Functions of these offices are as follows:

Functions of Treasury Front Office

- Statutory requirement management
- Optimization of risk return through specialization and management
- Funding of the Balance Sheet at optimum prices
- Proposing interest rate matrix to the ALCO
- Proposing various investment options to the ALCO
- Analyze various economic trends and propose Balance Sheet strategy to the ALCO
- Quotation of various foreign exchange and interest rates to customers
- Dealing in forex for position covering as well as for own account trading
- Various funding activities through various derivatives
- Provide structured or tailored treasury solutions to customer

- Remain vigilant for any arbitrage opportunities
- Marketing activities for future business growth
- Estimate daily P&L and work with reporting unit in resolving any differences
- Record/maintain all foreign exchange and money market positions and check for differences with system generated or back-office reports
- Sending dealing information to Back Office through deal slip and/or through automated system
- Performing money market activities
- Securities / fixed income trading

Functions of Treasury Mid Office:

- Limits monitoring and managing limit
- Adherence to various internal as well as regulatory policies
- Minimization of all risks
- Monitoring & management of various foreign exchange and money market positions
- Monitoring & management of various cash flows and cash positions
- Rate appropriateness function for all deals done
- Proposals/ renewals for various internal limits
- Monitor for trader's adherence to various internal and regulatory limits
- Monitor for trader's adherence to various counterparty limits
- Monitor and manage all balance sheet gaps
- Report any occurrence of crossing limit
- Various internal and regulatory reporting

Functions of Treasury Back Office:

- Input, verification and settlement of deals
- Receiving and sending of deal confirmation certificates
- Preparation of currency positions (of previous day-end) and report to traders prior to commencement of day's dealings
- Reconciliation of currency positions
- Revaluation of all foreign exchange positions at a pre-determined frequency
- Managing discrepancies and disputes
- Daily calculation for adherence to statutory maintenance
- Claim /pay good value date effect of late settlements

4.11 Balance Sheet and Capital Planning:

A financial statement that lists a company's assets, liabilities, and shareholder equity at a certain point in time is referred to as a balance sheet. The foundation for calculating investor return rates and assessing the capital structure of a company is provided by balance sheets. The balance sheet is a financial statement that gives a quick overview of the assets and liabilities of a firm as well as the amount of shareholder investment. When doing basic analysis or calculating financial ratios, balance sheets can be utilized in conjunction with other crucial financial data. A balance sheet is a financial statement that reports a company's assets, liabilities, and shareholder equity. The balance sheet is one of the three core financial statements that are used to evaluate a business. It provides a snapshot of a company's finances (what it owns and owes) as of the date of publication. The balance sheet adheres to an equation that equates assets with the sum of liabilities and shareholder equity. Fundamental analysts use balance sheets to calculate financial ratios.

The regulatory policy for investment securities, bank-owned life insurance (BOLI), liquidity risk, interest rate risk, and the evaluation of interest rate risk and liquidity risk for the national banking system as a whole are all covered under balance sheet management. The goal of balance sheet management is to identify a company's ideal mix of various funding sources, including debt, mezzanine, and equity. Finding the ideal balance between reducing the company's long-term funding expenses (such as WACC) and reducing short-term liquidity risk is difficult. A more leveraged funding structure decreases the after-tax funding costs, which raises shareholder value. On the one hand, corporates are looking for enough financial buffers to reduce liquidity risk. In addition to these incompatible goals, there are still additional conditions that must be taken into account in order to dynamically establish the best balance sheet composition, such as various shareholder and stakeholder goals.

A bank, credit union, or other financial institution should prioritize capital planning as one of its most vital tasks. It ought to be a significant extension of your annual strategic planning process. There should be a continuous process to assess and understand intermediate and long-term capital requirements given the regulatory emphasis on capital levels over the past few years, the evolution of your local market, the persistence of economic cycles, and, most recently, the impact of the COVID-19 pandemic.

A crucial element of total company planning is capital planning. It is especially crucial when taking into account initiatives and programs that require substantial total investments in order to add to or improve an organization's capacity to create income, reduce current costs, or avert anticipated future costs.

A number of capital financial planning trends have been more pronounced and in focus due to global dislocation, which started with the pandemic in early 2020 and continued to long-term structural changes in several segments.

Zero-based budgeting places less emphasis on relying on the historical level of spending from previous periods and more on the necessity and efficiency of a planned expenditure. Executive teams have come to the conclusion that the past is no longer a dependable indicator of the future, making this strategy more appealing.

This makes it more important than ever for capital planning experts to have access to information and context regarding projected capital expenditures. The ability of capital planners to monitor and evaluate the categorization and creation of business cases associated with projected capital expenditures is crucial since the capital process moves independently from the process of strategic initiative assessment.

Finally, a continuous process of contingency planning must be integrated with capital budgeting. Understanding the revenue and profitability effects of postponing or delaying some capital expenditures and accelerated depreciation for abandoned efforts is crucial.

Capital Planning Models: Depreciation and amortization represent the two broad categories addressed in capital planning models. Fixed assets, such as buildings, facilities, and computing equipment, are usually depreciated. Financial statements recognize fixed asset costs as expenses across the useful life of the item. Item life varies widely by type. For example, a data center computing infrastructure's useful life may be five years, while the rating of a commercial building's useful life is at twenty years.

Depreciation uses one of two methods:

1. Straight-line, where, after deducting an asset's salvage or resale value from the purchase price, the remaining amount is recognized evenly across the asset's useful life. For example, a \$120,000 piece of construction equipment with a ten-year useful life and \$20,000 salvage value is depreciated at \$10,000 each year using the straight-line method.
2. Declining balance, which recognizes the rapid obsolescence of certain assets by accelerating the depreciation schedule in the early years of an asset's useful life. For example, \$1.2 million of telecommunications switching and routing equipment with a five-year useful life and \$200,000 in salvage value may depreciate at 30% annually, as opposed to 20% in the straight-line method. With the declining balance method, the equipment depreciates at \$300,000 in the first year, \$210,000 in the second year, and so forth.

Assets that are intangible and have no salvage or resale value, such as a perpetual software license or franchise rights, for example, are capitalized through amortization. Costs for amortized assets are typically recognized using the straight-line method.

In some cases, labor capitalization is feasible. A specific linked asset's creation, modification, and implementation actions are often associated with eligibility. Before beginning a program to capitalize labor, executives should consult frequently and thoroughly with the company's independent auditors. The generally accepted accounting principles (GAAP) will be used by auditors as a guide to create a labor capitalization policy that complies with GAAP.

Finally, a capital planning model also includes guidelines for the in-service period, which establishes the interval between the acquisition of an asset and its initial productive usage. Each asset type's in-service times should be uniform. For instance, the average lifespan of computing equipment is two months while telecommunications equipment is three months.

Capital Planning Process: The capital planning process is distinct from the procedure used to collect concepts for fresh initiatives and advances chosen concepts for the development of thorough business cases for study, appraisal, and, as necessary, approval as projects that are planned for execution. Expenses for capital are taken out of projects that are being considered and evaluated from the perspectives of the profit and loss statement and balance sheet. Capital planners may employ a different organizational structure for evaluation and analysis than the method used to evaluate initiatives as a whole. The organizational structure of the business unit, for instance, could be used to frame how strategic initiatives are evaluated. On the basis of an organization's norms for reporting financial outcomes, capital planning may also take place at the national or regional level concurrently.

Also, the long-term capital planning process must incorporate new requests for capital in the context of many other factors already impacting profit and loss and balance sheet reporting:

- Construction in process: Assets already received but preceding the in-service date
- In-service assets: Depreciation and amortization schedules are already active
- Projected write-downs: Accelerated depreciation for any discontinued use and impact
- Potential schedule additions: Items associated with proposed initiatives
- Cash flow considerations (i.e buy vs. lease)

When capitalizing labor, human capital planning becomes significant, as well. It requires close collaboration between capital and workforce planning teams to determine the right blend of permanent and contingent resources that map to capitalized labor requirements.

The capital planning process is inherently complex, detailed, and requires a long-term view to ensure effective up-front planning and execution. These characteristics combine with the uncharted nature of waters ahead to make it more critical than ever for professionals seeking best practices in capital planning and budgeting to utilize a purpose-built technology solution.

All banks, credit unions and financial institutions should have a written capital policies and capital plan. And this capital plan should be tied to your strategic plan to show how you will have the capital to support your business over the next five years or more.

Key elements to include in your capital plan are:

- Summary of your business strategy
- Narrative on the business, local market and economic scenario for your next five years
- Financial forecast for minimum of five years
- Analysis of the balance sheet and profitability
- Assessment of key risks and uncertainties, including credit, interest rate, liquidity, price, operational, compliance, strategic, and reputation
- Summary of key capital policies, including dividends and capital adequacy

4.12 Transfer Pricing of Assets & Liabilities:

In a bank, the common resource - funds or liquidity is shared by all the business units. Therefore, the most important function of Funds Transfer Pricing (FTP) is to provide a basis for the exchange of funds between different business units of a bank. Without FTP it would seem that all deposits generate only costs, whereas they're the source of funding necessary for giving loans. As a consequence, business units that only raise deposit funds without giving loans would be deemed unprofitable. Whereas, business units that only provide loans without raising deposits seem to be highly profitable. If the deposit and loan amount were same for any business units, it wouldn't be a problem to measure the profitability of that unit and there would be no need of FTP. Since Deposit and loan amounts of any business unit is not the same, it is difficult to measure the profitability without pricing mechanism of deposits and loans. That is why it is necessary to have FTP which is an internal allocation and measurement mechanism for determining the pricing of incremental loans and deposits and for determining the profit contribution of various lending and borrowing units of a bank. It's important for the bank to measure the contribution of every unit, product and business to facilitate future strategy and performance evaluation. FTP sets an internal price that allows estimating the cost of financing a bank and assigning it to users of funds. It is critical component of the profitability measurement process, as it allocates the major component of profitability in a bank, Net Interest Margin (NIM). It's a management decision tool and is useful means to

identify the areas of strength and weaknesses as well as profitability of different business units within the bank.

Therefore, Fund Transfer pricing (FTP) is the process wherein the Treasury of a bank aggregates funds centrally from surplus business units by paying a price then redistributes them throughout the deficit business units by charging for use of fund balancing funding resource excesses and shortages. Thus an internal market for liquidity will be created in the process. If there is still a deficit for funds, Treasury will raise more funds from the wholesale market, and if there is an excess of funds Treasury shall invest them or lend in wholesale markets.

Therefore, charging for such fund transfers through FTP Mechanism will help determine the net interest income of different business units.

Key Objective of Transfer Pricing:

The main objective of fund transfer pricing is to assign a specific pricing to a product that will remain fixed for the remaining tenor of that product given that the product has a fixed tenor. With respect to this, Treasury will act as the price assignor as it will pool all the surplus funds from each business unit, price them, pool them and sell those surplus funds to each deficit business unit at another price. The prices or rates at which Treasury will buy and sell the surplus funds will be based on the yield curve. The key outcome of this is Treasury will retain all market-based risks as well as prepayment/ pre-encashment risks pertaining to each product. If bank raise any additional capital in future (in the form of issuing subordinate bond/ Tier-2 bond), Treasury will buy the capital fund at the appropriate rate for the tenor Tier-2 bond raised.

Necessity for FTP framework:

- The assets and liabilities profile of the bank is becoming more complex with differing maturities.
- The interest rates are very volatile and changes in interest rates affect both the current earnings as also the net worth of the bank.
- In a bank there are many suppliers of funds and equally many buyers of funds. There is no one-to-one match between the liabilities and assets of a bank.
- Banks are exposed to several major risks in the course of their business – credit risk, interest rate risk, foreign exchange risk, liquidity risk, operations risk, etc. Net interest margin (Interest income – interest expense)/ (Earning assets) of a bank is a function of the interest rate sensitivity, volume and mix of its earning assets and liabilities. The inherent interest rate risk and liquidity risk being assumed by the bank need to be taken into account when evaluating the performance and profitability of a bank.
- The phased deregulation of interest rates and the operational flexibility given to banks in pricing most of the assets and liabilities requires every bank to have a basis to arrive at risk based pricing for its products. It's also important for the banks to be able to price their products in a dynamic environment of changing interest rates and liquidity situation.

Imperatives of a robust Fund Transfer Pricing policy:

- The FTP methodology deployed should be consistent and transparent.
- FTP should be applied at an individual transaction level and should apply to all deposits and loans allowing determination of customer wise profitability.

- FTP shall be dynamic and available at the time of origination of the transaction, so that it is used in decision making. This requires the need to have a robust system for calculation and also dissemination across all business units. There shall be a mechanism for all business units to know on a periodic basis how they are performing, on the basis of the defined FTP framework vis-à-vis the budgeted targets.
- It's important to ensure that the budgets and the performance evaluation are based not just on volume target but also include profit targets. In the absence of an integrated planning exercise, it's possible that individual units may achieve their respective volume targets, but the bank as a whole may be worse off as there was no co-ordination between desired assets and liabilities profile and their impact on risk and profits.
- There shall be a clear linkage between the FTP outcomes and performance evaluation of businesses.
- For an FTP framework to be successful, the most critical thing is to have senior management buy-in. It's like a mirror and the management can make it as honest as they want it to be, based on the commitment to look at true economics across business lines. The senior management must play the crucial role of inculcating the culture across the organization whereby FTP becomes an integral part of the decision making process.

Methodology:

The bank will follow a Matched Maturity method to price its interest-bearing instruments that have a maturity. For products that do not have any fixed maturity, either Caterpillar Method will be followed or a pricing will be assigned based on subjective judgment and market analysis. The cases where Caterpillar Method will be followed and where subjective judgment will be applied will be identified later.

The yield curve formation that is central to pricing the products under FTP Framework is explained below.

1. Yield Curve Formation: The major characteristics that will determine the overall effectiveness of a yield curve are shown below:

- It should be market-based.
- It should reflect the market risks (mainly interest rate risk) and counterparty risks that exist in the market.
- It should reflect maturity Premium on yields at each maturity points.
- It should show proper relationships between risk-free rates and risky rates.
- It should reflect the interest rate volatility for a reasonable time period.
- It should act as a guide to respective business units (i.e., deposit units and lending units). It will convey to the deposit units at what rates they have to hunt deposits at respective maturity buckets and to the lending units at what rates they have to lend at respective maturity buckets.
- It should attempt for a fair distribution of net interest income among all the business units.
- The final yield curve should be adjusted for adequate liquidity Premium to form Yield Curve for Lending Units and Yield Curve for Deposit Units.

2. Basic assumptions made:

- There are only 360 days in a year and 30 days in a month.
- All the rates and values are rounded up to two digits.
- All the calculations are done based on actual number of days.
- Average balance reflects the logical balance for calculations.
- TP rates are interpolated or extrapolated based on actual days rather than year basis.

A. BDT Yield Curve Formation: The methodology that will be followed to form the BDT Yield Curve considering the above characteristics is described below.

- **Collecting Market Data:** The market rates that will be collected are as follows:
 - 10 Peer Banks’ Deposit Rates. (ALCO will decide which banks will be included as peers)
 - 91-Day, 182-Day, 364-Day T-Bill rates
 - 2-Year, 5-Year, 10-Year, 15-Year and 20-Year T-Bond rates
- **Calculating the Market-based Credit Risk Premium:**

The most recent months simple average deposit rates of peer banks will be calculated for the following tenors:

- 3-Month
- 6-Month
- 1-Year
- 2-Year

2- Year average deposit rates shall be compared to 2-Year Government securities’ yields to determine Credit risk premium. This risk premium shall be added to government securities yields beyond 2-year maturity.

Credit Risk Premium= (2-year peer banks’ deposit rate- 2-year T-bond rate)

Hypothetical Example: Say for example,

Simple Average Deposit rates of peer Banks’ of different tenors are as follows:

Tenor	3-Month	6-Month	1-Year	2-Year
Hypothetical Average Deposit Rate	5.00%	5.50%	5.75%	6.00%

Hypothetical Government Securities yields’ are as follows:

Tenor	3-Month	6-Month	1-Year	2-Year	5-Year	10-Year	15-Year	20-Year
GSEC Yield	4.00%	4.45%	4.75%	5.00%	6.00%	6.75%	7.25%	8.10%

Credit Risk Premium= (2-Year average Deposit rates of peer Banks- 2-year bond rate)

$$= (6.00\% - 5.00\%)$$

$$= 1.00\%$$

- **Deriving the Final Yield Curve:**

The credit risk premium, calculated in previous step will be added to the rest of the T-Bill and T-Bond yields to derive the final yields on respective maturity points.

Hypothetical base yield curve shall be as follows:

Tenor	3- Month	6- Month	1- Year	2- Year	5- Year	10- Year	15- Year	20- Year
1. GSEC Yield	-	-	-	-	6.00%	6.75%	7.25%	8.10%
2. Credit Risk Premium	-	-	-	-	1.00%	1.00%	1.00%	1.00%
3. Peer Bank Deposit rates	5.00%	5.50%	5.75%	6.00%	-	-	-	-
M. Base Yield curve (1+2+3)	5.00%	5.50%	5.75%	6.00%	7.00%	7.75%	8.25%	9.10%

LCY Liquidity Premium: The ex-ante spread between yield on advance and cost of deposit will be multiplied by 10.00% to determine the liquidity premium for BDT TP Curve. The half of the result obtained by this method will be added to and deducted from the yield curve to form final yield curves for the lending units and the deposit units respectively.

Hypothetical Example of Liquidity Premium Derivation:

Particulars	Rates
a. Ex-ante Yield on Advance	10.00%
b. Ex-ante Cost of Deposit	5.00%
c. Spread (a-b)	5.00%
d. Liquidity Premium (c*10.00%)	0.50%
Premium to be added to base yield curve to derive Asset TP Curve (d/2)	0.25%
Premium to be deducted from base yield curve to derive Liability TP Curve (d/2)	0.25%

The LCY asset & liability Curve will be derived after adjustment of the liquidity premium.

Tenor	3 Month	6 Month	1 Year	2 Year	5 Year	10 Year	15 Year	20 Year
1. GSEC Yield	-	-	-	-	6.00%	6.75%	7.25%	8.10%
2. Credit Risk Premium	-	-	-	-	1.00%	1.00%	1.00%	1.00%
3. Peer Bank Deposit rates	5.00%	5.50%	5.75%	6.00%	-	-	-	-
M. Base Yield curve (1+2+3)	5.00%	5.50%	5.75%	6.00%	7.00%	7.75%	8.25%	9.10%
N. Half Liquidity Premium	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
Asset Curve (M+N)	5.25%	5.75%	6.00%	6.25%	7.25%	8.00%	8.50%	9.35%
Liability Curve (M-N)	4.75%	5.25%	5.50%	5.75%	6.75%	7.50%	8.00%	8.85%

Liquidity Premium is needed to cover the overall liquidity risks that Treasury will face to support the banking book. For example, there is no guarantee that a 5-Year Term Deposit product will mature only after 5 years. Although it will earn a Transfer Pricing (TP) rate based on its stated tenor of 5 years, it will still enjoy the same TP rate even if it is pre-matured. This early withdrawal will adversely affect Treasury

as it will constantly try to match overall banking assets with overall banking liabilities at optimal levels on each maturity points.

Similarly, if a 5-Year Term Loan receiver defaults on the scheduled date of the maturity, the loan might still be on the book for the period until the adjustment. The loan will still be assigned the same TP rate based on the initial 5-Year tenor regardless of its extended tenor. In this case, again the fund is blocked for a loan product for which Treasury will experience maturity mismatches in its Asset-Liability Management and thus needs sufficient liquidity Premium to offset that risk.

B. FCY Yield Curve Formation:

- **Calculating the Borrower-specific Credit Risk Premium:** Credit risk Premium will be determined from the latest FCY borrowing from abroad. Now, on respective deal dates of these borrowings, 3-Month and 6-Month USD LIBOR rates were cross-matched with the booking rates to identify the bank specific FCY credit risk Premium for each borrowing.

The average of all the 3-month borrowing spread over LIBOR will be determined as 3-Month risk premium and the average of all the 6-Month borrowing spread over LIBOR will be determined as 6-Month risk premium. In cases where 6 month credit risk premium is lower than 3 month risk premium, lower risk premium will be considered as 3 month risk premium and higher one as 6 month risk premium with the notion that longer term risk premium should be higher than shorter term risk premium.

- **Deriving the Yield Curve up to 1 Year:** The credit risk Premium for 3-Month and 6-Month tenors, will be extrapolated to get credit risk Premium for Overnight, 1-Month and 1-Year tenors. Now, these credit risk Premium will be added to overnight, 1-Month, 3-Month, 6-Month and 1-Year USD LIBOR rates to derive the yield curve up to 1 year.
- **Deriving the Yield Curve beyond 1 Year:** The 6-Month and 1-Year yields will be extrapolated to get yield points for maturity points beyond 1 year, such as, 2-Year, 5-Year, 10-Year, 15-Year and 20-Year tenors.
- **Adjusting for the Liquidity Premium:** The ex-ante spread between USD yield on advance and cost of deposit will be multiplied by 10.00% to determine the liquidity premium for USD TP Curve. The half of the result obtained by this method will be added to and deducted from the base yield curve to form final yield curves for the lending units and the deposit units respectively.

Hypothetical Example of Liquidity Premium Derivation:

Particulars	Rates
a. Ex-ante USD Yield on Advance	5.00%
b. Ex-ante USD Cost of Deposit	2.00%
C. Spread (a-b)	3.00%
D. Liquidity Premium (C.*10.00%)	0.30%
Premium to be added to base yield curve to derive Asset TP Curve (D/2)	0.15%
Premium to be deducted from base yield curve to derive Liability TP Curve (D/2)	0.15%

For EUR and GBP, credit risk Premium will remain the same as those for USD considering that the rate differential among these currencies is not much significant. So, USD credit risk Premium calculated for 3-Month and 6-Month will be applied to the 3-Month and 6-Month LIBOR rates of EUR and GBP.

Matched Maturity Method – Assigning Prices for Products with Fixed Maturity:

Products that have a fixed maturity will be assigned TP rates based on their respective tenors. Products that will be priced under Matched Maturity method are: all Loans with stated tenors, Term Deposit, Recurring Deposit and Margin Deposit.

The methodology to assign TP Rates under the Matched Maturity method is shown below:

- **Loans with Stated Maturity:** Each loan item with stated maturity will be assigned a TP rate based on its fixed tenor. The month that the FTP system will be first implemented, the rate will be assigned on the basis of the remaining tenors. All BDT Loans will follow the BDT Yield Curve for the Lending Unit and all FCY Loans will follow the respective FCY Yield Curves for the Lending Units. In case, the FCY figures are not available in equivalent BDT amounts, Standard Mid Rates should be applied to convert the FCY figures first and then the TP rates have to be assigned.
There can be loans that will be rolled over at its scheduled date of expiry. Customers might apply for a maturity extension with a new interest rate or with the existing rate. In case of Rollover of loans, a separate new contract has to be created to allow counting it as new contract. Therefore, a rollover loan will also be assigned TP for new tenor after extension as it will be counted as new contract. So, for example, if a 5-year Term Loan is scheduled to mature in 15th March 2016 and then gets rolled over for another 2 years, the loan will initially get a TP rate based on its 5-Year term and from 15th March 2016 ,it will be assigned TP based on 2-year term.
- **TP Charge for Non-regular Loans:** A loan that has got a TP rate and is defaulted at maturity will still be charged the same TP rate until the final write-off. That means the loan will be charged the TP rate all through its non-regular stages: Special Mention Account (SMA), Substandard (SS), Doubtful (DF) and Bad & Loss (BL) until the board decides to write-off the loan. It might be the case that a loan is enjoying no interest earnings after it becomes non-due and remains in that state for a certain time. Regardless of that, the loan will be charged against the assigned TP rate. The rationales are:
 - Treasury did not price the loan initially for a term higher than the stated term;
 - The default will adversely affect the Treasury’s liquidity management;
 - It will also encourage the lending units to be extra cautious while lending.
 -
- **Term Deposit:** Each TD item with stated maturity will be assigned a TP rate based on its fixed tenor. The month that the FTP system will be first implemented, the rate will be assigned on the basis of the remaining tenors. All BDT Deposits will follow the BDT Yield Curve for the Deposit Unit and all FCY Deposits will follow the respective FCY Yield Curves for the Deposit Units. In case, the FCY figures are not available in equivalent BDT amounts, Standard Mid Rates should be applied to convert the FCY figures first and then the TP rates have to be assigned. Issues that are important in assigning TP rates to TD accounts are described below.
There can be TD accounts that will be rolled over at its scheduled date of expiry. Customers might apply for a maturity extension with the applicable interest rate. However whatever interest rate is applied to the TD account at its rollover, it will get a new TP rate for the extended period. Some TD accounts have a built-in instruction to renew and accumulate the interest with the Principal while being rolled over. These cases will not be a problem as TP rates will be assigned on average balances

of all TD accounts so that the incremental effect of the interest will be reflected through the increases in average balances. It will also incorporate the effect of middle-of-the-month increments.

Example: If a 5-year Term Deposit is scheduled to mature in 15th March 2016 and then gets rolled over for another 2 years, it will initially get a TP rate based on its 5-Year term and on 15th March 2016 will get a new TP based on its new tenor of 2 years. If the standard instruction is such that the interest will be renewed, this will also be added to the Principal amount. The new TP rate will be charged on this increased balance. For the month of March 2016, the TP Return will be calculated accordingly so that from 1st March 2016 till 15th March 2016 the original TD Principal will be priced at the old TP rate and from 16th March 2016 till 31st March 2016, the increased TD Balance will be priced at the new TP rate.

- Recurring Deposit:** RD accounts will receive the TP rates much in the same way as the TD accounts will receive TP rates. However, unlike TD, RD accounts have periodic cash flows. For example, an RD account might require a customer to open the account with 10,000 BDT and then deposit 1,000 BDT on a monthly basis for the next 5 years. In this case, if the average balance of this RD account receives a TP rate based on the 5-Year stated tenor, it will not adjust for the mid-period cash flows and hence, will overstate the TP return. This will be managed through adjusting the TP rates. For example, in the above case, the 10,000 initial balance of the RD account will get a TP rate based on the 5-Year Tenor. Next month, the additional 1,000 BDT will get a TP rate based on a tenor of 4 years 11 months. Then a weighted average TP rate will be calculated for this RD account. Let's say that the TP rate for the initial 10,000 BDT was 7% and for the new balance 6.9%. So, now the weighted average TP rate will be $(10,000 \times 7\% + 1,000 \times 6.9\%) / (10,000 + 1,000) = 6.9909\%$. Next month, this TP rate will be carried forward and again a weighted average TP rate will be determined incorporating the additional cash flow and TP rate on that additional cash flow.

Example: A RD account has been opened for One year on 1st January 2016. The account will provide BDT 10,000 cash flow each month. The following Liability TP rates are available: Let's assume the rates are fixed for each period for the sake of simplicity.

180-D	210-D	240-D	270-D	300-D	330-D	360-D
6.00%	6.25%	6.50%	6.75%	7.00%	7.25%	7.50%

TP amount will be:

For January, $10,000 \times 7.50\% \times (30/360) = 62.50$

For February, $10,000 \times 7.25\% \times (30/360) + 10,000 \times 7.50\% \times (30/360) = 60.42 + 62.50 = 122.92$

For March, $10,000 \times 7.00\% \times (30/360) + 20,000 \times \text{Weighted Average TP rates of previous Two months.}$
 $= 10,000 \times 7.00\% \times (30/360) + 20,000 \times 7.38\%$

Weighted Average TP rates of previous Two months =
 $(10,000 \times 7.50\% + 10,000 \times 7.25\%) / (10,000 + 10,000)$
= 7.38%.

- Margin Deposit:** LC and LG Margin Deposits will receive the TP rates based on their tenors (if any). In all cases, the FCY figures need to be converted to equivalent BDT figures if they appear in FCY

figures in the data set. In some cases, the margin accounts might be open-ended, meaning they will not have any fixed date of maturity. These open-ended margin deposits will receive TP rates as applicable for a tenor of 1 year. This is because the open-ended margin accounts have a tendency to be withdrawn in 1 year supported by past experience. There is no existing data set containing tenor-wise Margin on Acceptance balances. TP will be assigned on the average of the beginning-of-the-month and the end-of-the-month Margin on Acceptance figures.

For FCY Margin on Acceptance account (Corporate), TP rate will be = Total Onshore TP Amount on FCY Deposit (CORP) excluding Margin on Acceptance / Total Onshore FCY Deposit (CORP) excluding Margin on Acceptance x 12. TP will be assigned on other currency and business unit wise bucket in the same way.

Caterpillar Method – Assigning Prices for Products without any Fixed Maturity:

Products that will be assigned TP rates under this method are Overdrafts, Savings, Current accounts and SND accounts. All of these products will receive TP rates in the same method. The steps that have to be followed in this method are detailed below.

Segmenting the Total Balance according to the Past History of Repayment/ Withdrawal. This past withdrawal pattern analysis will be done annually to capture change in behavior of withdrawal based on market condition.

- **Determining TP Rates for Each Segment:** Each segment of the Savings products will receive a TP rate according to the withdrawal pattern shown in step 1. However, it has to be borne in mind that each segment's withdrawal will not occur at the end of each maturity bucket. Rather, it should be assumed that the withdrawal will take place uniformly over the maturity bucket. So, for example, the first bucket of 10% withdrawal will be assumed to occur uniformly over the period of 0-30 days. Then, on an average this bucket should receive a TP rate based on a tenor of 15 days. So, the overall maturity points to determine the TP rates are:

- 10.00% will receive a TP rate based on a tenor of 15 Days;
- 0.008% will receive a TP rate based on a tenor of 45 Days;
- 0.012% will receive a TP rate based on a tenor of 135 Days;
- 0.001% will receive a TP rate based on a tenor of 270 Days;
- 89.98% will receive a TP rate based on a tenor of 4 Years;

As described earlier, the withdrawal pattern analysis will be done annually and the allocation of these products will be changed accordingly.

Example: Savings Balance as on September 30, was BDT 1,000

Change in Balance= 1,000-(1000-100) =100

Savings Portfolio 1000 at 31st August 2017				
	Allocation	Tenor	Amount	Maturity
0-30 D	10.00%	15	100.00	15-Sep-17
31-90 D	0.008%	60	0.80	30-Oct-17
91-180 D	0.012%	135	0.12	13-Jan-18
181-360 D	0.001%	270	0.01	28-May-18
1-5 Yr	89.98%	3 yr	899.8	31-Aug-20

Savings Portfolio 100 at 30th September 2017				
	Tenor	Allocation	Amount	Maturity
0-30 D	15	10.00%	10	15-Oct-17
31-90 D	60	0.008%	0.008	29-Nov-17
91-180 D	135	0.012%	0.012	12-Feb-18
181-360 D	270	0.001%	0.001	27-Jun-18
3-5 YR	3 yr	89.98%	89.98	29-Sep-20

This Changed balance will be divided again in different maturity buckets and assigned new TP accordingly.

- **Determining the Change in Average Balance Next Month:** Next month, the change in the average balance of the Savings Products will be determined. The change will be as follows:
This month's total average balance – (Last month's total average balance – 10.00% of the last month's total average balance that is scheduled to mature by this month).
- **Assigning TP Rates on the Change in Average Balance Next Month:**

The above steps will be followed to assign TP rates on the change in average balance next month.

Remarks – What if the Average Balance Decreases in the Next Month?

Any decrease in the average balance will be treated the same way as the increase in the average balance. The reasoning is shown below:

- Any increase in the average balance will be appreciated by assuming that a portion of that increase is scheduled to mature after a period of more than 1 month. So, even if a significantly higher portion of this increase is repaid/ withdrawn after 1 month, the portion that was assumed to mature after 1 month will still receive the same TP rate.
- Any decrease in the average balance will be penalized by assuming that a portion of that decrease is scheduled to be booked after a period of more than 1 month. So, even if a significantly higher portion of this decrease is booked after 1 month, the portion that was assumed to be booked after 1 month will still receive the same TP rate.

- **Assigning TP Rates for Closed Accounts with a Fixed Maturity:**

If a fixed-tenor account gets closed on its scheduled maturity or before its fixed maturity, it will still receive the same TP rate assigned during the first opening of the account. The pre-closure risks are already adjusted in liquidity Premium. So, there will be no further adjustments if an account gets pre-closed. Once an account is closed, the associated TP rate and the account number will be discarded from the TP Archive and will not be carried forward to the next month.

- **TP Archive Maintenance and Carry-forwards:**

A key building block of FTP Framework is that once a TP rate is assigned on a certain account (with a fixed tenor), it will be carried forward until it matures or gets rolled over or gets written off (in case of loans). In case of RD accounts, TP rates are also archived and carried forward to the next months to

update the weighted average TP rates. So, whatever the case is, products that have a fixed tenor will be required to have a TP archive.

- **Other Remarks – Monthly Average Balance and TP Calculation Tenor:**

While calculating the TP Return/ Cost, monthly average balances will always be used. The key advantage of using monthly average balances is that the TP calculation tenors need not be adjusted. For example, a 5-Year 50,000 BDT TD account that will open on April 15, 2016 will only receive a 5-Year TP rate for the last 15 days of that month. So, the TP Cost will be = $50,000 \times \text{TP Rate} \times 15/360$.

However, this process will be complex and therefore will be difficult to build into the system for all accounts. So, an average balance method will be used instead. Under this method, the TP cost will be = $(50,000 \times 15/30) \times \text{TP Rate} \times (30/360)$. Both ways, the results are the same. The part within the first bracket is the average balance that is available from existing Data Set without any calculation. The second bracket contains the monthly equivalent tenor. By setting the tenor as fixed for all accounts, the system will ensure easy and fast FTP calculation.

Role of ALM Desk in FTP Framework:

There will be a strong central funding unit which shall drive the FTP policy throughout the bank. ALM desk in Treasury shall play this role in the bank. Its role would be to keep track of the overall priorities and objectives of the bank, deriving the FTP rates curve, updating and dissemination, applying the TP on loan and deposits, liquidity risk management, maintain statutory reserves, satisfactorily respond to queries from all business groups, deal with IT, keep evaluating market development and review changes required and presenting the profitability of different business units to ALCO. It's important to ensure that the central funding unit is staffed by appropriately trained staff to carry out the above functions efficiently. The central funding unit should be seen to be neutral by all business units for the greater interest of the bank. To perform the overall function smoothly, concerned people in this desk should have proper access to Internet.

Role of Finance Department in FTP Framework:

Finance shall help IT to generate useful raw data to generate accurate FTP result. At the beginning of every month, IT shall provide raw data to Finance in excel. Finance will then verify the data. If any discrepancy in data arises, Finance has to work with IT to make data accurate. Finance has to confirm that the raw data are ready and IT can proceed to run FTP in the System. Finally, Finance must validate the result generated by FTP system.

Role of IT Department in FTP Framework:

Concerned IT FTP personnel shall work dedicatedly to provide useful FTP result. At the beginning of every month, Concerned IT personnel has to provide raw data in excel to Finance and seek confirmation that the data are accurate. After getting confirmation from Finance, IT shall proceed to run the FTP in the system. IT shall be held responsible for any inaccurate result generated by FTP software given the data verified earlier by Finance.

Role of Business Finance Team:

There will be a Business Finance Team consisting of representatives from different business and non-business units which are related to FTP activities. This Business Finance Team should be familiarized with FTP framework and understand the implication of FTP on business decision making.

Following are the roles and responsibilities of Business Finance Team:

- Getting newly launched product incorporated in IT Data base properly.
- Informing respective business unit heads about the calculations of FTP.
- Meeting monthly to address any FTP related problems that may arise in future.
- Working dedicatedly to the smoother functioning of FTP.

While Conventional methodologies of reporting & measuring business performance can measure how the bank is performing at the macro level only, FTP will depicts the true picture of performance at business unit, branch & product levels. FTP is expected to help identify the key areas of strengths & weakness, which customers are creating value for the bank or which ones are subduing.

FTP is expected to provide remarkable business insights, convey operational efficiency of the bank & help identify the key drivers of profitability. The inclusion of a transfer pricing curve will radically change our understanding of the makeup of net interest margin and how the bank's activities have contributed to it.

4.13 Practice Questions:

1. Write short notes on the following topics:
 - a. Advance to Deposit Ratio (ADR)
 - b. Wholesale Borrowing
 - c. Maximum Cumulative Outflow (MCO)
 - d. ALCO Paper
 - e. Transfer Pricing
2. Define liquidity management? Why it is important to manage the liquidity efficiently?
3. What is contingency funding plan? What are the essential characteristics of a CFP?
4. Define ALCO. Briefly explain the responsibilities of ALCO.
5. What are the key agendas of ALCO meeting?
6. What are the functions of treasury front office, mid office and back office?
7. Define LCR and NSFR? Explain these with examples.

Module E: Derivatives

5.1 Derivatives:

Financial contracts known as derivatives are those whose value is based on an underlying asset or group of assets. Stocks, bonds, currencies, commodities, and market indexes are among the frequently used assets. According to market conditions, the value of the underlying assets is always changing. The fundamental idea behind using derivative contracts is to make money by making predictions about how much the underlying asset will be worth in the future.

Imagine that an equity share's market price could increase or decrease. As a result of a decline in stock value, you can lose money. You may enter a derivative contract in this circumstance either to profit by making a successful wager. You might also just protect yourself against losses in the stock's spot market.

Using derivatives to reach financial objectives can be quite practical. For instance, a business can buy or sell energy derivatives, such as crude oil futures, to protect itself against its exposure to commodities. Similarly, a business could purchase currency forward contracts to hedging its currency risk.

Derivatives can also assist investors in leveraging their positions, such as when purchasing stocks as stock options as opposed to actual shares. Counterparty risk, the inherent dangers of leverage, and the possibility of systemic risks brought on by intricate webs of derivative contracts are the key downsides of derivatives.

The use of derivatives in finance is not new. For instance, the first futures contracts appeared in Mesopotamia during the second millennium BC. The financial instrument did not, however, become widely employed until the 1970s. The rapid growth of the derivatives market was triggered by the advent of new valuation methodologies. Today, it is impossible to think of modern finance without derivatives.

Say for example, years later, Healthy Hen Farms is a publicly-traded corporation (HEN) and is America's largest poultry producer. Gail and Sam are both looking forward to retirement.

Sam acquired a sizable number of HEN shares throughout the years. He has actually put more than \$100,000 into the business. Sam is becoming anxious because he is concerned that another shock, such as a bird flu outbreak, could cause a significant portion of his retirement savings to be lost. Sam begins looking for someone to assume the risk for him. Lenny, who is now an expert in finance and a seller or writer of options, decides to help him. Sam pays Lenny a fee, or premium, for the right (but not the responsibility), to sell Lenny the HEN shares in a year at their present price of \$25 a share. This arrangement is known as a put option. Lenny safeguards Sam from losing his retirement savings in the event that the share prices fall. Healthy Hen Farms remains stable until Sam and Gail have both pulled their money out for retirement. Lenny profits from the fees and his booming trade as a financier. Lenny is OK because he has been collecting the fees and can handle the risk.

This story serves as an example of how derivatives can shift risk (and the associated profits) from risk-averse people to risk-takers. Although Warren Buffett sometimes referred to derivatives as "financial weapons of mass destruction," if handled properly, they can really be quite beneficial instruments. Derivatives, like all other financial instruments, have advantages and disadvantages of their own, but they also have a special potential to improve the efficiency of the entire financial system.

Apart from making profits, there are various other reasons behind the use of derivative contracts. Some of them are as follows:

1. **Arbitrage advantage:**Buying a good or security at a discount in one market and selling it at a premium in the other market is known as arbitrage trading.You gain from the disparities in the commodity's price between the two markets in this way.
2. **Protection against market volatility:**A change in an asset's price increases your risk of suffering losses.The derivatives market has products that can help you protect yourself from a drop in the value of the stocks you hold.In addition, if you want to purchase stocks, you can purchase items to protect against a price increase.
3. **Park surplus funds:**Some people employ derivatives as a risk-transfer strategy.Others, however, use it to speculate and profit from it.In this case, you can profit on price changes without actually selling the underlying shares.
4. **Efficient use of funds:** Because most derivatives are margin-powered, you might be able to invest in them with only a small amount of your own money.This can help you spread your money out among a variety of investments to maximize returns while avoiding putting too much money in one area, and it can also produce considerably higher returns than you would be able to with only your cash.However, it also implies that if you choose poorly when placing a derivatives contract, you may be exposed to enormous losses.

5.1.1 Advantages of Derivatives:

Let's examine the workings of many derivative types using the tale of a fictitious farm. Gail, the proprietor of Healthy Hen Farms, is concerned about recent changes in chicken pricing or market volatility brought on by concerns of avian flu. Gail wants to safeguard her company from more unfavorable events. So, once they meet, the investor and she sign a futures contract. Regardless of the market price, the investor undertakes to pay \$30 per bird when the animals are prepared for slaughter in six months. The investor will benefit if the price is above \$30 at that point since they will be able to purchase the birds for less than market value and resell them for a profit at a higher price. Gail will benefit if the price goes below \$30 because she will be able to sell her birds for more than the going rate, or more than what she would receive for them on the open market.

Derivatives can be a useful tool for businesses and investors alike. Derivatives exert a significant impact on modern finance because they provide numerous advantages to the financial markets:

1. **Hedging risk exposure:**The contracts are typically utilized for risk hedging because the value of the derivatives is correlated to the value of the underlying asset. An investor might, for instance, decide to buy a derivative contract whose value fluctuates in the opposite way from that of an asset the investor already owns. Profits from the derivative contract may thus be used to cover losses from the underlying asset.
2. **Underlying asset price determination:** The price of the underlying asset is frequently decided via derivatives. As an illustration, the spot prices for the futures can be used to approximate the price of a commodity.
3. **Market efficiency:**Derivatives are thought to make financial markets more effective. Derivative contracts can be used to mimic an asset's payment. To prevent arbitrage opportunities, the prices of the underlying asset and the related derivative typically are in equilibrium.
4. **Access to unavailable assets or markets:** Organizations can use derivatives to gain access to assets or markets that would otherwise be closed off. A business may use interest rate swaps to get an interest rate that is better than the interest rates available via direct borrowing.

5. Cost efficiency: Furthermore, buying derivatives on margin allows traders to buy them with borrowed money. Due to this, they are even more affordable.

5.1.2 Disadvantages of Derivatives:

Derivatives have advantages for the financial markets, but there are also some serious downsides to the financial products. The shortcomings had severe effects during the 2007–2008 Global Financial Crisis. Financial institutions and securities all across the world collapsed as a result of the sharp devaluation of mortgage-backed securities and credit-default swaps. Because they are based on the value of another asset, derivatives are challenging to value. OTC derivatives are subject to counterparty risks, which are challenging to estimate or value. Most derivatives are also sensitive to the following:

- 1. High risk:** Derivatives are very volatile, which exposes them to potentially enormous losses. The value is exceedingly challenging or maybe unattainable because of how complexly designed the contracts are. They run a high inherent risk as a result.
- 2. Speculative features:** Derivatives are frequently used in speculation. Because derivatives are so dangerous and unpredictable, irrational speculation could result in significant losses.
- 3. Counter-party risk:** Despite the fact that derivatives sold on exchanges often undergo a thorough due diligence procedure, some contracts traded over-the-counter do not include a standard for due diligence. Therefore, there is a chance of a counter-party default.

These variables make it difficult to perfectly match the value of a derivative with the underlying asset.

Since the derivative has no intrinsic value (its value comes only from the underlying asset), it is vulnerable to market sentiment and market risk. It is possible for supply and demand factors to cause a derivative's price and its liquidity to rise and fall, regardless of what is happening with the price of the underlying asset.

Finally, derivatives are usually leveraged instruments, and using leverage cuts both ways. While it can increase the rate of return, it also makes losses mount more quickly.

5.1.3 Risks of Derivatives:

Derivatives can be incredibly risky for investors. Potential risks include:

- 1. Counterparty risk:** With derivatives, especially when they are traded over-the-counter, there is a considerable potential for the opposing party to an arrangement to default. Derivatives are worth nothing in and of themselves since the parties that agree to them are either untrustworthy or have something valuable to lose.
- 2. Changing conditions:** Derivatives that contractually bind you to specific prices can make you wealthy—or bankrupt. If you accept futures, forwards, or swaps, you can be required to bear sizable losses, losses that might even be amplified by the margin you used. Though you must invest money to enter into contracts you might not choose to complete, even non-obligatory options carry some risk.
- 3. Complexity:** For most investors derivatives, particularly those based on investment types they're unfamiliar with, can get complicated fast. They also require a level of industry knowledge and active management that may not appeal to investors used to traditional hands-off, buy-and-hold strategies.

Participants in derivatives market: Each type of individual will have an objective to participate in the derivative market. You can divide them into the following categories based on their trading motives:

1. **Hedgers:**These stock market traders avoid taking risks. To protect their investment portfolio from market risk and price fluctuations, they are aiming for derivative markets. By taking an opposing position in the derivatives market, they achieve this. By doing this, they shift the loss risk to those who are willing to accept it. They must give the risk-taker a premium in exchange for the hedging options offered. Imagine you own 100 of the XYZ Company's shares, which are now trading for BDT 120.00.After three months, your goal is to sell these shares.But you don't want to suffer losses as a result of a decline in the market price.Nevertheless, you don't want to miss the chance to profit down the road by reselling them for more money.In this circumstance, you can fulfill both of the aforementioned requirements by purchasing a put option for a small price.
2. **Speculators:**These are market risk-takers for derivatives.To make money, they want to take on risk.They view the world entirely differently than the hedgers do.If the bets are successful, this difference of opinion enables them to gain enormous profits.In the aforementioned illustration, you purchased a put option to protect yourself from a decline in stock prices.The speculator, who is your counterparty, will wager that the stock price won't decrease.You won't exercise your put option if stock prices don't drop.As a result, the speculator maintains the premium and benefits.
3. **Margin traders:**A margin is the minimal sum you must deposit with your broker in order to trade on the derivative market.It is utilized to reflect your daily losses and gains in accordance with market fluctuations.It makes it possible to hold a sizable open position while obtaining leverage in derivative trades.Consider purchasing 200 shares of ABC Ltd. at a price of BDT 100 apiece in the stock market with a quantity of BDT 2.00 lac.However, in the derivatives market, you can use the same cash to buy a position that is three times larger, or BDT 6.00 lac. In contrast to the stock market, a little price shift will result in larger gains or losses in the derivatives market.
4. **Arbitrageurs:**These earn money by taking advantage of low-risk market defects.They acquire securities at a discount in one market and sell them at a premium in another market at the same time.Only when the same asset is offered at various prices in several marketplaces is this possible.Assume that a share of equity is priced at BDT 1000.00 on the stock market and BDT 1050.00 on the futures market.An arbitrageur would purchase the shares on the stock exchange for BDT 1000.00 and then sell it on the futures exchange for BDT 1050.00.He or she makes a low-risk profit of BDT 50.00 using this technique. These utilize the low-risk market imperfections to make profits. They simultaneously buy low-priced securities in one market and sell them at a higher price in another market. This can happen only when the same security is quoted at different prices in different markets. Suppose an equity share is quoted at BDT 1000.00 in the stock market and at BDT 1050.00 in the futures market. An arbitrageur would buy the stock at BDT 1000.00 in the stock market and sell it at BDT 1050.00 in the futures market. In this process, he/she earns a low-risk profit of BDT 50.00.

5.1.4 Types of Derivative Contracts:

Nowadays, there are many more uses for derivatives, which are based on a wide range of transactions. Even derivatives based on weather information, such how much rain fell or how many days had sunshine, exist. Derivatives come in a wide variety of forms that can be applied to risk management, speculation, and position leverage.With products that may accommodate almost every requirement or risk tolerance, the derivatives market is one that is still expanding.Derivative items fall into two categories: "lock" and "option."Lock products (such as swaps, futures, or forwards) obligate the parties to the terms of the contract from the beginning. On the other hand, option products (such as stock options) give the holder the right but not the responsibility to purchase or sell the underlying asset or security at a particular price

on or before the option's expiration date. Despite the fact that a derivative's value is based on an asset, owning a derivative does not entail owning the asset. Derivatives are often utilized and include futures contracts, forward contracts, options, swaps, and warrants.

However, the four major types of derivative contracts are futures, forwards, swaps, and options.

1. **Forwards:** Similar to futures contracts, forward contracts also require the holder to fulfill their obligations. However, forwards are not traded on stock exchanges and are not standardized. These can be purchased without a prescription and are not labelled to sell. The buyer and seller have the option to alter the terms, size, and settlement procedure when creating a forward contract. Forward contracts have higher counterparty risk for both parties because they are OTC items. Similar to futures, forward contracts or forwards are traded off-exchange.

A type of credit risk, counterparty risks involve the possibility that the parties may be unable to fulfill their contractual obligations. The other party may be left with no options and risk losing the value of its position if one party becomes bankrupt. Once a forward contract is established, the parties can trade off their positions with other counterparties, which raises the possibility of counterparty risk as more traders participate in the same contract.

2. **Futures:** An agreement between two parties for the purchase and delivery of an item at a certain price at a later time is known as a futures contract, or simply futures. Standardized contracts known as futures are traded on an exchange. A futures contract is used by traders to manage risk or make predictions about the value of an underlying asset. The parties are required to carry out an agreement to purchase or sell the underlying asset. Futures contracts can be utilized with both precious metals like gold and silver as well as commodities like wheat and oil.

A futures contract is an agreement between two parties to buy and sell an item at a specified price at a later time. Futures contracts can be used to mitigate the risk that an asset's price will increase or decrease, forcing someone to sell items at a significant loss or purchase them at a significant markup. Futures contracts bind parties to a specific price. Instead, futures fix a rate that is agreeable to both parties based on the information available at the time. Notably, futures are standardized, exchange-traded products, making it very simple for regular investors to purchase them, even if they do not personally require a specific good or service at a certain price. Gains and losses are resolved daily, so you are free to speculate on short-term price changes and are not required to hold a futures contract out for its whole term. Futures are traded on an exchange, therefore there is significantly less chance that one of the parties will breach the contract.

For example, say that on November 6, 2021, Company A buys a futures contract for oil at a price of \$62.22 per barrel that expires December 19, 2021. The company does this because it needs oil in December and is concerned that the price will rise before the company needs to buy. Buying an oil futures contract hedges the company's risk because the seller is obligated to deliver oil to Company A for \$62.22 per barrel once the contract expires. Assume oil prices rise to \$80 per barrel by December 19, 2021. Company A can accept delivery of the oil from the seller of the futures contract, but if it no longer needs the oil, it can also sell the contract before expiration and keep the profits.

In this example, both the futures buyer and seller hedge their risk. Company A needed oil in the future and wanted to offset the risk that the price may rise in December with a long position in an oil futures contract. The seller could be an oil company concerned about falling oil prices and wanted to

eliminate that risk by selling or shorting a futures contract that fixed the price it would get in December.

It is also possible that one or both of the parties are speculators with the opposite opinion about the direction of December oil. In that case, one might benefit from the contract, and one might not. Say for example, the futures contract for West Texas Intermediate (WTI) oil that trades on the CME and represents 1,000 barrels of oil. If the price of oil rose from \$62.22 to \$80 per barrel, the trader with the long position—the buyer—in the futures contract would have profited \$17,780 $[(\$80 - \$62.22) \times 1,000 = \$17,780]$.² The trader with the short position—the seller—in the contract would have a loss of \$17,780.

Not all futures contracts have their underlying asset delivered in order to settle them at expiration. It is improbable that either of the speculating investors or traders who are both parties to a futures contract would desire to arrange for the delivery of many barrels of crude oil. By closing (unwinding) their contract prior to expiration with an offsetting contract, traders can terminate their obligation to buy or deliver the underlying commodity. Since many derivatives are actually cash-settled, any profit or loss from the trade is just a cash flow into the trader's brokerage account. Numerous interest rate futures, stock index futures, and more exotic products like volatility futures or weather futures are among the futures contracts with cash settlements.

Futures are therefore standardized contracts that enable the holder to acquire or dispose of the asset at a predetermined price and date. The parties to the futures contract are obligated to carry out their obligations under the agreement. On the stock exchange, these contracts are traded. Futures contracts' values are daily marked to market. It denotes that up until the contract's expiration date, the contract value is modified in accordance with market trends.

3. **Options:** Options are derivative contracts that grant the purchaser the right to purchase or sell the underlying asset at the designated price for a predetermined amount of time. The option is not required to be exercised by the buyer. The option writer is often referred to as the option seller. The strike price is the determined price. In that it is an agreement between two parties to buy or sell an asset at a fixed future date for a specific price, an options contract is comparable to a futures contract. Options and futures differ primarily in that with an option, the buyer is not required to carry out their commitment to buy or sell. It is merely an opportunity, not a commitment like futures. Options, like futures, can be used to speculate or hedge against changes in the price of the underlying asset. The way options work is like a non-binding form of futures and forwards: they establish a contract to purchase and sell something at a specific price and time, but the party purchasing the contract is not required to use it.

As a result, you are usually required to pay an option premium that is a small portion of the agreement's value.

Options can be either American or European, which affects how you can put them into practice. The non-binding equivalent of a futures or forward contract is the European option. On the day the contract expires, the person who purchased it has the option of having it enforced or of letting it lapse. American options, however, can be used whenever they are before their expiration date. They can be ignored and are similarly non-binding. It depends on the "style" of the option when it comes to when you have the right to buy or sell. In the case of an American option, the option rights may be exercised at any moment up until the day of expiration. Only the expiration day allows for the

execution of a European option. Whilst equity indices, like the S&P 500, contain options in the European form, the majority of equities and exchange-traded funds have options in the American style.

Imagine an investor owns 100 shares of a stock worth \$50 per share. They believe the stock's value will rise in the future. However, this investor is concerned about potential risks and decides to hedge their position with an option. The investor could buy a put option that gives them the right to sell 100 shares of the underlying stock for \$50 per share—known as the strike price—until a specific day in the future—known as the expiration date. Assume the stock falls in value to \$40 per share by expiration and the put option buyer decides to exercise their option and sell the stock for the original strike price of \$50 per share. If the put option cost the investor \$200 to purchase, then they have only lost the cost of the option because the strike price was equal to the price of the stock when they originally bought the put. A strategy like this is called a protective put because it hedges the stock's downside risk.

Alternatively, assume an investor doesn't own the stock currently worth \$50 per share. They believe its value will rise over the next month. This investor could buy a call option that gives them the right to buy the stock for \$50 before or at expiration. Assume this call option cost \$200 and the stock rose to \$60 before expiration. The buyer can now exercise their option and buy a stock worth \$60 per share for the \$50 strike price for an initial profit of \$10 per share. A call option represents 100 shares, so the real profit is \$1,000 less the cost of the option—the premium—and any brokerage commission fees.

In both examples, the sellers are obligated to fulfill their side of the contract if the buyers choose to exercise the contract. However, if a stock's price is above the strike price at expiration, the put will be worthless and the seller (the option writer) gets to keep the premium as the option expires. If the stock's price is below the strike price at expiration, the call will be worthless and the call seller will keep the premium.

Due to the fact that an equity or stock option's value is "derived" from the underlying stock, it falls under the category of a derivative. There are two types of options: calls and puts. A call option gives the holder the right to purchase the underlying stock by a specified date and at a specific price (referred to as the strike price) specified in the contract (called the expiration date). The right to sell the stock at the predetermined price and specified date specified in the contract is provided by a put option. The option premium is the up-front payment associated with an option.

4. **Swaps:** Another popular class of derivative, swaps are frequently utilized to convert one sort of cash flow into another. Interest rate swaps, currency swaps, commodity swaps, and credit default swaps are typical forms of swaps (CDS). An interest rate swap, for instance, could be used by a trader to change from a variable interest rate loan to a fixed interest rate loan or the other way around. Swaps are therefore derivative arrangements in which the financial liabilities of two parties are traded. The cash flows are predicated on a nominal principal sum that both parties have agreed upon without actual principal being exchanged. Based on an interest rate, the cash flow amount is determined. One cash flow is typically constant, whilst the other fluctuates based on a benchmark interest rate. The most popular type of exchange is interest rate. Swaps are over-the-counter agreements between corporations or financial institutions that are not traded on stock exchanges. Consider a scenario where Company XYZ borrows \$1,000,000 at a variable interest rate that is now 6%. XYZ may worry that rising interest rates will drive up the cost of this loan or run into lenders who are hesitant to give

the company further credit while it is exposed to the danger of a variable rate. Consider that XYZ enters into a swap with Company QRS, which is prepared to trade the variable-rate loan payments for the payments on a 7 percent fixed-rate loan. This indicates that QRS will get a 7 percent interest payment from XYZ on its \$1,000,000 principal and XYZ will receive a 6 percent interest payment from QRS. XYZ will only pay QRS the 1% difference between the two swap rates at the start of the transaction. Company XYZ will be responsible for paying Company QRS the 2 percent difference on the loan if interest rates drop to the point where the variable rate on the initial loan is now 5 percent. If interest rates increase to 8%, QRS would be required to pay XYZ the 1% difference in the two swap rates. The swap has accomplished XYZ's initial goal of changing a variable-rate loan into a fixed-rate loan, regardless of how interest rates vary.

Swaps can also be created to trade cash flows from other business activities, loan default risk, and exchange rate risk. A very common type of derivative is one that deals with the cash flows and probable defaults of mortgage bonds. In the past, they've actually been a little too popular. This type of swap's counterparty risk ultimately contributed to the 2008 credit crisis.

Depending on the type of financial asset being swapped, swaps can take many different forms. Let's assume for the purpose of simplicity that a business contracts with another business to trade a variable rate loan for a fixed rate loan. The business is getting rid of its variable rate loan in an effort to hedge against the possibility of rates rising rapidly. The company providing the fixed rate loan, on the other hand, is betting that a profit will be made from its fixed rate and that it will be able to offset any rate rises brought on by the variable rate loan. Better still if interest rates fall from where they are. Swaps have a high counterparty risk and are typically only offered over-the-counter to businesses and financial institutions rather than to individuals.

To sum up, futures and options are regarded as the best hedging instruments in derivative contracts and can be utilized to speculate on price movement and benefit as much as possible from it. A financial item called a derivative gets its value from something else. Professional traders frequently buy and sell derivatives since their value is derived from other assets, which helps to balance risk. Derivatives, however, may have the reverse impact on less experienced investors, significantly increasing the risk in their investing portfolios.

Forwards Contract vs Futures Contract:

Characteristics	Futures Contract	Forwards Contract
Meaning	A futures contract is a standardized contract, traded on exchange, to buy or sell underlying instrument at certain date in future, at specified price.	A forward contract is an agreement between two parties to buy or sell underlying assets at specified date, at agreed rate in future.
Structure	Standardized contract	Customized contract
Counterparty Risk	Low	High
Contract size	Standardized/Fixed	Customized/depends on the contract term
Regulation	Stock exchange	Self-regulated
Collateral	Initial margin required	Not required
Settlement	On daily basis	On maturity date

5.2 Hedging Arrangement:

A hedging agreement is an investment that aims to lower potential risks in the event that an asset's price moves negatively. Hedging offers some form of insurance coverage to guard against investment loss. It usually involves protecting a portfolio by employing one investment in a financial instrument to balance out the risk of another investment. Hedging can effectively reduce losses even while it does not totally remove hazards. If the hedging is successful, the investor's gains will be safeguarded or losses will be at least partially mitigated. Portfolio managers and other investors sometimes opt to use financial instruments known as derivatives to hedge other assets. The instruments may be either contingent claims or forward claims. Contingent claims include option contracts and futures contracts.

Assume Joe has some Oil Exploration Corporation stock (OEC). The business has recently enjoyed steady expansion and market stability. The company's management predicts that the price of oil will continue to rise, improving the stock's worth. Joe, though, has some reservations. He predicts a decrease in the price of oil. He therefore sells short oil futures to protect his investment in OEC stock. Should oil prices fall, his investment in futures will yield a profit that can help offset potential losses from a drop in the price of OEC's stock.

Some investors simply wish to diversify their portfolios while hedging to lower their overall risk exposure. In contrast to direct hedging, general diversification typically doesn't include making specific investments to balance out other specific investments. It simply involves distributing investments across various market segments or asset classes.

5.2.1 Derivatives and Hedging:

Gail is shielded from market price swings by engaging in a futures contract because she has fixed a price of \$30 per bird. She might lose money if there is a mad cow panic and the price of a chicken jumps to \$50, but she will be safe if there is a bird flu outbreak and the price drops to \$10. Gail is able to concentrate on her business and lessen her concern about price volatility by hedging with a futures contract.

It's crucial to keep in mind that when businesses hedge, they aren't betting on the commodity's price. The hedge only serves as a means for each party to control risk. Each party includes their profit or margin in their pricing, and the hedge works to prevent those gains from being lost due to changes in the price of the commodity in the market. By signing into the contract with each other, both parties hedged their profits from the transaction, regardless of whether the price of the commodity goes higher or lower than the futures contract price by expiry.

5.3 Speculation:

In the world of finance, speculation, or speculative trading, refers to the act of conducting a financial transaction that has substantial risk of losing value but also holds the expectation of a significant gain or other major value. With speculation, the risk of loss is more than offset by the possibility of a substantial gain or other recompense.

An investor who purchases a speculative investment is likely focused on price fluctuations. While the risk associated with the investment is high, the investor is typically more concerned about generating a profit based on market value changes for that investment than on long-term investing. When speculative investing involves the purchase of a foreign currency, it is known as currency speculation. In this scenario, an investor buys a currency in an effort to later sell that currency at an appreciated rate, as

opposed to an investor who buys a currency in order to pay for an import or to finance a foreign investment.

Without the prospect of substantial gains, there would be little motivation to engage in speculation. It may sometimes be difficult to distinguish between speculation and simple investment, forcing the market player to consider whether speculation or investment depends on factors that measure the nature of the asset, expected duration of the holding period and/or amount of leverage applied to the exposure.

For example, real estate can blur the line between investment and speculation when buying property with the intention of renting it out. While this would qualify as investing, buying multiple condominiums with minimal down payments for the purpose of reselling them quickly at a profit would undoubtedly be regarded as speculation.

Speculators can provide market liquidity and narrow the bid-ask spread, enabling producers to hedge price risk efficiently. Speculative short-selling may also keep rampant bullishness in check and prevent the formation of asset price bubbles through betting against successful outcomes.

Mutual funds and hedge funds often engage in speculation in the foreign exchange markets as well as bond and stock markets.

Speculation and the Forex Market: Forex markets execute the world's highest total volume and dollar value, with an estimated \$6.6 trillion per day changing hands between buyers and sellers.¹ This market trades around the world for 24 hours a day while positions can be taken and reversed in seconds, utilizing high-speed electronic trading platforms.

Transactions typically feature spot deals to buy and sell currency pairs, such as EUR/USD (Euro-US Dollar), for delivery through options or simple exchange. This market is dominated by asset managers and hedge funds with multi-billion-dollar portfolios. Speculation in the forex markets can be hard to differentiate from typical hedging practices, which occur when a company or financial institution buys or sells a currency to hedge against market movements.

For example, a sale of foreign currency related to a bond purchase can be deemed either a hedge of the bond's value or common speculation. These relationships can get complicated to define if the currency position is bought and sold multiple times while the fund owns the underlying bond.

Speculation and the Bond Market: The global bond market is valued at over \$100 trillion, of which approximately \$40 trillion is based in the United States, and these assets may include debt issued by governments and multinational corporations. Asset prices can fluctuate greatly and are strongly influenced by interest rate movement as well as political and economic uncertainties. The largest single world market trades U.S. Treasuries, with prices in that venue often driven by common speculation.

5.4 Trading in Derivatives Market:

Before trading, you must comprehend how derivatives markets work. The appropriate strategies for derivatives are totally different from those for the stock market. Before you can start trading on the derivative market, you must deposit a certain amount as margin. It is not possible to withdraw the margin money until the trade has been finalized. In addition, you must top off the amount when it drops below the required level. You must have a trading account that is open and allows for derivative trading. You can place orders over the phone or online if you're working with a broker. You must take into account elements like cash on hand, the margin requirements, the contract price, and the price of the underlying shares when choosing stocks. Check to see if everything fits inside your budget. You have the option of

continuing to invest until the trade is settled. In this case, either settle the total balance owed or engage in a countertrade.

5.5 Commodity Derivatives:

A commodity futures contract is an agreement to purchase or sell a specified quantity of a commodity at a specified price on a future date. Investors and businesses frequently utilize commodity futures as a hedge against unfavorable changes in the price of the commodity. For instance, farmers and millers employ commodities derivatives to offer a certain amount of "insurance." The miller enters the contract to lock in a guaranteed supply of the commodity, and the farmer enters it to lock in an acceptable price for the product. The risks of price changes still exist for both the farmer and the miller, despite the fact that both have minimized risk by hedging.

Example of Commodity Derivative:

Even if the farmer is guaranteed a certain price for the commodity, prices could increase (for instance, due to a shortage caused by weather-related occurrences) and the farmer would lose any potential additional income. The commodity's price could also decrease, forcing the miller to pay more than he otherwise would have for it.

For example, let's assume that in April 2020 the farmer enters a futures contract with a miller to sell 5,000 bushels of wheat at \$4.404 per bushel in July. On the expiration date in July 2017, the market price of wheat falls to \$4.350, but the miller has to buy at the contract price of \$4.404, which is higher than the prevailing market price of \$4.350. Instead of paying \$21,750 ($4.350 \times 5,000$), the miller will pay \$22,020 ($4.404 \times 5,000$), while the farmer recoups a higher-than-market price.

However, had the price risen to \$5 per bushel, the miller's hedge would've allowed the wheat to be purchased at a \$4.404 contract price versus the \$5 prevailing price at the July expiration date. The farmer, on the other hand, would've sold the wheat at a lower price than the \$5 prevailing market price.

More Supervision on Commodity Traders:

The commodity trading market has recently attracted the attention of regulators and policymakers for the first time in a long time. They are not happy. Recently, the words "opaque" and "unregulated" have appeared in a number of studies, letters, and confidential memoranda from significant central banks and international financial authorities.

It would be understandable for somebody who is knowledgeable with commodities trading to assume this is apparent. It is, but you shouldn't discount the increased attention. This signals a new era for the sector, one of more scrutiny, if not outright regulation, coming from some of the most powerful institutions in the world, including the Financial Stability Board (FSB), the International Monetary Fund (IMF), and the United States Federal Reserve.

The most opaque areas of the commodities markets—futures and options—have received much of the attention from policymakers over the years, while the opaque areas—most notably, privately negotiated over-the-counter (OTC) derivatives and physical markets—have received less attention. Any more oversight landed on something that was already quite controlled and open. Top commodity trading companies including Vitol Group, Trafigura Group, Glencore Plc, and Cargill Inc. were able to grow without being burdened by further regulation as a result of this failure to investigate the opaque.

Commodity prices have increased as a result of the Russian invasion of Ukraine, which has since brought to light "the resilience of areas of global financial markets that were poorly known by the broader public only a few weeks ago," to use the IMF's phrase.

Not simply the general public was affected. Regulators lacked knowledge of their own. The relative opaqueness of the commodities derivatives markets and the fact that some "material physically resolved transactions are not reportable to trade repositories" make it more difficult to assess risk, according to the Bank of England. The British central bank also noted that a number of "major" commodity companies were exempt from the transparency rules put in place during the global financial crisis.

What's ahead will probably be much greater supervision, similar to what Wall Street experienced after 2009. After energy dealers requested assistance, more regulation was unavoidable. The advocacy group for European energy dealers wrote a letter to governments and regulators in March warning of "intolerable cash-liquidity pressure" throughout the industry and requesting financial assistance from taxpayers. The proposed bailout was rejected by central banks, notably the Federal Reserve (Fed) and the European Central Bank (ECB). Only the German government chose to support its utilities, some of which are major merchants, with a state-owned bank. However, the fact that the energy traders, who have long pushed for self-regulation, sought for assistance frightened officials.

The G-20-established FSB has now pledged to conduct an "in-depth investigation" of the vulnerabilities shown by Russia's conflict in Ukraine, "with a special focus on commodity markets." Klass Knot, chairman of the FSB and head of the Dutch central bank, outlined two areas of concern for regulators in a letter last week: the relationship between commodity traders and the banks that finance them, as well as the possibility that a major commodity trader could fail if raw material prices rise once more.

Commodity trading companies frequently put very little of their own equity at risk because they rely on bank loans to purchase commodities like food, metals, and oil, but their success is dependent on the health of the banking sector that provides the loans. Banks "play a critical role" and "have major exposures" in the commodities markets, according to the IMF, "particularly through providing liquidity and credit to a limited group of large energy trading firms that operate globally, are mostly unregulated, and are generally privately held."

The phrases "small handful of large enterprises," "unregulated," and "privately owned" deserve special attention. That kind of information alerts authorities to concentrated risk in a murky market niche that hasn't garnered much attention up to this point. Similar emphasis was placed by the Fed's Dallas office when it decided against a bailout. The statement indicated that the bar for central bank intervention in unregulated markets was high. Instead, it advised the industry to strengthen its finances. It would be wise for companies involved in the commodities market to proactively analyze and improve their liquidity profiles. Regulators must now follow up and fend off any possible industry lobbying efforts.

The first stage is to improve comprehension. The Bank of England stated that the commodity trading industry has numerous murky areas. More transparency is required before any regulations are implemented. So bring disclosures comparable to those already required for the futures and options markets to OTC derivatives markets. Regulators believed that looking only at the positions on the London Metal Exchange was sufficient, which was a mistake, and failed to recognize the scale of the OTC positions, which worsened the recent chaos in the nickel market.

Disclosures are also necessary for physical marketplaces. Here is one suggestion: The G-7 nations might consent to establish a ledger of global oil transactions. Revolutionary? They did indeed promise to do it in 1979. Because oil dealers thwarted every attempt at regulation, this was never put into practice.

Regulators also need to look at how much risk commercial banks are assuming when they support the commodities trading sector, especially in terms of whether traders are adequately securing the loans they take with their own equity. The Fed has already stated that commodity dealers may need to acquire additional funds in order to remain in operation.

Law enforcement authorities have been scrutinizing commodity traders for the past ten years, with the US Department of Justice in particular cracking down on bribes and money laundering. It's past time for financial authorities to examine them as well.

5.6 Interest Rate Swap:

Additionally, interest-rate instruments can be employed with derivatives. The main purpose of interest rate derivatives is to protect against interest rate risk. When the price of the underlying asset changes due to a change in interest rates, interest rate risk may result.

Loans, for instance, may be granted with a fixed interest rate (which remains the same for the duration of the loan), or a variable interest rate (which fluctuates in accordance with market interest rates). Some businesses might prefer to transfer their loans from variable to fixed interest rates.

For instance, if a business has an extremely low rate, it could seek to lock it in to safeguard itself against rate increases in the future. Other businesses could seek to convert from their high fixed-rate debt to their present, lower variable rate debt since it has a higher fixed rate compared to the market. An interest-rate swap can be used to make the transaction, in which the two parties swap payments so that one obtains the floating rate and the other the fixed rate.

Example of Interest Rate Swap:

Continuing our example of Healthy Hen Farms, let's say that Gail has decided that it's time to take Healthy Hen Farms to the next level. She has already acquired all the smaller farms near her and wants to open her own processing plant. She tries to get more financing, but the lender, Lenny, rejects her.

Lenny's reason for denying financing is that Gail financed her takeovers of the other farms through a massive variable-rate loan, and Lenny is worried that if interest rates rise, she won't be able to pay her debts. He tells Gail that he will only lend to her if she can convert the loan to a fixed-rate loan. Unfortunately, her other lenders refuse to change her current loan terms because they are hoping interest rates will increase, too.

Gail gets a lucky break when she meets Sam, the owner of a chain of restaurants. Sam has a fixed-rate loan about the same size as Gail's, and he wants to convert it to a variable-rate loan because he hopes interest rates will decline in the future.

For similar reasons, Sam's lenders won't change the terms of the loan. Gail and Sam decide to swap loans. They work out a deal in which Gail's payments go toward Sam's loan, and his payments go toward Gail's loan. Although the names on the loans haven't changed, their contract allows them both to get the type of loan they want.

The transaction is a bit risky for both of them because if one of them defaults or goes bankrupt, the other will be snapped back into their old loan, which may require payment for which either Gail or Sam may be unprepared. However, it allows them to modify their loans to meet their individual needs.

5.7 Credit Derivative:

Through a contract between two parties known as a credit derivative, a creditor or lender might assign the risk of default to a different party. The agreement transfers the credit risk associated with the potential default of the borrower on the loan. The risk is shifted to a different party, but the loan is still recorded on the lender's books. In exchange for an up-front payment known as a premium, lenders like banks utilize credit derivatives to eliminate or significantly lower the risk of loan defaults in their entire loan portfolio.

Example of Credit Derivative:Lenny, Gail's banker, ponies up the additional capital at a favorable interest rate and Gail goes away happy. Lenny is pleased as well because his money is out there getting a return, but he is also a little worried that Sam or Gail may fail in their businesses.

To make matters worse, Lenny's friend Dale comes to him asking for money to start his own film company. Lenny knows Dale has a lot of collateral and that the loan would be at a higher interest rate because of the more volatile nature of the movie industry, so he's kicking himself for loaning all of his capital to Gail.

Fortunately for Lenny, derivatives offer another solution. Lenny spins Gail's loan into a credit derivative and sells it to a speculator at a discount to the true value. Although Lenny doesn't see the full return on the loan, he gets his capital back and can issue it out again to his friend Dale. Lenny likes this system so much that he continues to spin out his loans as credit derivatives, taking modest returns in exchange for less risk of default and more liquidity.

How to Invest in Derivatives:

Investments in derivatives are extremely risky and are not recommended for novice or even intermediate investors. Before you participate in more risky products, like derivatives, be sure you've got the fundamentals of your finances in order, such as an emergency fund and retirement contributions. Even then, you shouldn't put a sizable chunk of your funds into derivatives.

Having said that, if you want to begin utilizing derivatives, you can do it without much difficulty by buying fund-based derivative products using a standard investment account. You might think about investing in an inverse fund, which utilizes derivatives to profit investors when the underlying market or index decreases, or a leveraged mutual fund or exchange-traded fund (ETF), which can employ options or futures contracts to improve returns.

These types of fund-based derivative products assist in lowering some of the risks associated with derivatives, such as counterparty risk. However, they can still increase losses as they aren't typically designed for long-term, buy-and-hold investing.

As an individual investor, you might be able to trade options and futures if you'd like to have more direct exposure to derivatives. However, not all brokerages permit this, so make sure the platform you choose has derivatives trading capabilities.

A complicated form of financial security known as a derivative is agreed upon by two or more parties. Derivatives are a tool that traders use to trade a variety of assets on particular markets. Stocks, bonds, commodities, currencies, interest rates, and market indices are the most often used underlying assets for derivatives. The underlying asset's price movements determine how much a contract is worth.

Derivatives can be used to leverage holdings, speculate on the direction of an underlying asset's movement, and hedge a position. Brokerages are used to buy these assets, which are frequently traded on exchanges or over-the-counter (OTC). One of the biggest derivatives markets in the world is the Chicago Mercantile Exchange (CME).

OTC-traded derivatives typically have a higher counterparty risk, or the chance that one of the parties to the transaction could go out of business. These uncontrolled transactions take place between two private parties. The investor could buy a currency derivative to lock in a particular exchange rate in order to mitigate this risk. Currency futures and currency swaps are two derivatives that could be used to manage this type of risk. Comparatively to derivatives bought over the counter, exchange-traded derivatives are more standardized and strictly regulated.

Derivatives were originally used to ensure balanced exchange rates for internationally traded goods. International traders needed a system to account for the differing values of national currencies. Assume a European investor has investment accounts that are all denominated in euros (EUR). Let's say they purchase shares of a U.S. company through a U.S. exchange using U.S. dollars (USD). This means they are now exposed to exchange rate risk while holding that stock. Exchange rate risk is the threat that the value of the euro will increase in relation to the USD. If this happens, any profits the investor realizes upon selling the stock become less valuable when they are converted into euros.

A speculator who expects the euro to appreciate compared to the dollar could profit by using a derivative that rises in value with the euro. When using derivatives to speculate on the price movement of an underlying asset, the investor does not need to have a holding or portfolio presence in the underlying asset.

Many derivative instruments are leveraged, which means a small amount of capital is required to have an interest in a large amount of value in the underlying asset.

5.8 Practice Questions:

1. Write short notes on the following topics:
 - a. Hedging
 - b. Speculation
 - c. Commodity Derivatives
 - d. Credit Derivatives
2. Define derivatives. What are the advantages of derivatives?
3. What are the risks associated with derivatives. Briefly describe those.
4. Who are the major participants in the derivative markets?
5. Briefly describe the types of derivatives with illustrations.
6. What is interest rate swap and how it works?
7. Differentiate between future contract and forward contract.

Module F: Fixed Income

6.1 Fixed Income:

In general, investment securities with fixed interest or dividend payments up until their maturity date are referred to as having fixed income. Investors receive their principal investment back when the investment reaches maturity. Bonds issued by governments and corporations are the most popular fixed-income vehicles. A fixed-income security's payments are predetermined, as opposed to equity investments, which may not provide cash flows to investors, or variable-income securities, whose payments might vary depending on a number of factors, such as short-term interest rates. There are various fixed-income exchange-traded funds (ETFs) and mutual funds available in addition to buying fixed income assets directly.

Key Features:

- Assets and securities in the fixed income category provide investors with a predetermined level of cash flows, often in the form of fixed interest or dividends.
- Government and corporate bonds are the most popular types of fixed-income products.
- At maturity for many fixed income securities, investors are repaid the principal amount they had invested in addition to the interest they have received.
- In the event of a company's bankruptcy, fixed-income investors are frequently paid before common stockholders.

Debt securities are sold by businesses and governments to raise funds for ongoing expenses and major initiatives. Fixed-income securities reward investors with a predetermined interest rate in return for lending their money. Investors receive their capital, or initial investment, back at the maturity date. An organization might, for instance, issue a 5-year, 5% bond with a \$1,000 face value or par value. The bond costs \$1,000 to purchase, and the investor won't receive payment until five years have passed. The business makes interest payments throughout the course of the five years, known as coupon payments, at a rate of 5% annually. As a result, the investor receives \$50 annually for a period of five years. The investor receives their initial \$1,000 investment back on the maturity date, which is the conclusion of the five-year period. Fixed-income investments are also available that offer coupon payments on a monthly, quarterly, or semi-annual basis.

For cautious investors looking for a well-diversified portfolio, fixed-income assets are advised. Depending on the investor's investment approach, the percentage of the portfolio allocated to fixed income will vary. Another option for portfolio diversification is to blend equities and fixed income securities, resulting in a portfolio that might be split 50/50 between stocks and fixed income securities.

Fixed-income securities include, for instance, Treasury bonds and bills, municipal bonds, corporate bonds, and certificates of deposit (CDs). On both the bond market and secondary market, bonds are exchanged over-the-counter (OTC).

Fixed income investing is a cautious strategy that generates returns from stable, low-risk investments. The interest coupon payments are often smaller because the risk is lower. Bonds, bond mutual funds, and certificates of deposit can all be included in a fixed income portfolio (CDs). The laddering strategy is one such fixed income product-based technique. When using a laddering approach, you can invest in a number of short-term bonds and receive consistent interest income. The portfolio manager extends the

ladder of short-term bonds by reinvesting the refunded principal as bonds mature. By using this technique, the investor is able to acquire ready funds without missing out on the rising market interest rates.

For example, a \$60,000 investment could be divided into one-year, two-year, and three-year bonds. The investor divides the \$60,000 principle into three equal portions, investing \$20,000 into each of the three bonds. When the one-year bond matures, the \$20,000 principal will be rolled into a bond maturing one year after the original three-year holding. When the second bond matures those funds roll into a bond that extends the ladder for another year. In this way, the investor has a steady return of interest income and can take advantage of any higher interest rates.

Again, to illustrate, let's say PepsiCo (PEP) floats a fixed-income bond issue for a new bottling plant in Argentina. The issued 5% bond is available at face value of \$1,000 each and is due to mature in five years. The company plans to use proceeds from the new plant to repay the debt.

You purchase 10 bonds costing a total of \$10,000 and will receive \$500 in interest payments each year for five years ($0.05 \times \$10,000 = \500). The interest amount is fixed and gives you a steady income. The company receives the \$10,000 and uses the funds to build the overseas plant. Upon maturity in five years, the company pays back the principal amount of \$10,000 to the investor who earned a total of \$2,500 in interest over the five years ($\$500 \times \text{five years}$).

6.1.1 Types of Fixed Income Products:

A government or business bond is the most typical example of a fixed-income asset, as was previously mentioned. Government-issued securities, sometimes known as Treasury securities, are the most popular type of security. However, non-government organizations and businesses also provide a large number of fixed income instruments. Here are the most common types of fixed income products:

1. **Treasury bills (T-bills)** are short-term fixed-income securities that mature within one year that do not pay coupon returns. Investors buy the bill at a price less than its face value and investors earn that difference at the maturity.
2. **Treasury notes (T-notes)** come in maturities between two and 10 years, pay a fixed interest rate, and are sold in multiples of \$100. At the end of the maturity, investors are repaid the principal but earn semiannual interest payments until maturity
3. **The Treasury bond (T-bonds)** are similar to the T-note except that it matures in 20 or 30 years. Treasury bonds can be purchased in multiples of \$100.
4. **Treasury Inflation-Protected Securities (TIPS)** protects investors from inflation. The principal amount of a TIPS bond adjusts with inflation and deflation.
5. **A municipal bond** is similar to a Treasury since it is government-issued, except it is issued and backed by a state, municipality, or county, instead of the federal government, and is used to raise capital to finance local expenditures. Muni bonds can have tax-free benefits to investors as well.
6. **Corporate bonds** come in various types, and the price and interest rate offered largely depends on the company's financial stability and its creditworthiness. Bonds with higher credit ratings typically pay lower coupon rates.
7. **Junk bonds** also called high-yield bonds are corporate issues that pay a greater coupon due to the higher risk of default. Default is when a company fails to pay back the principal and interest on a bond or debt security.
8. **A certificate of deposit (CD)** is a fixed income vehicle offered by financial institutions with maturities of less than five years. The rate is higher than a typical saving account, and CDs carry FDIC or National Credit Union Administration (NCUA) protection.

9. **Fixed-income mutual funds (bond funds)** such as those offered by Vanguard invest in various bonds and debt instruments. These funds allow the investor to have an income stream with the professional management of the portfolio. However, they will pay a fee for the convenience.
10. **Asset-allocation or fixed income ETFs** works much like a mutual fund. These funds target specific credit ratings, durations, or other factors. ETFs also carry a professional management expense.

6.1.2 Risks Associated with Fixed Income:

Fixed income investments give investors a consistent income stream throughout the course of the bond's or debt instrument's life while also giving the issuer access to capital or money that is desperately needed. These products are common in retirement portfolios because steady income enables investors to manage their spending. Investment portfolio risk, commonly referred to as market risk, can be stabilized by investors with the use of interest payments from fixed-income instruments. Prices for equities held by investors might change, resulting in significant gains or losses. Fixed-income products' consistent and reliable interest payments might help offset some of the losses brought on by falling equity values. As a result, these secure investments aid in spreading out an investment portfolio's risk.

Although there are many benefits to fixed income products, as with all investments, there are several risks investors should be aware of before purchasing them.

- **Credit and Default Risk:** Treasuries and CDs are protected by the government and FDIC, as was previously mentioned. Despite being less safe, corporate debt is nevertheless more likely to be repaid than equity held by shareholders. Consider the bond's and the underlying company's credit ratings while making your investing decision. The valuations of the fixed-income instrument prior to maturity might be affected in a variety of ways by the credit risk associated with a firm. Bond prices for a struggling corporation may decrease in value on the secondary market. A bond issued by a faltering corporation may not sell for its face value or par value if an investor tries to sell it. Due to a lack of demand, it could also be challenging for investors to sell the bond on the open market at a fair price or at all. Over the course of a bond's existence, prices may rise and fall. The price changes are unimportant if the investor maintains the bond until it matures because they will be compensated with the face value of the bond. However, the investor will get paid the current market value at the time of the sale if the bondholder sells the bond through a broker or financial institution before its maturity. Depending on the underlying company, the coupon interest rate, and the current market interest rate, the selling price could result in a gain or loss on the investment.
- **Interest Rate Risk:** Investors in fixed income could be exposed to interest rate risk. This risk arises when the bond's rate of interest payment lags behind market interest rates, which are growing. The bond would become less valuable in this situation in the secondary bond market. Additionally, because of the investment's linkage to the investor's cash, they are unable to use it to make additional money without first suffering a loss. For instance, if an investor bought a 2-year bond paying 2.5 percent annually and 2-year bond interest rates rose to 5 percent, the investor would still be locked in at 2.5 percent. Regardless of the direction interest rates take in the market, investors holding fixed-income securities receive their fixed rate, for better or worse.
- **Inflationary Risks:** Inflationary risk is also a danger to fixed income investors. The pace at which prices rise in the economy is called inflation. If prices rise or inflation increases, it eats into the gains

of fixed income securities. For example, if fixed-rate debt security pays a 2% return and inflation rises by 1.5%, the investor loses out, earning only a 0.5% return in real terms.

Pros & Cons of Fixed Income Securities:

The pros and cons of fixed income securities are listed below:

Pros:

- Steady income stream
- More stable returns than stocks
- Higher claim to the assets in bankruptcies
- Government backing on some

Cons:

- Returns are lower than other investments
- Credit and default risk exposure
- Susceptible to interest rate risk
- Sensitive to Inflationary risk

6.2 Bond Pricing:

Bond pricing is an empirical matter in the field of financial instruments. The price of a bond depends on several characteristics inherent in every bond issued. These characteristics are:

- Coupon, or lack thereof
- Principal/par value
- Yield to maturity
- Periods to maturity

Coupons: A bond may or may not come with attached coupons. A coupon is stated as a nominal percentage of the par value (principal amount) of the bond. Each coupon is redeemable per period for that percentage. For example, a 10% coupon on a \$1000 par bond is redeemable each period.

A bond may also come with no coupon. In this case, the bond is known as a zero-coupon bond. Zero-coupon bonds are typically priced lower than bonds with coupons.

Principal/Par Value: Each bond must come with a par value that is repaid at maturity. Without the principal value, a bond would have no use. The principal value is to be repaid to the lender (the bond purchaser) by the borrower (the bond issuer). A zero-coupon bond pays no coupons but will guarantee the principal at maturity. Purchasers of zero-coupon bonds earn interest by the bond being sold at a discount to its par value. A coupon-bearing bond pays coupons each period, and a coupon plus principal at maturity. The price of a bond comprises all these payments discounted at the yield to maturity.

Yield to Maturity: Bonds are priced to yield a certain return to investors. A bond that sells at a premium (where price is above par value) will have a yield to maturity that is lower than the coupon rate. Alternatively, the causality of the relationship between yield to maturity and price may be reversed. A bond could be sold at a higher price if the intended yield (market interest rate) is lower than the coupon rate. This is because the bondholder will receive coupon payments that are higher than the market interest rate, and will, therefore, pay a premium for the difference.

Periods to Maturity: Bonds will have a number of periods to maturity. These are typically annual periods, but may also be semi-annual or quarterly. The number of periods will equal the number of coupon payments.

Main Characteristics of Bond Pricing:

Ceteris paribus, all else held equal:

- A bond with a higher coupon rate will be priced higher
- A bond with a higher par value will be priced higher
- A bond with a higher number of periods to maturity will be priced higher
- A bond with a higher yield to maturity or market rates will be priced lower

An easier way to remember this is that bonds will be priced higher for all characteristics, except for yield to maturity. A higher yield to maturity results in lower bond pricing.

The empirical characteristics outlined above affect bond issues, especially in the primary market. There are other, however, bond characteristics that can affect bond pricing, especially in the secondary markets. These are:

- Creditworthiness of issuing firm
- Liquidity of bond trade
- Time to next payment

Firm Creditworthiness: Bonds are rated based on the creditworthiness of the issuing firm. These ratings range from AAA to D. Bonds rated higher than A are typically known as investment-grade bonds, whereas anything lower is colloquially known as junk bonds. Junk bonds will require a higher yield to maturity to compensate for their higher credit risk. Because of this, junk bonds trade at a lower price than investment-grade bonds.

Bond Liquidity: Bonds that are more widely traded will be more valuable than bonds that are sparsely traded. Intuitively, an investor will be wary of purchasing a bond that would be harder to sell afterward. This drives prices of illiquid bonds down.

Time to Payment: Finally, time to the next coupon payment affects the “actual” price of a bond. This is a more complex bond pricing theory, known as ‘dirty’ pricing. Dirty pricing takes into account the interest that accrues between coupon payments. As the payments get closer, a bondholder has to wait less time before receiving his next payment. This drives prices steadily higher before it drops again right after coupon payment.

Bond prices, rates, and yields: When investing in bonds it's imperative to understand how prices, rates, and yields affect each other.

If you buy a new bond and plan to keep it to maturity, changing prices, market interest rates, and yields typically do not affect you, unless the bond is called. But investors don't have to buy bonds directly from the issuer and hold them until maturity; instead, bonds can be bought from and sold to other investors on what's called the secondary market. Similar to stock, bond prices can be higher or lower than the face value of the bond because of the current economic environment and the financial health of the issuer.

How price is measured: Price is important when you intend to trade bonds with other investors. A bond's price is what investors are willing to pay for an existing bond.

Example: You are considering buying a corporate bond. It has a face value of \$20,000. At 3 points in time, its price—what investors are willing to pay for it—changes from 97, to 95, to 102.

Price and interest rates: The price investors are willing to pay for a bond can be significantly affected by prevailing interest rates. If prevailing interest rates are higher than when the existing bonds were issued, the prices on those existing bonds will generally fall. That's because new bonds are likely to be issued with higher coupon rates as interest rates increase, making the old or outstanding bonds generally less attractive unless they can be purchased at a lower price. So, higher interest rates mean lower prices for existing bonds.

If interest rates decline, however, bond prices of existing bonds usually increase, which means an investor can sometimes sell a bond for more than the purchase price, since other investors are willing to pay a premium for a bond with a higher interest payment, also known as a coupon.

This relationship can also be expressed between price and yield. The yield on a bond is its return expressed as an annual percentage, affected in large part by the price the buyer pays for it. If the prevailing yield environment declines, prices on those bonds generally rise. The opposite is true in a rising yield environment—in short, prices generally decline.

Determination of Bond Pricing: The price of any financial instrument is equal to the present value of the expected cash-flow. The interest rate or discount rate used to compute the present value depends on the yield offered on comparable securities in the market.

The first step in determining the price of a bond is to determine its cash-flow. The cash-flow of an option-free bond consists of (1) periodic coupon interest payments to the maturity date and (2) the par (or maturity) value at maturity. Although the periodic coupon payments can be made over any time interval (weekly, monthly, quarterly, semiannually, or annually), most bonds issued in the United States pay coupon interest semiannually. In our illustrations, we shall assume that the coupon interest is paid semiannually. Also, to simplify the analysis, we shall assume that the next coupon payment for the bond will be made exactly six months from now. In practice, determining the cash-flow of a bond is not simple, even if we ignore the possibility of default. The only case in which the cash-flow is known with certainty is for fixed-rate, option-free bonds. For callable bonds, the cash-flow depends on whether the issuer elects to call the issue. In the case of a puttable bond, it depends on whether the bondholder elects to put the issue. In either case, the date that the option will be exercised is not known. Thus the cash-flow is uncertain. For mortgage-backed and asset-backed securities, the cash-flow depends on prepayments.

The amount and timing of future prepayments are not known, and therefore, the cash-flow is uncertain. When the coupon rate is floating rather than fixed, the cash-flow depends on the future value of the reference rate. The techniques discussed in Part 5 have been developed to cope with the uncertainty of cash-flows.

The cash-flow for an option-free bond consists of an annuity (i.e., the fixed coupon interest paid every 6 months) and the par or maturity value. For example, a 20-year bond with a 9% (4.5% per 6 months) coupon rate and a par or maturity value of \$1,000 has the following cash-flows:

Semiannual coupon interest = \$1,000 x 0.045

= \$45

Maturity value = \$1,000

Therefore, there are 40 semiannual cash-flows of \$45, and a \$1,000 cash-flow 40 six-month periods from now.

Notice the treatment of the par value. It is not treated as if it will be received 20 years from now. Instead, it is treated on a consistent basis with the coupon payments, which are semiannual.

Determination of the Required Yield:

The interest rate that an investor wants from investing in a bond is called the required yield. The required yield is determined by investigating the yields offered on comparable bonds in the market. By comparable, we mean option-free bonds of the same credit quality and the same maturity. The required yield typically is specified as an annual interest rate. When the cash-flows are semiannual, the convention is to use one-half the annual interest rate as the periodic interest rate with which to discount the cash-flows. A periodic interest rate that is one-half the annual yield will produce an effective annual yield that is greater than the annual interest rate. Although one yield is used to calculate the present value of all cash-flows, there are theoretical arguments for using a different yield to discount the cash-flow for each period. Essentially, the theoretical argument is that each cash-flow can be viewed as a zero-coupon bond, and therefore, the cash-flow of a bond can be viewed as a package of zero-coupon bonds. The appropriate yield for each cash-flow then would be based on the theoretical rate on a zero-coupon bond with a maturity equal to the time that the cash-flow will be received.

Determination of the price:

Given the cash-flows of a bond and the required yield, we have all the necessary data to price the bond. The price of a bond is equal to the present value of the cash-flows, and it can be determined by adding (1) the present value of the semiannual coupon payments and (2) the present value of the par or maturity value. Because the semiannual coupon payments are equivalent to an ordinary annuity, the present value of the coupon payments and maturity value can be calculated from the following formula:

$$c \left[\frac{1 - \left\{ \frac{1}{(1+i)^n} \right\}}{i} \right] + \frac{M}{(1+i)^n}$$

Here, the first term in the formula is the same as the formula for the present value of an ordinary annuity for n periods.

c = semiannual coupon payment (\$)

n = number of periods (number of years times 2)

i = periodic interest rate (required yield divided by 2) (in decimal)

M = maturity value

Example: Compute the price of a 9% coupon bond with 20 years to maturity and a par value of \$1,000 if the required yield is 12%.

The cash-flows for this bond are as follows: (1) 40 semiannual coupon payments of \$45 and (2) \$1,000 40 six-month periods from now. The semiannual or periodic interest rate is 6%.

The present value of the 40 semiannual coupon payments of \$45 discounted at 6% is \$677.08, as shown below:

$$c = 45$$

$$n = 40$$

$$i = 0.06$$

$$\text{Now, } \$45 \left[\frac{1 - \frac{1}{(1.06)^{40}}}{0.06} \right] = \$677.08$$

The present value of the par or maturity value 40 six-month periods from now discounted at 6% is \$97.22, as shown below:

$$M = \$1000 ; n = 0.40 ; i = 0.06$$

$$\text{Again, } \$1000 \left[\frac{1}{(1.06)^{40}} \right] = \$97.22$$

The price of the bond is then equal to the sum of the two present values:

$$\text{Present value of coupon payments} = \$677.08$$

$$\text{Present value of par (maturity) value} = 97.22$$

$$\text{Price } \$774.30$$

Relationship between Required Yield and Price at a Given Time:

The price of an option-free bond changes in the direction opposite to the change in the required yield. The reason is that the price of the bond is the present value of the cash-flows. As the required yield increases, the present value of the cash-flows decreases; hence the price decreases. The opposite is true when the required yield decreases: The present value of the cash-flows increases, and therefore, the price of the bond increases.

The Relationship among Coupon Rate, Required Yield, and Price:

For a bond issue at a given point in time, the coupon rate and the term-to-maturity are fixed. Consequently, as yields in the marketplace change, the only variable that an investor can change to compensate for the new yield required in the market is the price of the bond. As we saw in the preceding section, as the required yield increases (decreases), the price of the bond decreases (increases).

Generally, when a bond is issued, the coupon rate is set at approximately the prevailing yield in the market. The price of the bond then will be approximately equal to its par value. For example, in Exhibit 6-1, we see that when the required yield is equal to the coupon rate, the price of the bond is its par value.

Consequently, we have the following properties:

- When the coupon rate equals the required yield, the price equals the par value.
- When the price equals the par value, the coupon rate equals the required yield.

When yields in the marketplace rise above the coupon rate at a given time, the price of the bond has to adjust so that the investor can realize some additional interest. This adjustment is accomplished by having the bond's price fall below the par value. The difference between the par value and the price is a capital gain and represents a form of interest to the investor to compensate for the coupon rate being lower than the required yield. When a bond sells below its par value, it is said to be selling at a discount. When the

required yield is greater than the coupon rate of 9%, the price of the bond is always less than the par value. Consequently, we have the following properties:

- When the coupon rate is less than the required yield, the price is less than the par value.
- When the price is less than the par value, the coupon rate is less than the required yield.

Finally, when the required yield in the market is below the coupon rate, the price of the bond must be above its par value. This occurs because investors who could purchase the bond at par would be getting a coupon rate in excess of what the market requires. As a result, investors would bid up the price of the bond because its yield is attractive. It will be bid up to a price that offers the required yield in the market. A bond whose price is above its par value is said to be selling at a premium.

Consequently, we have the following properties:

- When the coupon rate is greater than the required yield, the price is greater than the par value.
- When the price is greater than the par value, the coupon rate is greater than the required yield.

Time Path of a Bond:

If the required yield is unchanged between the time the bond is purchased and the maturity date, what will happen to the price of the bond? For a bond selling at par value, the coupon rate is equal to the required yield. As the bond moves closer to maturity, the bond will continue to sell at par value. Thus, for a bond selling at par, its price will remain at par as the bond moves toward the maturity date. The price of a bond will not remain constant for a bond selling at a premium or a discount. For all discount bonds, the following is true: As the bond moves toward maturity, its price will increase if the required yield does not change. For a bond selling at a premium, the price of the bond declines as it moves toward maturity.

Reasons for the Change in the Price of a Bond:

The price of a bond will change because of one or more of the following reasons:

- A change in the level of interest rates in the economy. For example, if interest rates in the economy increase (fall) because of Fed policy, the price of a bond will decrease (increase).
- A change in the price of the bond selling at a price other than par as it moves toward maturity without any change in the required yield. As we demonstrated, over time a discount bond's price increases if yields do not change; a premium bond's price declines over time if yields do not change.
- For non-Treasury bonds, a change in the required yield due to changes in the spread to Treasuries. If the Treasury rate does not change but the spread to Treasuries changes (narrows or widens), non-Treasury bond prices will change.
- A change in the perceived credit quality of the issuer. Assuming that interest rates in the economy and yield spreads between non-Treasuries and Treasuries do not change, the price of a non-Treasury bond will increase (decrease) if it's perceived credit quality has improved (deteriorated).
- For bonds with embedded options (callable bonds, puttable bonds, and convertible bonds), the price of the bond will change as the factors that affect the value of the embedded options change.

Pricing a Zero-Coupon Bond:

So far we have determined the price of coupon-bearing bonds. Some bonds do not make any periodic coupon payments. Instead, the investor realizes interest by the difference between the maturity value and the purchase price. The pricing of a zero-coupon bond is no different from the pricing of a coupon bond:

Its price is the present value of the expected cash-flows. In the case of a zero-coupon bond, the only cash-flow is the maturity value. Therefore, the price of a zero-coupon bond is simply the present value of the maturity value. The number of periods used to discount the maturity value is double the number of years to maturity. This treatment is consistent with the manner in which the maturity value of a coupon bond is handled.

Determination of the Price When the Settlement Date Falls Between Coupon Periods:

Say for example, the next coupon payment is six months away. This means that settlement occurs on the day after a coupon date. Typically, an investor will purchase a bond between coupon dates so that the next coupon payment is less than six months away. To compute the price, we have to answer the following three questions:

- How many days are there until the next coupon payment?
- How should we determine the present value of cash-flows received over fractional periods?
- How much must the buyer compensate the seller for the coupon interest earned by the seller for the fraction of the period that the bond was held?

The first question is the day-count question. The second is the compounding question. The last question asks how accrued interest is determined. Below we address these questions.

Day Count: Market conventions for each type of bond dictate the answer to the first question: The number of days until the next coupon payment. For Treasury coupon securities, a non-leap year is assumed to have 365 days. The number of days between settlement and the next coupon payment is therefore the actual number of days between the two dates. The day count convention for a coupon-bearing Treasury security is said to be "actual/actual," which means the actual number of days in a month and the actual number of days in the coupon period. For example, consider a Treasury bond whose last coupon payment was on March 1, 2021; the next coupon would be six months later on September 1, 2021. Suppose that this bond is purchased with a settlement date of July 17. The actual number of days between July 17 (the settlement date) and September 1 (the date of the next coupon payment) is 46 days (the actual number of days in the coupon period is 184), as shown below:

July 17 to July 31	- 14 days
August	- 31 days
September 1	- 1 day
Total	= 46 days

In contrast to the actual/actual day count convention for coupon-bearing Treasury securities, for corporate and municipal bonds and agency securities, the day count convention is "30/360." That is, each month is assumed to have 30 days and each year 360 days. For example, suppose that the security in our previous example is not a coupon-bearing Treasury security but instead either a coupon-bearing corporate bond, municipal bond, or agency security. The number of days between July 17 and September 1 is shown below:

Remainder of July	- 13 days
August	- 30 days
September 1	- 1 day

Total = 44 days

Compounding: Once the number of days between the settlement date and the next coupon date is determined, the present value formula must be modified because the cash-flows will not be received six months (one full period) from now. The Street convention is to compute the price as follows:

1. Determine the number of days in the coupon period.
2. Compute the following ratio: number of days between settlement and next coupon payment

$$w = \frac{\text{number of days between settlement and next coupon payment}}{\text{number of days in the coupon period}}$$

For a corporate bond, a municipal bond, and an agency security, the number of days in the coupon period will be 180 because a year is assumed to have 360 days. For a coupon-bearing Treasury security, the number of days is the actual number of days. The number of days in the coupon period is called the basis.

3. For a bond with n coupon payments remaining to maturity, the price is

$$p = \frac{c}{(1+i)^w} + \frac{c}{(1+i)^{1+w}} + \frac{c}{(1+i)^{2+w}} + \dots + \frac{c}{(1+i)^{n-1+w}} + \frac{M}{(1+i)^{n-1+w}}$$

where,

p = price (\$)

c = semiannual coupon payment (\$)

M = maturity value

n = number of coupon payments remaining

i = periodic interest rate (required yield divided by 2) (in decimal)

The period (exponent) in the formula for determining the present value can be expressed generally as $t-1+w$. For example, for the first cash-flow, the period is $1-1+w$, or simply w . For the second cash-flow, it is $2-1+w$, or simply $1+w$. If the bond has 20 coupon payments remaining, the last period is $20-1+w$, or simply $19+w$.

Accrued Interest and the Clean Price:

The buyer must compensate the seller for the portion of the next coupon interest payment the seller has earned but will not receive from the issuer because the issuer will send the next coupon payment to the buyer. This amount is called accrued interest and depends on the number of days from the last coupon payment to the settlement date. Accrued interest is not computed for all bonds. No accrued interest is computed for bonds in default or income bonds. A bond that trades without accrued interest is said to be traded "flat". The accrued interest is computed as follows:

$$AI = c \left[\frac{\text{number of days from last coupon payment to settlement date}}{\text{number of days in coupon period}} \right]$$

Conventional Yield Measures:

An investor who purchases a bond can expect to receive a dollar return from one or more of the following sources:

- The coupon interest payments made by the issuer
- Any capital gain (or capital loss- negative dollar return) when the bond matures, is called, or is sold
- Income from reinvestment of the coupon interest payments

This last source of dollar return is referred to as interest-on-interest. Three yield measures are commonly cited by market participants to measure the potential return from investing in a bond—current yield, yield-to-maturity, and yield-to-call. These yield measures are expressed as a percent return rather than as a dollar return. However, any yield measure should consider each of the three potential sources of return just cited. Below we discuss these three yield measures and assess whether they consider the three sources of potential return.

Current Yield: The current yield relates the annual coupon interest to the market price. The formula for the current yield is

$$\text{Current yield} = \frac{\text{annual dollar coupon interest}}{\text{price}}$$

For example, the current yield for an 18-year, 6% coupon bond selling for \$700.89 per \$1,000 par value is 8.56%, as shown below:

$$\text{Annual dollar coupon interest} = \$1,000 \times 0.06 = \$60$$

$$\text{Current yield} = 0.0856, \text{ or } 8.56\%$$

The current yield considers only the coupon interest and no other source of return that will affect an investor's return. For example, in Illustration 6, no consideration is given to the capital gain that the investor will realize when the bond matures. No recognition is given to a capital loss that the investor will realize when a bond selling at a premium matures. In addition, interest-on-interest from reinvesting coupon payments is ignored.

6.3 Yield-to-Maturity: The yield or internal rate of return on any investment is the interest rate that will make the present value of the cash-flows equal to the price (or initial investment). The yield-to-maturity is computed in the same way as the yield; the cash-flows are those which the investor would realize by holding the bond to maturity. For a semiannual-pay bond, doubling the interest rate or discount rate gives the yield-to-maturity.

The calculation of a yield involves a trial-and-error procedure. Practitioners usually use calculators or software to obtain a bond's yield-to-maturity.

Yield to Maturity (YTM) – otherwise referred to as redemption or book yield – is the speculative rate of return or interest rate of a fixed-rate security, such as a bond. The YTM is based on the belief or understanding that an investor purchases the security at the current market price and holds it until the security has matured (reached its full value), and that all interest and coupon payments are made in a timely fashion.

YTM is typically expressed as an annual percentage rate (APR). It is determined through the use of the following formula:

$$YTM = \frac{C + \frac{FV - PV}{t}}{\frac{FV + PV}{2}}$$

Where,

C – Interest/coupon payment

FV – Face value of the security

PV – Present value/price of the security

t – How many years it takes the security to reach maturity

The formula's purpose is to determine the yield of a bond (or other fixed-asset security) according to its most recent market price. The YTM calculation is structured to show – based on compounding – the effective yield a security should have once it reaches maturity. It is different from simple yield, which determines the yield a security should have upon maturity, but is based on dividends and not compounded interest.

It's important to understand that the formula above is only useful for an approximated YTM. In order to calculate the true YTM, an analyst or investor must use the trial and error method. This is done by using a variety of rates that are substituted into the current value slot of the formula. The true YTM is determined once the price matches that of the security's actual current market price.

Example of YTM Calculation: To get a better understanding of the YTM formula and how it works, let's look at an example. Assume that there is a bond on the market priced at \$850 and that the bond comes with a face value of \$1,000 (a fairly common face value for bonds). On this bond, yearly coupons are \$150. The coupon rate for the bond is 15% and the bond will reach maturity in 7 years.

$$\text{Thus, YTM} = \frac{150 + \frac{1000 - 850}{7}}{\frac{1000 + 850}{2}} = 18.53\%$$

The primary importance of yield to maturity is the fact that it enables investors to draw comparisons between different securities and the returns they can expect from each. It is critical for determining which securities to add to their portfolios. Yield to maturity is also useful as it also allows the investors to gain some understanding of how changes in market conditions might affect their portfolio because when securities drop in price, yields rise, and vice versa.

6.3.1 Calculation procedure of Standard Tenor Yield:

Standard tenor yield calculation process using the interpolation/extrapolation methods based on latest cut off yield of auctions as illustrated below:

Standard Tenor Yield (For 2, 5, 10 and 15 Years):

$$Y = Y1 + Y2 - Y1$$

$$T2 - T1 (T - T1)$$

Where,

Y1 = Latest auction cut-off yield.

Y2 = Immediate higher tenor cut-off yield.

T1 = Tenor of bond associated with Y1.

T2 = Tenor of bond associated with Y2.

T = Standard tenor.

Standard Tenor Yield (For 20 Year):

$$Y = Y1 + Y1 - Y3$$

$$T1 - T3 (T - T1)$$

Where,

Y3 = Immediate lower tenor cut-off yield.

T3 = Tenor of bond associated with Y3

Let's look at the following example:

Available Data from Auction		Standard Tenor Yield Calculation		
Tenor (Year)	Cut off Yield (%)	Standard Tenor (Year)	Calculation Process	Yield (%)
1.85	5.09	2	$5.09 + (5.45 - 5.09)/(4.92 - 1.85) * (2 - 1.85)$	5.11
4.92	5.45	5	$5.45 + (7.54 - 5.45)/(9.93 - 4.92) * (5 - 4.92)$	5.48
9.93	7.54	10	$7.54 + (7.70 - 7.54)/(14.92 - 9.93) * (10 - 9.93)$	7.54
14.92	7.70	15	$7.70 + (8.44 - 7.70)/(19.92 - 14.92) * (15 - 14.92)$	7.71
19.92	8.44	20	$8.44 + (8.44 - 7.70)/(19.92 - 14.92) * (20 - 19.92)$	8.45

6.4 Duration and Convexity:

Two strategies are used to control the risk exposure of fixed-income investments: duration and convexity. The duration gauges how sensitive the bond is to fluctuations in interest rates. Convexity refers to the relationship between an interest rate change's impact on a bond's yield and price. Investors use a statistic called duration to assess a bond's price sensitivity to changes in interest rates when dealing with coupon bonds. Fixed-income investors need a mechanism to calculate the average maturity of a bond's promised cash flow because coupon bonds make a series of payments during their tenure. This figure may then be used to calculate the bond's actual maturity. This is achieved by the length, enabling fixed-income investors to manage their portfolios more effectively by assessing uncertainty.

Along with maturity, yield, coupon, and call features, duration is one of the main properties of a fixed-income security (such as a bond). It is a tool for evaluating a fixed-income security's price volatility. Duration gauges how sensitive value variations are to changes in interest rates, which is one of the main

factors influencing a bond's value. According to the general rule, a longer duration denotes a higher possibility that a bond's value would decrease as interest rates rise.

In the portfolio and risk management of fixed-income instruments, duration is frequently used. A portfolio manager can adjust a portfolio's composition to match its duration with the anticipated level of interest rates using interest rate projections. Duration just shows one aspect of a fixed-income security, though. It is necessary to do a thorough study of the fixed-income asset utilizing all available data.

Types of Duration:

The duration metric comes in several modifications. The most common are the Macaulay duration, modified duration, and effective duration.

1. Macaulay Duration: Macaulay duration is a weighted average of the times until the cash flows of a fixed-income instrument are received. The concept was introduced by Canadian economist Frederick Macaulay. It is a measure of the time required for an investor to be repaid the bond's price by the bond's total cash flows. The Macaulay duration is measured in units of time (e.g., years).

The Macaulay duration for coupon-paying bonds is always lower than the bond's time to maturity. For zero-coupon bonds, the duration equals the time to maturity.

The formula for the calculation of Macaulay duration is expressed in the following way:

$$\text{Macaulay Duration} = \sum_i^n t_i * \frac{PV_i}{V} ; \text{ where,}$$

t_i – the time until the i th cash flow from the asset will be received

PV_i – The present value of the i th cash flow from the asset

V – The present value of all cash flows from the asset

2. Modified Duration: Relative to the Macaulay duration, the modified duration metric is a more precise measure of price sensitivity. It is primarily applied to bonds, but it can also be used with other types of securities that can be considered as a function of yield. The modified duration figure indicates the percentage change in the bond's value given an X% interest rate change. Unlike the Macaulay duration, modified duration is measured in percentages.

The modified duration is often considered as an extension of the Macaulay duration. It is supported by the following mathematical formula:

$$\text{Modified Duration} = \frac{\text{Macaulay Duration}}{1 + \frac{YTM}{n}}; \text{ where:}$$

YTM – The yield to maturity of a bond

n – The frequency of compounding

3. Effective Duration: Effective duration is a measure of the duration for bonds with embedded options (e.g., callable bonds). Unlike the modified duration and Macaulay duration, effective duration considers fluctuations in the bond's price movements relative to the changes in the bond's yield to maturity (YTM). In other words, the measure takes into account possible fluctuations in the expected cash flows of a bond.

The effective duration is calculated using the following formula:

Effective Duration = $\frac{V_{-\Delta y} - V_{+\Delta y}}{2 * V_0 * \Delta y}$; where,

$V_{-\Delta y}$ – The bond's value if yield falls by $y\%$

$V_{+\Delta y}$ – The bond's value if yield rises by $y\%$

V_0 – The present value of all cash flows of the bond

Δy – The yield change

Duration is critical to managing fixed-income portfolios, for the following reasons:

- It's a simple summary statistic of the effective average maturity of a portfolio.
- It's an essential tool in immunizing portfolios from interest rate risk.
- It estimates the interest rate sensitivity of a portfolio.

The duration metric carries the following properties:

- The duration of a zero-coupon bond equals time to maturity.
- Holding maturity constant, a bond's duration is lower when the coupon rate is higher, because of the impact of early higher coupon payments.
- Holding the coupon rate constant, a bond's duration generally increases with time to maturity. But there are exceptions, as with instruments such as deep-discount bonds, where the duration may fall with increases in maturity timetables.
- Holding other factors constant, the duration of coupon bonds is higher when the bonds' yields to maturity are lower. However, for zero-coupon bonds, duration equals time to maturity, regardless of the yield to maturity.
- The duration of level perpetuity is $(1 + y) / y$. For example, at a 10% yield, the duration of perpetuity that pays \$100 annually will equal $1.10 / .10 = 11$ years. However, at an 8% yield, it will equal $1.08 / .08 = 13.5$ years. This principle makes it obvious that maturity and duration may differ widely. Case in point: the maturity of the perpetuity is infinite, while the duration of the instrument at a 10% yield is only 11 years. The present-value-weighted cash flow early on in the life of the perpetuity dominates the duration computation.

Examples of Bond Duration: The rule of thumb is, for every 1% change in interest rates, the value of the bond will either increase or decrease by the same amount as its duration. By examining three different bonds, zero-coupon bonds, short-term bonds and long-term bonds, we can shed light on just how much duration can affect its value.

- **Long-Term Bonds:** Let's use the 30-year Treasury with 4.5% coupon and a duration of 14.5 years as another example. If rates rose 2% in this scenario, the bond would lose 26% of its value! So you see how interest rate changes can really play havoc on bonds with longer terms. Even though its coupon is greater, the higher duration makes it more prone to interest rate fluctuations.
- **Zero-Coupon Bonds:** The easiest duration to calculate is that of a zero-coupon bond. This bond has zero yield, which means it does not pay any interest. Its duration is equal to its time to maturity. When a coupon is added to a bond, the duration will always be less than its maturity.
- **Short and Medium-Term Bonds:** In a nutshell, the general rule is that for every 1% increase in interest rates, a bond's price will decrease 1% for every year of duration. Alternatively, for every 1% decrease in interest rates, the bond will increase 1% for every year of duration.

Duration	Interest Rate Change	Bond Price Change
10 years	+1%	-10%
10 years	-1%	+10%

For example, if interest rates rose by 2%, a 10-year Treasury with a coupon of 3.5% and a duration of 8.4 years would fall in value by 15%.

Duration for Gap Management:

Asset and obligation maturities are often out of whack in banks. Customers' deposits make up the majority of bank obligations, which are often short-term in nature and have low duration statistics. On the other hand, a bank's assets are mostly made up of outstanding consumer and business loans. These assets often have a longer tenure, and interest rate changes have a greater impact on their value. Banks' net worth may drastically decline during times when interest rates unexpectedly jump if the value of their assets declines more than the value of their liabilities.

A common risk management approach is called "gap management," in which banks try to reduce the "gap" between the durations of their assets and liabilities. Adjustable-rate mortgages (ARMs), which are crucial elements in shortening the duration of bank asset portfolios, are significantly reliant on gap management. Because they are pegged to the current interest rate, ARMs do not lose value when market rates rise like traditional mortgages do. By extending the maturity of bank liabilities, the issuance of longer-term bank certificates of deposit (CDs) with set terms to maturity helps close the duration gap on the other side of the balance sheet.

By balancing the durations of assets and liabilities, banks can effectively protect their overall position against changes in interest rates. Theoretically, the size of a bank's assets and liabilities are about equal. As a result, assuming their durations are likewise identical, any change in interest rates will have the same impact on the value of assets and liabilities. As a result, interest rate changes will have little to no impact on net worth in the long run. Therefore, a portfolio duration, or gap, of zero is necessary for net worth immunization.

Banks operate with an eye toward current liabilities; institutions with future fixed responsibilities, such as pension funds and insurance companies, operate with a view toward future liabilities. For instance, pension plans must keep enough money on hand to pay workers an income stream when they retire. The value of the assets owned by the fund and the rate at which those assets produce income fluctuate along with interest rates. As a result, portfolio managers may want to hedge against interest rate changes in order to preserve the fund's future accrued value at a specific date. In other words, immunization protects assets and liabilities that are duration-matched, ensuring that a bank can fulfill its obligations regardless of changes in interest rates.

Convexity in Fixed Income Management:

Duration has drawbacks as an indicator of interest rate sensitivity, regrettably. In reality, the relationship between price and yield changes in bonds is convex rather than linear, despite the fact that the statistic calculates a linear relationship between price and yield changes. Bond convexity can be used to gauge a bond's susceptibility to interest rate changes. Bonds with higher convexity are typically thought to be better investments in markets where interest rates are anticipated to increase, whereas bonds with lower convexity are preferable in environments where rates are anticipated to remain stable or decline.

In general, the higher the coupon, the lower the convexity, because a 5% bond is more sensitive to interest rate changes than a 10% bond. Due to the call feature, callable bonds will display negative convexity if yields fall too low, meaning the duration will decrease when yields decrease. Zero-coupon bonds have the highest convexity, where relationships are only valid when the compared bonds have the same duration and yields to maturity. Pointedly: a high convexity bond is more sensitive to changes in interest rates and should consequently witness larger fluctuations in price when interest rates move.

The opposite is true of low convexity bonds, whose prices don't fluctuate as much when interest rates change. When graphed on a two-dimensional plot, this relationship should generate a long-sloping U shape (hence, the term "convex").

Bonds with low and zero coupon rates exhibit the largest interest rate volatility and typically offer lower yields. Technically speaking, this indicates that a larger modification to the bond's adjusted length is needed to keep up with the higher change in price after interest rate changes. Higher degrees of convexity are accompanied by lower yields and lower yields are accompanied by lower coupon rates.

A bond's lifespan varies along with its yield. The convexity of a bond gauges how sensitive its duration is to variations in yield. A bond's price change can't be accurately measured by duration since it suggests that the change is linear when it actually has a sloped or "convex" shape. If a bond's duration increases while the yield decreases, this is referred to as positive convexity. An increase in price brought on by a decrease in rates will have a greater impact on a bond with positive convexity than a rise in price brought on by an increase in yields. Since prices become less sensitive when yields increase (prices go down), positive convexity can be thought of as benefiting investors (prices up). Bonds may also exhibit negative convexity, which would mean that as rates rise, duration climbs as well, potentially working against the interests of investors.

A useful way to visualize a bond's convexity is to plot the potential price change against various yields. If two bonds have the same duration and yield but differing convexities, a change in interest rates will affect each bond differently.

6.5 Primary and Secondary Market of Govt. Securities:

Although the word "market" can refer to a wide range of concepts, it is most frequently used as a blanket term to describe both the main market and the secondary market. In actuality, the words "primary market" and "secondary market" are separate. Investors frequently refer to the "market" in general terms rather than naming the specific market they are referring to. However, the primary and secondary markets differ significantly from one another. When businesses or sovereign governments initially need to raise money, they first issue securities like stocks or bonds. It is difficult for individual investors to access and is primarily aimed at big institutional investors. Investors can buy or sell securities from or to other investors in the secondary market, which is the location of trading operations. Additionally, it is significant because it might reveal information about the state of the whole economy. Primary and secondary markets make up the capital markets. In the primary market, a business or government usually seeks to raise capital by releasing brand-new securities onto the market for the first time. Securities are created in the primary market. Investors exchange already-available securities with one another in the secondary market. The secondary market serves as a gauge for the state of the economy. Due to the huge institutions that typically participate in primary markets, individual investors typically have limited access to these markets.

Primary Markets:

Newly created securities that have not yet been traded come from the primary market. A firm or the government may offer securities to the market, most frequently in the form of shares or bonds, when they need to raise money for their operations, expansion plans, or policies. New securities are bought directly from the issuer in the primary market. Underwriters will assist and advise issuers throughout the process of the first public offering (or IPO). These advisers are often sizable investment banks that use their reputation and contacts to draw cash and find institutional investors to acquire the newly minted securities.

For example, company ABCWXYZ Inc. hires five underwriting firms to determine the financial details of its IPO. The underwriters detail that the issue price of the stock will be \$15. Investors can then buy the IPO at this price directly from the issuing company. This is the first opportunity that investors have to contribute capital to a company through the purchase of its stock. A company's equity capital is comprised of the funds generated by the sale of stock on the primary market.

Since it is impossible to predict future demand, price volatility is frequently higher in primary markets. However, underwriters can effectively limit the risk by using short-term price stabilization techniques. Since sovereign bonds do not trade on a centralized exchange, they are often made available at state-sponsored auctions. For instance, in the UK, the primary market for new gilt issues is managed by the Debt Management Office (or DMO). Since new shares are often first issued to big institutions, small or individual investors typically have limited access to IPOs. Investing in a collective investment plan that participates in the offering, typically a mutual fund or investment trust, is one method that gives individual investor's exposure to IPOs.

Types of Primary Offering:

A rights offering (issue) permits companies to raise additional equity through the primary market after already having securities enter the secondary market. Current investors are offered prorated rights based on the shares they currently own, and others can invest anew in newly minted shares.

Other types of primary market offerings for stocks include private placement and preferential allotment. Private placement allows companies to sell directly to more significant investors such as hedge funds and banks without making shares publicly available. While preferential allotment offers shares to select investors (usually hedge funds, banks, and mutual funds) at a special price not available to the general public.

Similarly, businesses and governments that want to generate debt capital can choose to issue new short- and long-term bonds on the primary market. New bonds are issued with coupon rates that correspond to the current interest rates at the time of issuance, which may be higher or lower than pre-existing bonds.

The important thing to understand about the primary market is that securities are purchased directly from an issuer.

Secondary Markets:

The trading activity happens on the secondary market. Stocks and other securities can be traded between buyers and sellers, but the underlying corporation is not involved. The NYSE (New York Stock Exchange), LSE (London Stock Exchange), and NASDAQ are examples of secondary markets. These over-the-counter transactions for equity and fixed income assets are made possible by stock exchanges (OTC). The secondary market is frequently referred to as the "stock market" when buying stocks. Investors trading among themselves is what makes the secondary market unique. Many investors believe that secondary markets may accurately foretell the economic cycle; an increase or decrease in stock

values denotes a boom or a recession. Through supply and demand, secondary markets can further push share prices in the direction of their intrinsic worth, enhancing both market and economic efficiency. In typical market conditions, the majority of secondary markets are extremely liquid, allowing investors to purchase and sell securities at nearly any time, which attracts individual investors. In other words, investors trade previously issued securities on the secondary market without the involvement of the issuing company.

For instance, if you want to buy Amazon (AMZN) stock, you will only be dealing with other investors who also hold Amazon shares. Amazon is not directly involved with the transaction. In the debt markets, while a bond is guaranteed to pay its owner the full par value at maturity, this date is often many years down the road. Instead, bondholders can sell bonds on the secondary market for a tidy profit if interest rates have decreased since the issuance of their bond, making it more valuable to other investors due to its relatively higher coupon rate.

The secondary market can be further broken down into two specialized categories:

1. **Auction Markets:** In the auction market, everyone who wishes to trade securities gathers in one location and declares the prices at which they are prepared to purchase and sell. The terms "bid" and "ask" apply to these. The assumption is that by bringing all parties together and requiring them to publicly disclose their prices, an efficient market should win out. Therefore, theoretically, finding the optimum price for an item is unnecessary because mutually agreeable pricing will arise as a result of the convergence of buyers and sellers. The New York Stock Exchange serves as the best illustration of an auction market (NYSE).
2. **Dealer Markets:** A dealer market, on the other hand, does not call for parties to assemble in one place. Instead, electronic networks are used to connect market participants. The dealers keep a stock of securities and are then prepared to transact with other market participants. The difference in the prices at which these dealers acquire and sell assets is how they make money. The Nasdaq is an illustration of a dealer market where dealers, also referred to as market makers, set definite bid and ask prices at which they are willing to purchase and sell securities. According to the premise, dealers will compete to offer investors the best price.

Over-the-counter (OTC) market is a term that is occasionally used to describe a dealer market. The phrase initially referred to a system that was rather disorganized and in which trade took place through dealer networks rather than at a physical location as we have previously defined. The phrase likely originated from the burgeoning off-Wall Street trading that took place during the 1920s' great bull market, in which shares were traded "over-the-counter" on stock exchanges. In other terms, the equities were "unlisted," meaning they were not listed on a stock exchange.

Over time, however, the meaning of OTC began to change. The Nasdaq was created in 1971 by the National Association of Securities Dealers (NASD) to bring liquidity to the companies that were trading through dealer networks.³ At the time, few regulations were placed on shares trading over-the-counter, something the NASD sought to improve. As the Nasdaq has evolved over time to become a major exchange, the meaning of over-the-counter has become fuzzier.

Nowadays, the term "over-the-counter" generally refers to stocks that are not trading on a stock exchange such as the Nasdaq, NYSE, or American Stock Exchange (AMEX). This means that the stock trades either on the over-the-counter bulletin board (OTCBB) or the pink sheets. Neither of these networks is an exchange; in fact, they describe themselves as providers of pricing information for securities. OTCBB and pink sheet companies have far fewer regulations to comply with than those that trade shares on a stock

exchange. Most securities that trade this way are penny stocks or are from very small companies. For these reasons, while the Nasdaq is still considered a dealer market and, technically, an OTC, today's Nasdaq is also a stock exchange and, therefore, it is inaccurate to say that it trades in unlisted securities.

You might also hear the terms "third" and "fourth" markets. These don't concern individual investors because they involve significant volumes of shares to be transacted per trade. These markets deal with transactions between broker-dealers and large institutions through over-the-counter electronic networks. The third market comprises OTC transactions between broker-dealers and large institutions. The fourth market is made up of transactions that take place between large institutions. The main reason these third- and fourth-market transactions occur is to avoid placing these orders through the main exchange, which could greatly affect the price of the security. Because access to the third and fourth markets is limited, their activities have little effect on the average investor.

6.6 Government Securities Market in Bangladesh:

Government securities market of Bangladesh is consist of tradable and non-tradable securities. Non-tradable securities include National Savings Certificates i.e. Sanchayapatras and Sanchayabonds which are only for retail investors.

The tradable securities include Treasury Bills (T-Bills) of 91, 182 and 364 days maturities and Bangladesh Government Treasury Bonds (BGTB) of 2, 5, 10, 15 and 20 years maturities. T-Bills and BGTBs are issued through auctions. Only Primary Dealers (PD) can submit bids in the auctions. Other institutions and individuals can submit bids in auction but through the PDs. At present 20 banks are performing as Primary Dealer. T-Bills and BGTBs can be sold in the secondary market.

Non-resident individual and institutional investors also eligible to buy BGTBs through a Non-Resident Foreign Currency Account and Non-Resident Investor's Taka Account maintained with commercial banks of Bangladesh.

Bangladesh Bank have its own depository system for the transaction and settlement of Government securities in the Market Infrastructure (MI) Module. In 2011 BB introduced this automated system to expedite the primary auction and secondary market.

Bangladesh Bank initiated to automate the process of trading and settlement of Government securities transactions in October 2011. The secondary market of Government securities of Bangladesh is comprised of Over the Counter (OTC) and Trader Work Station (TWS). Both the procedure are the integral parts of Market Infrastructure Module (MI Module)-the automated auction and trading platform of government securities.

- **Over-the-Counter (OTC):** In OTC market participants are required to submit sale/buy order in the OTC platform while counter party conform the order. Once they complete the trading process and the system accepts trades, the data automatically flows to Core Banking System (CBS) for clearing and settlement of funds for completion of the settlement of funds in CBS. Further, the trading securities have been transferred automatically to the buyer securities account in MI.
- **Trader Work Station (TWS):** Bangladesh Bank has introduced the Trader Work Station (TWS)- an Order Matching system. The TWS is an electronic, screen based, order driven trading system for dealing in Government securities. In addition, the platform highlights the existing facility of Over-The-Counter (OTC) market in Government securities. Further, the TWS brings transparency in secondary market transactions in Government securities. Members can place bids (buy orders) and offers (sell orders) directly on the TWS screen. The system is order driven that

matches all bids and offers focusing price/time. In particular, among the similar price orders, it matches the order on first come and first serve basis. The TWS facilitates Straight-Through-Processing (STP) system. In that system, trades that are automatically sent to the CBS for settlement.

6.7 DIBOR:

Dhaka Interbank Offered Rate (DIBOR) saw its inauguration in January of 2010 by Dr. Atiur Rahman, then governor of the Bangladesh Bank. At present, the administration of DIBOR is undertaken by the Bangladesh Foreign Exchange Dealers' Association (BAFEDA), and this includes the duty to calculate the weighted average of the rates submitted by member banks.

In order to determine the value of short-term loans and floating rate notes at a given maturity date, DIBOR establishes the benchmark interest rate at which banks can borrow from or lend to one another. An easy illustration would be for Bank X to give Bank Y a dollar loan for 30, 60, or 90 days based on the daily DIBOR rate. All interbank rates share the same goal of providing transparency, sustainability, and a useful barometer of confidence and trust between the active institutions and the broader financial market.

The question of whether the DIBOR rate is susceptible to manipulation has now remained unanswered. It is, in fact. The trial of former UBS trader Tom Alexander William Hayes in the UK has prompted alarm, which has now been raised. He was found guilty on five charges of conspiring to commit fraud in connection with the manipulation of the Japanese yen LIBOR in August 2015.

The London Interbank Offered Rate, also known as LIBOR, is widely acknowledged as the foundation for determining the interbank commercial lending rates globally for financial instruments like bonds, credit cards, and mortgages. Nearly \$450 trillion worth of contracts are estimated to be affected by the rate. This incredible price represents about one-fourth of the worldwide derivatives market.

The LIBOR controversy was born at the height of the 2007–2008 global financial crisis and the subsequent collapse and meltdown of the sub-prime mortgage industry. Member institutions and individuals were severely fined and criticized for collaborating to submit fraudulent rates in order to boost their credibility and make money off of their lending.

The idea that the numerous LIBOR rates for various currencies and maturities were not precisely determined by a quantitative approach forms the foundation of part of the scandal's justification. Member banks were given the freedom to make some educated guesses and/or estimates. However, changes have been made since the scandal. The system is now based on actual bank-to-bank transactions, and the Intercontinental Exchange (ICE) serves as a central market that displays the history of transactions. By doing this, the objective of having a transparent market is met, and the utility gained via backdoor monopolies is reduced. It is reasonable to infer that Hayes is only one of the numerous traders involved in LIBOR fixing. He was nevertheless the first to be found guilty and given an 11-year term for this crime in the UK. Not to diminish the standing of the BAFEDA in any respect, it is worth noting that in this turbulent period the supervision and surveillance of LIBOR was superseded by the ICE from the British Banker's Association. This paved the way for a more transparent system.

The expectations from member banks connected to DIBOR are relatively straightforward and they are under an obligation to provide submissions that is and was a genuine and honest representation of their assessment and with the genuine view that the rate submitted is one which would not advantage the submitter unfairly. We should tread carefully so as not to fall within the same trap that led to the LIBOR scandal.

DIBOR is still in its infancy and requires proper nurturing and oversight to ensure it obtains the standing of a benchmark rate that is both trustworthy and reliable. The onus falls on all those concerned to guarantee that it is the case.

6.8 Primary Dealer Activities:

Primary Dealers are financial institutions that act as underwriters of government securities in primary auction. Auction Committee can devolve securities on Primary Dealers (PDs) in case they find the offered bids unacceptable. PDs receive periodic underwriting commission on successful bids and devolved amount. A primary dealer is a bank or financial institution that is approved to trade in national securities treasury bills and bonds. The government collects money by selling Treasury Bills (T-Bills) and Bangladesh Government Treasury Bonds (BGTBs) issued through auctions. Only primary dealers (PD) can submit bids at these auctions where the central bank acts as the government representative. Out of 61 banks, only 20 banks are working as primary dealers at present in Bangladesh.

With a view to activating a secondary market in Treasury bills and other Government securities, it has been decided to introduce the following guidelines for enlistment and operations of Primary Dealers (PDs) with roles in subscribing and underwriting primary issues and in market making for secondary trading deals with firm two-way price quotes.

Objectives:

1. To enhance liquidity and depth in the securities market by facilitating price discovery and turnover, encouraging voluntary holding of government securities amongst a wide investor base;
2. To develop underwriting and market making capabilities for government securities amongst the market participants;
3. To facilitate efficient liquidity management, and open market operations of monetary policy management

Eligibility for Primary Dealership:

The Bangladesh Bank (BB) shall select PDs from amongst the scheduled banks and licensed financial institutions with current accounts with the BB for fulfillment of Cash Reserve Requirement. In selecting PDs from amongst the intending applicants and in allotting to them specified minimum subscription and underwriting responsibilities, the BB shall take into account their-

- i) physical infrastructure in terms of number and geographical coverage of offices/branches for securities dealings, the extent of use of computers and information technology in settlement, record keeping and analysis of day to day transactions, skill and capabilities of the manpower for efficient participation in primary issues and secondary trading, and for advising and educating the investing public about investment in Government securities;
- ii) internal control system for fair conduct of business, settlement of trade and maintenance of accounts in securities transactions, risk management capabilities and arrangements;
- iii) the level of past engagement in primary auctions and secondary trading transactions in Treasury bills and other Government securities, on own account and on account of customers;

- iv) solvency and overall standard of the applicant's compliance with the prudential and regulatory guidelines of the BB and other relevant regulatory agencies

Roles and responsibilities of a PD

- i) A PD shall regularly and actively participate in all primary auctions and issues of Treasury bills and tradable securities, with bidding commitment for a minimum specified percentage of the primary issues of Treasury bills and underwriting commitment for a minimum specified percentage of primary issues of dated Government securities over a year. These minimum bidding and underwriting requirements will be allotted by the BB in a manner ensuring off-take of the entire intended volumes of issues. The PDs will be required to maintain success ratios (successful bids: allotted targets) of 40 percent or higher in bids over a year. A PD shall, if asked for by the BB, subscribe in any issue over and above its successful bid but within its minimum bidding or underwriting commitment, at the weighted average yield of the accepted bids for auctioned issues, and at par in case of fixed par issues.
- ii) A PD shall, within the first year of operation as PD, acquire a sizeable portfolio of Treasury bills and Government securities substantially in excess of its own SLR. The PD shall actively engage in secondary trading, quoting firm two-way prices and keeping its trading window open throughout each business day. An annual turnover (total purchases and sales, inclusive of redemptions at maturity) not less than ten times the average of month-end stocks of Treasury bills and Government securities over the year shall be attained and maintained.

Regulations for operations as PD:

Apart from the general regulatory instructions and prudential guidelines for scheduled banks and licensed financial institutions as applicable, a PD shall be subject to the following regulations in its operations as a dealer in Treasury bills and Government securities:

- A PD shall not act as interbank or inter dealer broker.
- A PD shall maintain separate accounts in respect of its own positions and customer transactions, with separate Subsidiary General Ledger (SGL) account in the name of each customer.
- For bids in primary issues on behalf of customers, a PD shall, if so desired by a customer, quote the price indicated by the customer. Purchases against bids on behalf of customers would immediately be credited in the SGL accounts of the customers concerned.
- Transfers arising from secondary trading deals shall be booked through the SGL accounts maintained in the PD's own books; and also in the PD's SGL account with the BB, submitting transfer applications as per procedure to be prescribed by the BB.
- Prices would be quoted by a PD in terms of face value units of Taka 100. A two-way price quote of Taka 101.00/101.50 would indicate premium of Taka 1.00 and Taka 1.50 for bid and offer, while a quote of Taka 98.50/99.00 would indicate discount of Taka 1.50 and Taka 1.00 on bid and offer. The bid and offer prices may differ for deals of differing sizes, but in no case should the bid-offer spread be more than taka 0.50.
- The secondary trading deals of a PD would be on spot value basis, considered as T+2 local working days.
- A PD shall not short-sell any particular issue and shall not carry a short position in secondary dealings.

- A PD shall furnish to the BB daily returns on dealing prices, positions and transactions on own account and on account of customers. A PD shall also furnish to the BB such other returns and reports in such forms and at such intervals as may be prescribed from time to time by the BB.
- The BB shall reserve the right to inspect the books and records of all transactions and dealings of a PD;
- A PD shall immediately bring to the notice of the BB any major complaint against it by a customer, and any action initiated or taken against it by any regulatory entity including the BSEC, the Registrar of Joint Stock Companies, the Income Tax authorities, the Stock Exchanges.

Privileges of a PD:

i) A PD shall have the credential of a sub-depository of Treasury bills and Government securities, for custodial services to its customers.

ii) Between bids at the same yield/p rice for an issue in a primary auction, the bid of a PD will rank higher in priority for acceptance than those of other bidders.

iii) A PD shall be eligible for liquidity support from the BB for its operations, collateralized by Treasury bills and Government securities from its own positions, through the repo mechanism or such other arrangements as the BB may prescribe from time to time.

iv) A PD shall be entitled to underwriting commission on the issues of dated government securities underwritten by it, at rates to be prescribed by the Government from time to time (non-fulfillment of the minimum underwriting commitment will in turn attract penalties at rates to be prescribed from time to time).

6.9 Case Study:

Perpetual Bond: A capital market instrument and step forward for developing the bond market

The coupon payments on perpetual bonds will, theoretically, be paid forever – in perpetuity – hence the name, perpetual bonds. Perpetual bonds are bonds with no maturity date. They pay interest to investors in the form of coupon payments, just as with most bonds, but the bond's principal amount does not come with a set date for redemption (repayment). The coupon payments on perpetual bonds will, theoretically, be paid forever – in perpetuity – hence the name, perpetual bonds.

Additional Tier 1 (AT1) bonds are issued to raise Additional Tier 1 capital; as per the Basel III norms, they ensure that a financial institution's capital requirements are met. Perpetual bonds are seen as riskier quasi-debt instruments which do not have fixed maturity. Issuers pay coupons on these forever. The price of such a bond is the coupon amount divided by a constant discount rate. Since they have no maturity date, investors can get their investment back only by selling them in the secondary debt market, unless the issuer calls the bonds back, i.e., redeems them.

The issuer has several advantages to raise capital through issuing perpetual bonds because unlike Tier-II subordinated bonds, perpetual bonds have only a one-time flotation cost, cheaper than common stock, having call option issuer has the right to retire the bond and issue a less costly bond.

On the contrary, the investor should consider the following before investing in perpetual bonds:

1. Liquidity: This is a new instrument and has no secondary market. If a proper secondary market is not established then the investors will have no way of unloading the investment. However, the bonds are freely transferable in accordance with the provisions of the Deed of Trust.

2. Asset quality and capital management of the issuer: Increasing NPL and weak capital management will reduce the distributable profit which ultimately reduces the probability of providing coupon income.

3. Corporate Governance: Good corporate governance and status as well exposure of the BoD is important.

4. Long term share price of the issuing bank: Assessing intrinsic value based on fundamental analysis. Moreover, the investors must incorporate the distressed economic situation in the valuation.

5. Inflation risk and interest rate risk: Higher inflation rates and long term interest rates view is very essential. Due to the coupon cap at 10 percent, the investors cannot avail of higher rate benefits.

6. Repayment date risk: The issuer has the full discretion to cancel the distributions/ payments of the bonds.

7. Capital market exposure: Currently, these instruments are not listed but will later have capital market exposure once it is listed in the capital market.

The steps that need to be taken by the regulator:

Considering the nature of the perpetual bond, scheduled banks and NBFIs are likely to be the major investors. The following should be resolved immediately to fully subscribe to these instruments.

1. Ensure individual participation: The investor may facilitate individual investment by making regulations that allow perpetual bonds worth Tk. 10,000.00 or Tk.100, 000.00 to be issued.

2. Sinking fund issue: For bonds (convertible/non-convertible) and debentures issued by institutions other than PSEs (public sector entities), initially, the issuer must maintain a sinking fund of 10 percent of the instrument issue size. Subsequently, the issuer also has to contribute 3 percent of annual revenue into sinking funds until maturity. This criterion is only applicable if a bank has made investments in this instrument. As a bank-based economy, to develop the bond market, the regulator can modify the rule depending on their research and judgment.

3. CIB reporting issue: As per DOS circular-04 dated 26 May 2019, banks are instructed to report these types of investment in the CIB portal of Bangladesh Bank. Bangladesh Bank should solve and enforce this issue for proper and transparent reporting. CIB reporting system currently is utilized only for reporting loans and advances.

4. Capital market exposure: These types of instruments are non-listed securities. In the future, the perpetual bonds may be listed in the capital market and expose bank investments to capital market risks. As with Tier-II debt instruments, the regulator should consider whether there is any scope for keeping perpetual bonds outside of capital market exposures.

6.10 Practice Questions:

1. Write short notes on the following topics:
 - a) Coupon
 - b) Par value
 - c) Yield-to-maturity
 - d) Duration & convexity
 - e) Secondary Markets
 - f) DIBOR
2. What are the key features of a fixed income securities? Briefly describe the types of fixed income securities.
3. What are the pros and cons of a fixed income security?
4. From an investor's point of view, what considerations must be made before investing in a perpetual bond?
5. Define primary dealers and their objectives? Also state the roles and responsibilities of a PD.
6. State some measures that the regulators can take to keep the deposits in banking system.
7. Briefly describe the government security markets in Bangladesh.

Module G: Risk Management

7.1 Risk Factors in Bank:

Risk factors are cautionary statements about risks a company faces that could have a material adverse impact on its business, financial condition and results of operations. Risk factors improve a company's overall disclosure by highlighting the challenges it faces. Practitioners often refer to risk factor disclosure as an insurance policy for the company because it can also help mitigate litigation and liability risk. Risk factors appear in a separately captioned heading of a prospectus, offering memorandum or periodic report and provide investors with management's views on the risks the company faces and, if those risks materialize, the effect they may have on:

- The company's business, financial condition and results of operations.
- The value of company securities held by investors.

From a Treasury perspective, Risk Management is the practice of planning for unexpected expenditures. It is primarily about mitigating and avoiding the impact of the changing financial environment on the company's cash flow objectives. Risk management is a broad term, though. Depending on the context of a company's operations, it can also have very different meanings, so it is also useful here to point out the forms of risk management that fall outside the scope of Treasury. This is not an article about governmental regulation, earthquakes, political instability, or the threat of potential new business competitors. These forms of risk are the concern of other departments within the corporation. This article is about risk management specifically within the context of Treasury.

Before describing the various types of Risk Management, let's focus on what a risk manager really does. Many company-wide policies and procedures are fundamentally shaped by the risk manager. He or she first assesses the types of risk that could exist, the range of possible outcomes, and the impact that these risks may have on the company. The risk manager then informs leadership and decides how to measure and report on risk factors, and how to implement policies. The implementation process will require extensive stakeholder management and will have to give clear guidance as to who is authorized to act, and in what scenario. Regular policy review, along with a heavy dose of stakeholder management, is an essential part of Risk Management.

Within Corporate Treasury, the two most prominent areas of Risk Management are FX (foreign exchange) risk, which concerns foreign currency, and interest rate risk, which concerns the cost of borrowing. These two areas do not comprise the entire field of Risk Management, however. The following four additional types of risk should also be mentioned: commodity, credit, liquidity, and operational risk. The potential impact of each of these types of risk depends on many variables. For example, a small company, which does business only in its local currency and has no international presence, has of course no FX exposure.

7.2 Examples of Risk Management activities:

Although the list below is by no means exhaustive, the following examples illustrate the primary issues that concern corporate risk managers:

1. Interest Rate Risk: A chemical company builds a business case for a new product and decides to start a new factory to manufacture the product. It is expected that the product will be sold over 10 years. The factory costs €1 billion, and the company decides to borrow €500 million from the bank at an interest rate of 3%, which it will pay back over 5 years. The price of this product is then set based upon this interest rate. What if interest rates go up during these 5 years, and the company wishes to extend the loan? The

bank may only agree to extend at an interest rate of 8%, for example. This is a major risk. To mitigate it, the bank may offer a financial instrument which hedges this interest rate risk. Alternatively, the company may decide to put more of its own money into the project, or it may seek out other parties who are willing to fund the project for 10 years at an acceptable rate.

2. Foreign Exchange Risk: Foreign exchange, or FX, is the conversion of one country's currency into another. In a free economy, a country's currency is valued according to the laws of supply and demand. In other words, a currency's value can be pegged to another country's currency, such as the U.S. dollar, or even to a basket of currencies. A country's currency value may also be set by the country's government. However, most countries float their currencies freely against those of other countries, which keeps them in constant fluctuation.

An oil company buys Saudi Arabian fuel and sells it to car owners in Germany. The purchase happens on February 1st, and payment is done in US dollars. The fuel is shipped, but it takes 4 weeks to bring it to the petrol stations in Germany where it will be sold in Euros. Within these four weeks, the exchange rate between the US dollar and the Euro can swing in all directions for all kinds of reasons. Most companies decide to mitigate this risk. To do so, a company enters into a contract with another party, who agrees to pay a set rate in US dollars for the Euros that the company receives when selling the petrol. Such contracts are known as "financial instruments". The particular financial instrument just described is known as an FX hedge. Typically, the company pays a fee to a bank, also known as a "premium", and the bank brings together the buyers and sellers of such contracts together. In return, the company secures the US dollar value of its goods. There are many variations on such hedges, which as a whole are known as financial "derivatives", but their complexity is beyond the scope of this article. Note: As an alternative to this FX hedge, the company could convince Saudi Arabian suppliers to accept Euros, but this is not always easy.

FX Risk Is Growing: When businesses are exposed financially to prospective fluctuations in foreign currency rates, this is known as FX risk. A decline in profitability, failed goals, and/or substantial losses may result from this risk. Forward contracts, which guarantee the current exchange rate for currency purchases or sales on a specified future date, are commonly used by businesses to mitigate the risk that unforeseen FX fluctuations may negatively affect their financial results.

Currency risk is now a concern for companies of all sizes as a result of increased globalization. According to the Citizens report, FX risk is actually almost as common as interest rate risk. Fewer than half of all respondents (54%) are hedging the FX risk that almost three-quarters of the companies we evaluated are exposed to. There could be a number of causes for this. One is that the management is occasionally unsure of how much the company is exposed to foreign exchange. Lack of experience with different hedging tools is another.

The fact that many businesses simply are unaware they are exposed to currency risk, either because it has crept into the company as a result of organic growth or acquisitions, or because they are not fully aware of contractual provisions that permit customers and suppliers to reprice goods and services, may be the main reason why almost half of companies with FX risk do not hedge those exposures. FX risk has the potential to be concealed, whereas interest rate risk is often visible.

As an illustration, a business might start off small and rely entirely on domestic suppliers. The company might eventually join the global supply chain as it expands. The business may require that all international transactions be conducted in U.S. dollars while working with foreign suppliers, but later may come to understand the advantages of transacting in foreign currencies. Customers from other countries might want to make purchases in their home currency because it makes the transaction simpler for them.

On the procurement side, the business may realize that asking for invoices in the currencies of suppliers and paying in those currencies will offer it more specific information about what it is paying and allow the procurement function more control over purchasing procedures generally.

The process of financial planning and budgeting can be made more certain by hedging this new risk. According to the Citizens study, futures are the most widely used tool for hedging FX risk among respondents. However, more sophisticated approaches are also becoming popular; 27% of businesses use cross-currency swaps, and 22% use options.

3. Commodity Risk: For many companies, the cost of their products depends on commodities, such as oil, grain, plastic, or other raw materials. Once again, hedging may be a good strategy. Alternatively, a company can decide to work with large stocks of raw material bought at a time when prices are low, or it may even buy a company that produces its raw material. (This second strategy is known as “backwards integration”.) Finally, the company may simply choose to pass increased commodity prices onto consumers by increasing the price of its finished goods. Note: We are all affected by changing commodity prices, thanks to the law of supply and demand. Aircraft carriers demand enormous quantities of jet fuel, for example, which is a form of highly refined kerosene (or paraffin oil). Demand for jet fuel means demand for kerosene, which means that the price of kerosene will go up for everyone.

Commodity Risks May Be Difficult to Hedge: Of the hazards we looked at, commodity risk is the least common. Only 49% of businesses are exposed to commodity risk, and only 31% of businesses are hedging that risk. The majority of these exposures are related to energy rather than metals or agricultural items.

Given the relative fall in the proportion of industrial, manufacturing, and other commodity-consuming sectors in the U.S. economy, these conclusions make sense. Due to the highly fragmented markets and the numerous underlying price indices that result, commodity risks are frequently difficult to hedge, even for businesses in industries that are dependent on commodities.

If commodity prices and volatility continue to rise, the proportion of corporations hedging their commodity risk may soon rise. At the time this piece was written, oil prices, which briefly fluctuated in the negative during the pandemic, were near \$100 per barrel. Last October, natural gas costs in Europe increased to such a high level that some industries had to close. If recent occurrences are any indication, commodity volatility will continue even as the world economy continues to move away from fossil fuels and toward renewable energy sources.

Senior leaders have recently been more aware of commodities risk as a result. Commodity risk is often managed further down the company structure, by the procurement department, as opposed to interest rate and FX risk, which are handled by the CFO or treasurer. But today, businesses that use a lot of energy, including those that produce steel, cement, and fertilizer, are starting to move these conversations up to the executive level. And many more firms, particularly those with sizable fleets of vehicles or those that depend on third parties for transportation, are suddenly becoming aware of the full scope of their energy vulnerability.

4. Credit Risk: Sometimes, customers fail to pay their bills. This is known as credit risk. There are several ways to manage this risk. Sometimes, companies assess the creditworthiness of customers in advance, in order to avoid non-payment. Companies also commonly purchase credit insurance, where the insurer pays if the customer does not. Sometimes, companies simply ask the customer to pay in advance, which is known as “prepayment”. When large amounts of goods are traded directly between two parties, credit risk is always an issue. There is entire field of banking, called Trade Finance, which is designed to mitigate this risk. Most commonly, banks issue a letter for credit, which is a form of assurance to the

seller that the buyer possesses the funds needed to purchase the goods. In addition, banks may also offer payment guarantees.

5. Liquidity Risk: This is the risk that a company cannot fulfil its short-term obligations, such as employee salaries. (A shortage of cash is known as a shortage of “liquidity”.) The first way to mitigate liquidity risk is to have a robust cash flow forecast. Nevertheless, if liquidity issues arise, a bank might offer short-term credit. There are also other alternatives. Assets may be sold to generate cash quickly, and then leased back from the purchaser. Payment terms with suppliers can sometimes be extended, or prepayment asked of clients. Finally, there are companies that pay for the right to collect money that is owed to other companies. (This is known as “factoring”.) In essence, these factoring companies buy your invoices, which allows you to receive more quickly the money that you are owed.

6. Operational Risk: Within a treasury department where large sums of money are handled, many aspects of the operation can go wrong. The biggest operational risk for most companies is the possibility that their information technology (IT) infrastructure might fail, due to software bugs or viruses. Such an outage would make payments impossible. Just as computer hackers can corrupt IT systems, so too can employees steal or commit fraud. Indeed, we have recently had many cases of “CFO fraud” around payments. The best way to mitigate this risk is to invest time in the development of sound internal policies and money in the proper IT infrastructure.

Example -1: If FX risk management is done well, how can it be that companies still report losses based upon FX fluctuations?

Ans: Most of the time, mitigating risk costs money. Most often, FX risk management solutions are bought from banks. Furthermore, such solutions do not usually offer 100% mitigation. (Indeed, 100% mitigation is very expensive.) Consequently, companies do still sometimes report losses based on FX fluctuations, despite their risk management efforts.

Example – 2: Who should be responsible for failures in risk management?

Ans: This is a question where companies often struggle. Risk can be mitigated, but it usually cannot be avoided entirely, which makes it difficult to assign responsibility to any one person. For example, sugarcane harvest results depend on the weather: the amount of sugarcane and the quality of the harvest vary. Quantifying this risk, modelling it, structuring a solution, and buying hedging products is the expertise of a treasurer. Nevertheless, it is difficult to assign responsibility for a failure to predict changes in the weather.

Example – 3: What are Chinese walls?

Ans: “Chinese wall” refers to the segregation of duties within organizations, especially regarding payments. This is extremely important, not only in Treasury but also in the entirety of most organizations. The one who enters a payment should not be the same person who authorises the payment. If done well, a Chinese wall prevents fraudulent behaviour.

Example – 4: What about insurance against risk?

Ans: Some of the solutions described above are insurance products. Indeed, some corporations employ a designated insurance manager, who sometimes reports to the group treasurer. However, there is no industry standard as of yet.

7.3 Treasury Risks:

From a treasury perspective, risks can generally be confined to financial risks of various kinds. While treasury is not usually responsible for general business risks, some treasurers are accountable for insurance and / or enterprise risk management for their organisation.

Business risks that are generally out of treasury's scope include non-transferable risks such as strategic risk, product risk, market risk, and reputational risk. Transferable business risks typically include insured risks related to property, freight, liability, cyber, etc.

The primary financial risks for which treasury is responsible for can be categorised into:

- Liquidity risk (i.e. availability of funds)
- Price risk (i.e. commodity price risk)
- Credit risk (i.e. financial loss)
- Operational risk (i.e. treasury processes, payments, etc.)

The eventual scope of a treasurer's responsibility may vary in different organizations. Some areas that typically vary include:

ERM (Enterprise Risk Management): ERM is often a function that reports directly to the board or CFO and is sometimes managed by a Chief Risk Officer. In some companies, this is a treasurer's responsibility.

Insurance: insurance is also a function that reports to the CFO, and is sometimes a treasurer's responsibility

Commercial credit risk: The credit risk of commercial counterparties (customers and vendors) is often managed by sales and procurement or the controller function, but is sometimes managed by treasury. Financial counterparty credit risk is normally handled by treasury, but in businesses with substantial sales to financial institutions, this can be a controller's responsibility

Operational risk for commercial payments etc.: operational risk for commercial flows is typically a treasurer's responsibility in organizations with In-House Bank or Payment Factory operating models. However, it falls under the controller's responsibility in organizations without a centralized treasury function

Operational risk for treasury processes: while operational risk for treasury processes may naturally fall under the treasurer's responsibility, but in many instances, treasuries are too small to effect a full segregation of duties and so the treasury process operational risk is delegated to other finance colleagues

As the treasury function evolves to play a more strategic advisory role in business decisions, they naturally get more involved in risk management decisions too. Treasury must be flexible in adding value either as the primary responsible team or in an advisory capacity to balance the business' overall risks in the most cost-effective manner.

Whether or not a treasury team has employed derivatives hedges in the past to reduce financial risks, this is a great moment to look at some of the ingrained presumptions that have influenced those choices.

Important inquiries to make include:

- Do we fully comprehend the risks to which our business is exposed, including interest rate, foreign exchange, and/or commodity risk?

- Are these risks properly accounted for in our planning procedures?
- Are our present risk mitigation and management practices sufficient to address the risks our business faces today and in the future?
- Do we have the necessary risk management skills on staff to handle the issues of today?

Treasury groups should evaluate the company's risk exposures as part of the budgeting and financial planning procedures with the aim of identifying untapped opportunities or hidden hazards. A corporation is more likely to fulfill its financial goals and satisfy stakeholder expectations the more risk it can remove from the equation. A crucial first step in developing a new risk management plan can be to enlist a partner with expertise in hedging to evaluate these risks.

7.4 Risk Management:

Risk management encompasses the identification, analysis, and response to risk factors that form part of the life of a business. Effective risk management means attempting to control, as much as possible, future outcomes by acting proactively rather than reactively. Therefore, effective risk management offers the potential to reduce both the possibility of a risk occurring and its potential impact.

7.4.1 Risk Management Structures:

Risk management structures are tailored to do more than just point out existing risks. A good risk management structure should also calculate the uncertainties and predict their influence on a business. Consequently, the result is a choice between accepting risks or rejecting them. Acceptance or rejection of risks is dependent on the tolerance levels that a business has already defined for itself.

If a business sets up risk management as a disciplined and continuous process for the purpose of identifying and resolving risks, then the risk management structures can be used to support other risk mitigation systems. They include planning, organization, cost control, and budgeting. In such a case, the business will not usually experience many surprises, because the focus is on proactive risk management.

Response to risks usually takes one of the following forms:

1. **Avoidance:** A business strives to eliminate a particular risk by getting rid of its cause.
2. **Mitigation:** Decreasing the projected financial value associated with a risk by lowering the possibility of the occurrence of the risk.
3. **Acceptance:** In some cases, a business may be forced to accept a risk. This option is possible if a business entity develops contingencies to mitigate the impact of the risk, should it occur. When creating contingencies, a business needs to engage in a problem-solving approach. The result is a well-detailed plan that can be executed as soon as the need arises. Such a plan will enable a business organization to handle barriers or blockage to its success because it can deal with risks as soon as they arise.

7.4.2 Importance of Risk Management:

Risk management is an important process because it empowers a business with the necessary tools so that it can adequately identify and deal with potential risks. Once a risk has been identified, it is then easy to mitigate it. In addition, risk management provides a business with a basis upon which it can undertake sound decision-making.

For a business, assessment and management of risks is the best way to prepare for eventualities that may come in the way of progress and growth. When a business evaluates its plan for handling potential threats and then develops structures to address them, it improves its odds of becoming a successful entity.

In addition, progressive risk management ensures risks of a high priority are dealt with as aggressively as possible. Moreover, the management will have the necessary information that they can use to make informed decisions and ensure that the business remains profitable.

7.4.3 Risk Analysis Process:

Risk analysis is a qualitative problem-solving approach that uses various tools of assessment to work out and rank risks for the purpose of assessing and resolving them. Here is the risk analysis process:

1. Identify existing risks: Risk identification mainly involves brainstorming. A business gathers its employees together so that they can review all the various sources of risk. The next step is to arrange all the identified risks in order of priority. Because it is not possible to mitigate all existing risks, prioritization ensures that those risks that can affect a business significantly are dealt with more urgently.

2. Assess the risks: In many cases, problem resolution involves identifying the problem and then finding an appropriate solution. However, prior to figuring out how best to handle risks, a business should locate the cause of the risks by asking the question, “What caused such a risk and how could it influence the business?”

3. Develop an appropriate response: Once a business entity is set on assessing likely remedies to mitigate identified risks and prevent their recurrence, it needs to ask the following questions: What measures can be taken to prevent the identified risk from recurring? In addition, what is the best thing to do if it does recur?

4. Develop preventive mechanisms for identified risks: Here, the ideas that were found to be useful in mitigating risks are developed into a number of tasks and then into contingency plans that can be deployed in the future. If risks occur, the plans can be put to action.

7.4.4 Mitigation of Financial Risk:

Many companies do not understand the scope of their interest rate, currency, and commodity price risks. That knowledge gap has the potential to blow up corporate planning processes. Risks abound in today's linked and complex society.

Financial estimates, budgets, and the company's ability to satisfy stakeholder expectations may all suffer when companies fail to adequately manage the highest-impact risks. These risks are extremely common; according to a recent Citizens Commercial Bank Risk Management Study of 350 U.S. publicly traded corporations, 78% of respondents claimed their organization is exposed to interest rate risk, 74% to foreign currency (FX) risk, and just under 50% to commodity risk.

Exposures to risk differ by industry. For instance, businesses in the healthcare, industrial, and materials sectors typically borrow more money and have capital-intensive operations. Companies operating in these areas are consequently significantly more susceptible to interest rate fluctuations over time. The amount of foreign exchange risk that a firm is exposed to often relies on how much of its business is conducted internationally versus locally. But other elements might also be at play. Because international crude and

processed goods like gasoline and diesel are exchanged in US dollars at the wholesale level, the US energy sector is shielded from FX risk.

According to some research, 78% of businesses are at risk from interest rate fluctuations. And to make matters worse, many of them are exposed to floating-rate debt that is linked to the London interbank offered rate (LIBOR). Only 51% of all respondents hedge interest rate risk, which involves using a financial instrument like an interest rate swap to change a variable-rate liability into a fixed-rate liability. Given the unusually low interest rate environment of recent years, this is understandable. However, it is not a wise long-term plan.

Unhedged investments are now riskier as interest rates start to increase. The market is beginning to feel more inclined to hedge. Uncertainty when LIBOR is phased out in the business is another problem. The majority of banks have stopped making loans that are based on LIBOR, and in 2023, LIBOR will no longer be quoted. This could make it difficult to hedge current LIBOR-linked loans.

There are four regularly employed hedging strategies for businesses that are exposed to high interest rate risk:

1. Swap: A swap is a contract that trades one future stream of interest payments for another. To lessen or enhance exposure to interest rate changes, these often entail switching from a fixed interest rate to a variable rate, or vice versa.

2. Cap: A limitation on interest rates sets a maximum limit for interest payments. The rollover dates for the borrower's floating liabilities correspond to a series of call options on a floating interest rate index, often the three- or six-month LIBOR. (A call option is the right to purchase assets at a predetermined price on or before a specific date.)

3. Floor: Using put options, which are options to sell assets at a predetermined price on or before a specific date, a minimum interest rate can be constructed.

4. Collar: Simultaneous acquisition of a limit on interest rates and sale of a floor on those rates for the same index, same duration, and same nominal principal amount. These agreements provide protection from rising interest rates and provide a ceiling on falling interest rates.

According to the Citizens poll, 91 percent of respondents whose companies are hedging interest rate risk employ interest rate swaps, although a smaller percentage (13.5 percent) other options such as interest rate collars or caps are also used.

Many businesses hedge between 50% and 60% of their exposure to interest rate changes, maintaining roughly half of their debt at floating rates. They have the opportunity to profit from reduced interest rates thanks to this impartial stance. However, given the low interest rates and the low cost of a hedged position, several businesses prefer the security of a fully hedged position. Their financial planning and budgeting procedure is made even more definite by this "all-in" rate perspective.

7.5 What is Basel III?

The Basel III accord is a set of financial reforms that was developed by the Basel Committee on Banking Supervision (BCBS), with the aim of strengthening regulation, supervision, and risk management within the banking industry. Due to the impact of the 2008 Global Financial Crisis on banks, Basel III was introduced to improve the banks' ability to handle shocks from financial stress and to strengthen their transparency and disclosure.

Basel III builds on the previous accords, Basel I and II, and is part of a continuous process to enhance regulation in the banking industry. The accord aims to prevent banks from hurting the economy by taking more risks than they can handle.

The BCBS was established in 1974 by the central bank governors of the Group of Ten (G10) countries, as a response to disruptions in financial markets. The committee was set up as a forum where member countries can deliberate on banking supervisory matters. BCBS is responsible for ensuring financial stability by strengthening regulation, supervision, and banking practices globally.

The committee was expanded in 2009 to 27 jurisdictions, including Brazil, Canada, Germany, Australia, Argentina, China, France, India, Saudi Arabia, the Netherlands, Russia, Hong Kong, Japan, Italy, Korea, Mexico, Singapore, Spain, Luxembourg, Turkey, Switzerland, Sweden, South Africa, the United Kingdom, the United States, Indonesia, and Belgium.

The BCBS reports to the Group of Governors and Heads of Supervision (GHOS). Its secretariat is located in Basel, Switzerland, at the Bank for International Settlements (BIS). Since being established, the BCBS has formulated the Basel I, Basel II, and Basel III accords.

Key Principles of Basel III:

1. Minimum Capital Requirements: The Basel III accord raised the minimum capital requirements for banks from 2% in Basel II to 4.5% of common equity, as a percentage of the bank's risk-weighted assets. There is also an additional 2.5% buffer capital requirement that brings the total minimum requirement to 7%. Banks can use the buffer when faced with financial stress, but doing so can lead to even more financial constraints when paying dividends. As of 2015, the Tier 1 capital requirement increased from 4% in Basel II to 6% in Basel III. The 6% includes 4.5% of Common Equity Tier 1 and an extra 1.5% of additional Tier 1 capital. The requirements were to be implemented starting in 2013, but the implementation date has been postponed several times, and banks now have until January 1, 2022, to implement the changes.

2. Leverage Ratio: Basel III introduced a non-risk-based leverage ratio to serve as a backstop to the risk-based capital requirements. Banks are required to hold a leverage ratio in excess of 3%. The non-risk-based leverage ratio is calculated by dividing Tier 1 capital by the average total consolidated assets of a bank. To conform to the requirement, the Federal Reserve Bank of the United States fixed the leverage ratio at 5% for insured bank holding companies, and at 6% for Systematically Important Financial Institutions (SIFI).

3. Liquidity Requirements: Basel III introduced the usage of two liquidity ratios – the Liquidity Coverage Ratio and the Net Stable Funding Ratio. The Liquidity Coverage Ratio requires banks to hold sufficient highly liquid assets that can withstand a 30-day stressed funding scenario as specified by the supervisors. The Liquidity Coverage Ratio mandate was introduced in 2015 at only 60% of its stated requirements and is expected to increase by 10% each year till 2019 when it takes full effect.

On the other hand, the Net Stable Funding Ratio (NSFR) requires banks to maintain stable funding above the required amount of stable funding for a period of one year of extended stress. The NSFR was designed to address liquidity mismatches and will start becoming operational in 2018.

Impact of Basel III:

The requirement that banks must maintain a minimum capital amount of 7% in reserve will make banks less profitable. Most banks will try to maintain a higher capital reserve to cushion themselves from

financial distress, even as they lower the number of loans issued to borrowers. They will be required to hold more capital against assets, which will reduce the size of their balance sheets.

A study by the Organization for Economic Cooperation and Development (OECD) in 2011 revealed that the medium-term effect of Basel III on GDP would be -0.05% to -0.15% annually. To stay afloat, banks will be forced to increase their lending spreads as they pass the extra cost on to their customers.

The introduction of new liquidity requirements, mainly the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), will affect the operations of the bond market. To satisfy LCR liquid-asset criteria, banks will shy away from holding high run-off assets such as Special Purpose Vehicles (SPVs) and Structured Investment Vehicles (SIVs).

The demand for secularized assets and lower-quality corporate bonds will decrease due to the LCR bias toward banks holding government bonds and covered bonds. As a result, banks will hold more liquid assets and increase the proportion of long-term debts, in order to reduce maturity mismatch and maintain minimum NSFR. Banks will also minimize business operations that are more subject to liquidity risks.

The implementation of Basel III will affect the derivatives markets, as more clearing brokers exit the market due to higher costs. Basel III capital requirements focus on reducing counterparty risk, which depends on whether the bank trades through a dealer or a central clearing counterparty (CCP). If a bank enters into a derivative trade with a dealer, Basel III creates a liability and requires a high capital charge for that trade.

On the contrary, derivative trade through a CCP results in only a 2% charge, making it more attractive to banks. The exit of dealers would consolidate risks among fewer members, thereby making it difficult to transfer trades from one bank to another and increase systemic risk.

7.6 Risk Reporting:

Risk reporting is a method of identifying risks tied to or potentially impacting an organization's business processes. The identified risks are usually compiled into a formal risk report, which is then delivered to an organization's senior management or to various management teams throughout the organization.

Types of Risk Reporting:

A fundamental truth of risk management is that risks vary from one another in scope. Some risks are relatively minor in scope. For example, a minor risk might delay a project's completion by a day or two. Conversely, businesses might occasionally face major risks that jeopardize the wellbeing of the entire organization.

Not only do risks vary by severity, but they can also vary in terms of their impact. Some risks affect a whole organization or even an entire industry. Other risks might only impact a single department or a particular account. Because risks can vary so widely from one another, there are several different types of risk reporting.

Some of the more common risk reporting types include:

Project Risk Reporting: As the lowest level of risk reporting, this pertains to risks that may affect a particular project, such as a supply chain disruption or a change in the price of raw materials.

Program Risk Reporting: In business, programs are generally made up of multiple projects. A program risk report generally covers any project-level risks or other risks that are significant enough to adversely impact the entire program.

Portfolio Risk Reporting: This is generally an aggregate summary of program-level risks across an organization's entire portfolio or collection of programs.

Business Risk Reporting: This is used for significant risks that have the potential to impact the entire organization.

7.7 Risk Management of Capital Market Exposures:

Uncertainty presents both risk and opportunity, eroding or enhancing value. Enterprise risk management lets financial firms deal effectively with uncertainty and associate risk with opportunity. The ability to price risk appropriately differentiates a successful player from the rest of the crowd.

Firms spend a considerable amount of time and money building risk management systems to measure, monitor, mitigate and report risk. Risk management becomes more complex with financial innovation and increasing regulatory and compliance constraints. Performance measurement, attribution and maximization of risk-adjusted returns also compel firms to spend more on enterprise risk applications.

As financial markets become more open and deregulated, it is imperative for firms to update their enterprise risk systems in order to remain competitive.

The boom in complex structured products has had an overwhelming impact on risk management departments, as proper calculations for VaR, Potential Future.

7.8 Case Study:

Impact of Setting Floor Deposit Rate for FDR:

The Bangladesh Bank has recently set the floor interest rate for the individual fund, provident fund, and gratuity fund of government/private banks as three months or more tenor term deposit in the banking sector. Indeed this is a history.

The government has announced Tk 1,284.4 billion in stimulus packages, which was 4.59 per cent of the gross domestic product, to face Covid shock. The central bank also takes several policy-related initiatives, such as cash reserve ratio reduction, policy rate reduction, increasing the money supply and making the stimulus packages successful. This attitude has been also expressed following the Covid outbreak in two accommodative and expansionary monetary policies.

Large remittance inflow amidst the pandemic was another astonishing area. The central bank again managed the appreciation of the taka against the dollar by open market operation. Hence, from January 20 to June 21, an additional Tk 723 billion has been injected into the money market.

Another point is that few banks take the refinance against the stimulus packages. Respective banks' asset and liability management desk was unable to predict the huge liquidity which ultimately has increased the money liquidity enormously.

As per the Monetary Policy Statement, 2020–21 domestic credit growth was projected at 19.30 per cent. Policymakers probably thought that stimulus packages would be implemented properly and there will be

expected credit growth at less than 9 per cent. Actual domestic credit growth was 10.30 per cent as of June 21 as per the Monetary Policy Statement. So, this is clear that the stimulus packages announced by the central bank might not work properly. The implementation status and the success rate of all the stimulus packages should immediately be made public so that experts can find out the problem and provide a better path to solve the problem.

Lower credit growth and unexpected money market liquidity from refinancing against stimulus packages taken by commercial banks and the open market operation by the central bank to keep the appreciation of the taka against the dollar stable increase the money market liquidity and, hence, lower the money market interest. Wholesale market rate or money market rate influence the deposit rates and, ultimately, the lending rates. It was a natural economic phenomenon in the monetary economy and the customer deposit rate was in line with the wholesale market interest rate. The excess liquidity was Tk 2,315 billion as of June 21, which was significantly higher than Tk 1,396 billion of June 2020.

Small individual savers are highly affected not only in this crisis but also in the boom economic situation. To protect the individual depositor's interest, future deposit mobilization in the banking sector, and discourage investment in risky assets such as stock, mutual fund, etc, the central bank floor the deposit rate with the inflation rate.

In the past from 1980 to 1988, 1994 to 1996, 1999, 2003 to 2004, 2009 to 2011, 2015 to 2019, the real deposit rate was also negative. At that time we have not seen this type of initiative. Maybe, other high-yielding assets were there such as unlimited National Savings Directorate purchase ability then. This is also observable that after the negative real interest rate, the stock market got hit and crushed. To conclude this we need a statistical measure of whether there is a significant relationship between negative real interest and capital market crash.

Is there any alternative other than flooring the deposit rate to protect the individual interest? Because, this rate will increase the banking industry's fixed deposit pie with high cost, reduce savings deposit pie, and also provide bargaining power to the corporate deposit holder. Low loan growth will again reduce the lending rate as year-end approaches. Hence, commercial banks might unintentionally create an interest rate arbitrage opportunity for the corporate or other customers to compete with peer groups in the name of non-performing loan management or budget target achievement. So, this floor rate might create several uneven fields for all the stakeholders. Lower money market rate, higher deposit rate, illogical inflation unadjusted lending rate and lower lending growth provide an image of headless species, which is not only physically but also theoretically handicapped.

Problem likely on the cards:

Since the central bank instruction does not reduce money market liquidity, this will create a massive imbalance between money market interest rate and commercial bank offered deposit rate. Six months fixed deposit interest rate and Mudaraba rate are used as a reference rate of Coupon Rate of subordinate Bond (Tire-II Capital Instrument) with a floor and ceiling rate. So, the previously approved Tire-II Capital Instrument by Bangladesh Securities and Exchange Commission and the central bank will be less attractive and tough for the issue manager to arrange a subscription in this liquid market. Due to the higher deposit rate, all commercial banks will increase their retail as well as corporate lending rates that will ultimately and negatively impact the retail customer because of lower bargaining power than corporate customers. As the calendar year is approaching to an end, there will be a takeover competition among the commercial bank to maintain non-performing loans at a comfortable level. This inorganic competition will further push down the lending rates.

Bangladesh's economic system is a banking-based economic system. The central bank should not take any action that makes everyone feel that there is no value of services. Protecting depositor's safety is also a crucial responsibility. It is true that in this pandemic, by and large, we all are affected. We all should help each other without making anyone worse off.

Here the central bank and other regulators may take the following steps to keep the deposit in the banking sector or not to invest in the risky assets category:

— The central bank can introduce central bank reverse repo at 4 per cent. This will automatically set the wholesale market rate at 4 per cent. Hence, banks will easily set the minimum deposit rate to 4 per cent. But this will increase the expenses of the central bank.

— The National Board of Revenue can reduce the excise duty and can withdraw tax over income from the national savings certificate and deposit interest income for this and the upcoming two fiscal years. When domestic credit growth increases, the regulator will again impose the excise duty and tax rate over the income.

— Increase the individual/joint investment ceiling in the national savings certificate in this pandemic time only.

— The debt management department of the central bank may introduce inflation-linked bonds only for the individuals with buyback facilities through a commercial bank.

— Currently, the post office savings account rate is 7.50 per cent and the term deposit account rate is a maximum of 11.28 per cent. Here modernization of post office deposit and lining with mobile financial service may reduce the uncertainty of individual depositor's interest.

If the regulators do not immediately take the necessary steps to modify/withdraw the circular, this might create an imbalanced economy now. Moral persuasion is required in all stages of the economy. Creating level playing fields with modernization, efficiency and futuristic vision are better than any kind of segmented facility.

7.9 Practice Questions:

1. Write short notes on the following topics:
 - a. Risk factors in banks
 - b. Credit Risk
 - c. Liquidity Risk
 - d. Treasury Risk
2. Briefly describe the importance of risk management and the risk management process.
3. What are the key principles of Basel III?
4. State some measures that the regulators can take to keep the deposits in banking system.

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List of Acronyms

ADR- Advance to Deposit Ratio	HQLA- High Quality Liquid Assets
OBO- Offshore Banking Operation	RSA- Interest Rate Sensitive Assets
ALCO- Asset and Liability Management Committee	RSL- Interest Rate Sensitive Liabilities
OTC- Over the counter	LCR- Liquidity Coverage Ratio
ALM- Asset and Liability Management	LCY- Local Currency
ATDTL- Average Total Demand and Time Liabilities	L/C- Letter of Credit
SLP- Structural Liquidity Profile	MCO- Maximum Cumulative Outflow
BB- Bangladesh Bank	MVE- Market Value of Equity
SLR- Statutory Liquidity Ratio	NII- Net Interest Income
BCBS- Basel Committee for Banking Supervision	NIM- Net Interest margin
SND- Short Notice Deposit	NPL- Non Performing Loan
CFP- Contingency Funding Plan	NSFR- Net Stable Funding Ratio
VaR- Value at Risk	PD-Primary Dealers
CMT- Contingency Management Team	RFCD-Resident Foreign Currency Deposit
WBG- Wholesale Borrowing Guidelines	REPO-Repurchase Agreement
CRAR- Capital to risk weighted Asset Ratio	RTGS- Real Time Gross Settlement
BC- Bills for Collection	SLR-Statutory Liquidity Ratio
CRR- Cash Reserve Ratio	TT-Telegraphic Transfer
FCY- Foreign Currency	CP-Commercial Paper
FX- Foreign Exchange	FDD-Foreign Demand Draft
GDP- Gross Domestic Product	LIBOR-London Inter-Bank Offer Rate
GFC- Global Financial Crisis	FDR- Fixed Deposit Receipt

About Author

Mr. Mehdi Zaman is currently working as Deputy Managing Director in Eastern Bank Ltd. and he is heading the Treasury, FIs & Offshore Banking Division. He started his career with EBL in 1999 as 4th batch Management Trainee. He is the 2nd MANCOM member from the EBL Management Trainee. Before working in the Treasury Department, Mr. Mehdi gained experience working in branches and the international division during the course of his 24-year banking career. He advanced himself at EBL Treasury from being a Dealer to the Head of Treasury, FIs, and Offshore Banking. He is also a member of ALCO, BRMC, and Basel II Committee.

Mr. Mehdi is a key contributor to the BIBM's annual study, "Review of Treasury Operations in Banks," and he frequently presents on topics related to foreign exchange, risk management, dealing room operations, and asset & liability management in various banks.

In partnership with BIBM, Bangladesh Bank, and numerous local bank executives, he organized the first-ever "Foreign Exchange Bourse Game." He also plays a key role in using internal IT resources to completely automate the Treasury Front Office Operations. Mr. Mehdi completed his Master's in Bank management (MBM) from BIBM.