CHAPTER I
INTRODUCTION

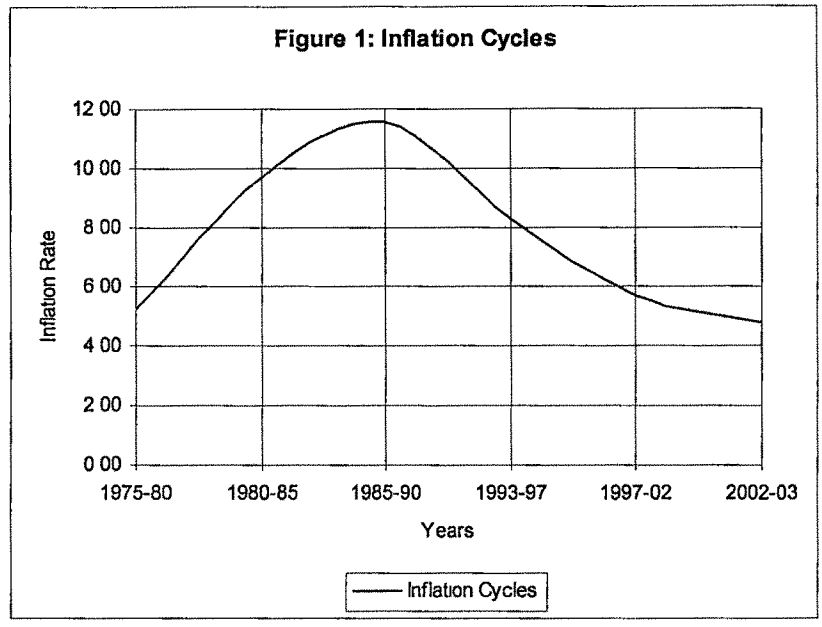
This chapter defines the problem of business cycles, and explains cyclical pattern of the important macroeconomic variables in Nepal. It provides definition, advantages, consequences of inflation, and discusses various approaches of inflation analysis, transmission mechanism of monetary policy and problem of the study.

1. BUSINESS CYCLES IN NEPAL

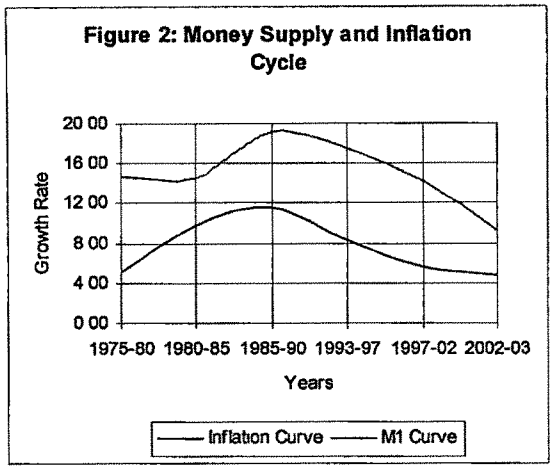
Short-run fluctuations or business cycles in the macroeconomic variables are economic instability. The theory of business cycles offers some guidelines to policy makers for countering the said fluctuations through the appropriate use of the fiscal and monetary policy. If the economy is suffering from recession because of the deficiency of aggregate demand, expansionary macroeconomic policies can counter such a situation. Similarly, if economy is inflationary, leading to uncertainty, tight monetary policies can stabilize the economy. Economic fluctuations turn into a severe problem in the absence of stabilization policies. The explanation of these fluctuations is one of the core areas of macroeconomics.

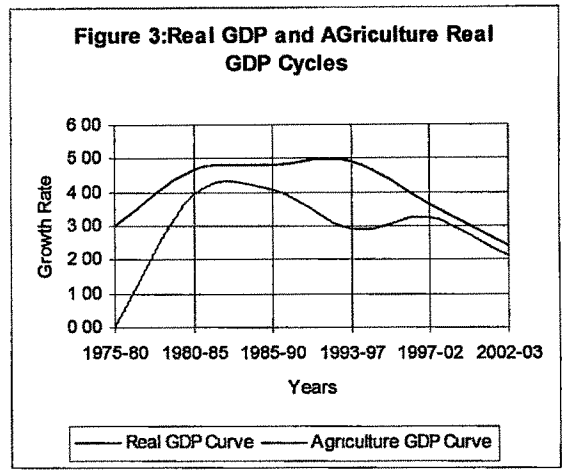
Inflation in Nepal is one of the major important macroeconomic variables. Understanding the phases and amplitudes of inflation business cycles is important for the formulation of macroeconomic polices in general and monetary policy in particular. The inflation business cycle of Nepal is shown in Figure 1. The mean of five years annual averages of rate of changes of Urban Consumer Price Index of Nepal during 1975-2003 is used to plot business cycles. Since business cycles are short-run fluctuations, five years growth rates

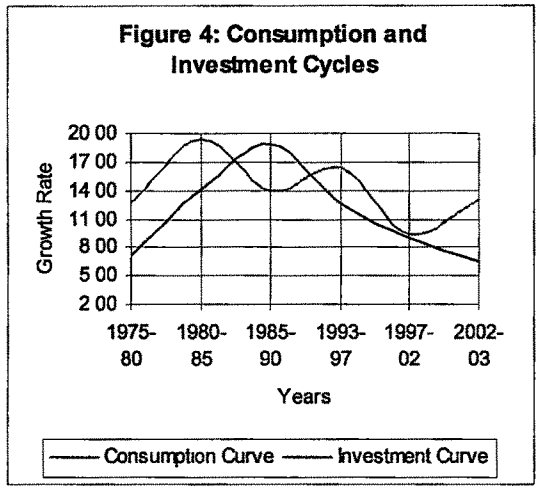
of price index are used to visualize whether they create small or large business cycles in Nepal as follows:

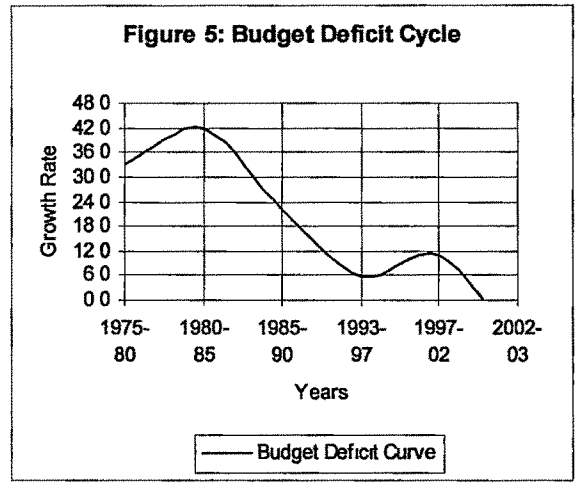


The inflation cycles show a concave downward move with peaked inflation rate during the end of Eighties. There is a sharp increase in the inflation rate from 1975 to 1982, showing an inflationary situation and later a deflationary situation. The rate of inflation from its low level at the beginning of the study period to the peak level in 1991, is characterized by increasing at an increasing rate in the initial period of the analysis, and increasing at a decreasing rate afterwards. Once the peak level of inflation is achieved in 1991, it continuously deceased at an increasing rate till 2000, and at decreasing rate till the end of the period of the analysis.









As shown in Figure 2, the cycles of inflation and money supply are waving in a similar pattern. The peaks of both cycles are found to be occurring during the same period 1985-90. During this period, the average rate of growth of money supply rose from 14 percent to around 19 percent. It led inflation to increase from 5 percent to almost 12 percent.

Besides that, the peak level of the economy's real GDP and agricultural real GDP (one of the components of economy's real GDP) cycles also occurred during 1985-90 as shown in Figure 3. Real GDP and agricultural GDP grew respectively, from 3 percent and negative of 1 percent to 4 percent and 5

percent. Therefore, variables like real GDP, agricultural real GDP, money supply and inflation head towards the same direction.

Aggregate consumption and investment are the two major components of aggregate demand of the economy. The peak level of the consumption cycle occurred during 1985-90, as shown in Figure 4. Aggregate consumption during the period increased from 7 percent to 19 percent. This supports the view of consumption being a component of aggregate demand that contributed to business cycles. However, in the case of investment, the peak level occurred during 1980-85, one period before the peak of the consumption cycle. However, the investment cycle shows a zigzag pattern, with a long downward movement followed by a short upward movement. This may be cause of the investment uncertainty in the economy after the mid eighties.

The cycle of the budget deficit, though increasing in the initial five years of the study, is seen to be sharply declining throughout the years, with the exception of a small increase during 1997-2000, as shown in Figure 5. Since, budget deficit in the long-run shows the tendency of declining during the inflationary period, as explained above, it is not considered to be a major source of the inflationary cycle in Nepal.

The rate of inflation during that period is recorded at 5.22 percent. During the 1980s, the country faced double digit inflation of 10.7 percent. Major factors in the flaring up of inflation during the decade were supply constraints, the rise in prices of food and beverages group due to severe drought both in Nepal and the bordering areas of India, higher inflation rates in India, expansionary fiscal and monetary policy in the domestic economy and the successive devaluation of the Nepalese rupee vis-à-vis the US dollar to control BOP crisis.

The nineties observed the speeding up of the economic liberalization process. The first two years of the nineties witnessed a continuous increase in the price

level. FY 1991/92 witnessed an inflation of 21.1 percent, the highest ever recorded in the Nepal. The reasons for the acceleration of inflation were the same as mentioned above during the period.

However, the economic liberalization policies taken up by the government in various macroeconomic sectors since 1990 has been instrumental in containing the rate of inflation after FY 1991/92. Many reform measures were enhanced in order to maintain macroeconomic stability, together with making structural changes in the economy. Containing monetary expansion consistent with real sector growth, introduction of market operation as a direct tool to control monetary aggregates, adoption of prudential fiscal policy to contain budget deficit, and relative stability in exchange rates contributed in maintaining the inflation at a low level. During the first four years of 2000s, inflation remained at a level lower than 5 percent. The factors contributing the low level of inflation during the periods are: a good supply situation in conjunction with a good harvest both in India and Nepal, and favourable weather conditions for cereal and cash crops as well as vegetables and fruits.

The above discussion highlights presence of problem of the business cycles in Nepal. The attributes of the cyclical fluctuations were many- external and internal both. The fluctuations in macro variables shaped the inflation trend in Nepal. Thus there is need to examine this inflation issue, its attributes etc. in details for academic and policy interest purposes.

2. DEFINITON, ADVANTAGES AND CONSEQUENCES OF INFLATION

Inflation is a process in which the aggregate price level of goods and services rises continuously or appreciably. It is an economic state in which the value of money and other assets falls continuously. The importance of inflation stems from the pervasive role played by money in coordinating economic activities in

a modern economy. The well-being of all individuals is affected by the changes in the value of money that take place due to changes in the price level over a period of time (Laidler and Parkin, 1975). A continuous decline in the value of the real balance of money has a great impact on the store of the value function of money. Further, while a continuous fall in the value of goods and services would not be regarded as a major social problem, the people directly engaged in the production and sale of these goods and services would certainly be badly affected by inflation. In fact any persistent rise in the general price level is defined as inflation but the unpleasant effects of inflation can only be noticed if such a rise in the general price level is appreciably high. Although the relative prices of individual commodities may change during the course of inflation, the main feature of inflation is that the general price level (that is, on an average of all prices) is rising (Levacic and Rebmann, 1982).

Though inflation is harmful for an individual, it is neither a loss nor a gain for the society as a whole. If inflation does not decrease the total volume of output in an economy, its main effect is only on the redistribution of current income and wealth (Bach, 1975). Therefore, inflation results in the redistribution of income and wealth from a fixed income stratum to another (Khatiwada, 1981, Pandey, 2005). Any change in price affects different sectors of the economy. It distorts the allocation of resources within the economy. High inflation erodes savings and discourages investment by making long-term investment risky and uncertain. It induces exchange rate instability leading to adverse effect on balance of payment and thus stimulates capital flight. These evils ultimately inhibit economic growth, lead to uncertainty in economic planning, and, in their extreme forms, cerate political and social unrest in a country (Debelle, 1998).

A moderate degree of inflation is conducive to economic growth. It maintains the rates of return to entrepreneur, reduces the real cost of borrowing and lowers the burden of debt (Chowdhary and Dowling, 1982). A sufficiently

flexible price system is equally able to allocate scarce resources efficiently and yields the highest possible return in terms of output gains. Generally, if wages and other costs lag behind the rising selling prices in periods of inflation, profits expand, investment is stimulated, and the economy grows faster. But if wages and other costs rise faster than the selling prices (as in cost-push inflation), profits are squeezed, investment is discouraged, and growth slows down. Further, those governments, particularly in developing countries, facing difficulties in building an adequate administrative machinery to collect taxes, may resort to inflation tax as an effective instrument for mobilizing resources for development.

The distributional effects of inflation depend crucially on the extent to which the inflation is anticipated on the one hand, and the effectiveness with which different groups take these anticipations into account in their economic transactions on the other. If inflation is fully anticipated by all parties, the economy can operate consistently at full employment without redistribution of income and wealth (Laidler and Parkin, 1975). When inflation is poorly anticipated, employment can fluctuate away from its long-run equilibrium level and apparently arbitrary redistribution of income and wealth may take place.

There are a number of theories of inflation developed and reformulated on the basis of empirical analysis. Most of these theories attempt to find the major sources and consequences of inflation in an economy. Theories of inflation are broadly classified into two categories; viz, monetarists' theories and non-monetarists' theories. These theories provide certain guidelines and benchmarks in order to understand the sources of inflation. The Monetarist's approach to inflation has been extensively discussed in Milton Friedman's important work 'Studies in the Quantity Theory of Money (1956), and this is a reformulation of Classical Quantity Theory of Money. Keynes takes the quantity theory as a special case of his "General Theory" applicable under a situation of full employment in an economy. The basic difference in the

assumption of the Monetarists' and the Keynesians' is that the former assume wage-price flexibility whereas the latter assume sticky price in the economy. Adaptive expectation and rational expectations models are the special cases of the monetarist approach to inflation, whereas the Phillips curve, sticky-wage model, the sticky price model and the imperfect information model are the special cases of the Keynesian approach (Mankiw, 2004). Since inflation theories are considered helpful tools to analyze behavior of inflation. Thus, some important approaches to inflation analysis are discussed in the following section.

3. APPROACHES TO INFLATION ANALYSIS

In the classical and neo-classical economic analysis, in which the history of the quantity theory is based, inflation is viewed as proportional to money supply. The determinants of the demand for real balances, according to neo-classical economists were the volume of real transactions, or the level of real income and wealth. These factors are supposed to be determined by real factors such as population growth, technical change, productivity and thrift. For the analysis of inflation movement, these factors are assumed constant because of their slow changing nature. Therefore, given the demand for money function constant, the general price level is determined proportionately to nominal money supply.

According to neo-classical economists, the real theory of allocation and distribution and the monetary theory of the price level are assumed dichotomized. Therefore, money is neutral in its effect on real variables. Their model is based on the assumptions of full employment, closed economy, constant velocity and wage-price flexibility in the economy. Thus, quantity theory of money states that the central bank, which controls the money supply, has ultimate control over inflation. If the central bank keeps the money supply stable, the price level remains stable. If the central bank increases the money supply, the price level also rises. (Mankiw, 2004).

Keynesians emphasized the determination of the level of real income and employment rather than monetary theory of inflation. It was necessitated by the then prevailing world economic depression of the 1920s and 1930s. Keynesians argue that there is trade-off between inflation and unemployment as postulated by the Phillips curve, and policy makers have options for specific combination of inflation and unemployment. If policy makers want to decrease unemployment or equivalently increase output or income, they have to sacrifice higher level of inflation. The Phillips curve envisages that the monetary policy effects both the price level and unemployment in the short-run but it does not describe anything about the long-run determination of these variables. Keynesian arguments are based on sticky price behavior and less than full employment in the economy. Therefore, the effect of changes in money supply is distributed between inflation and output.

The Monetarists' model of inflation assumes that the demand for money is a stable function of income, or equivalently, money is demanded only for transaction purposes. Money supply is exogenous, predictable and controllable by monetary policy instruments. There is a unidirectional causality from money supply to inflation. There is no long-run effect of money supply on output. If the monetary policy affects output and employment, it is only in the short-run transitory effect, not the permanent (Friedman, 1970). The strict monetarists' model, which is encapsulated in the Classical Quantity Theory model, postulates that money supply has a direct effect on price level with given output. The strict monetarist model is reformulated into the dynamic model incorporating short-run effect of money supply on output and price expectations. It has two versions: the Adaptive Expectations Model (AEM) and the Rational Expectations Model (REM).

The Adaptive Expectation Model of inflation assumes that the current inflation rate is not only a function of excess demand alone but also of an expected rate

of inflation, where the expected rate of inflation is a function of the past rates of inflation. Adaptive Expectation Model is a backward looking model. Therefore, it is able to explain the dynamic behavior of inflation where inflation is sustained on its own momentum. The Adaptive Expectation Model was used, for the first time, to explain hyper-inflation in the study of Cagan (1956). This model assumes that there is long-run neutrality of money supply in real income but not in the short-run neutrality.

The Rational Expectations Models are inherently forward-looking, in the sense that current inflation depends not only on the current and past rate of inflation but also on the state of information available at the end of the last period obtained by forecasting. This gives rise to the understanding of course of events such as anticipated economic policies and economic environment forecast at current point of time (Begg, 1992, Frydman and Phelps, 1983, Minford and Peel, 1983, Sheffrin, 1983). If such a forecast is conditional upon the latest information available to an experienced forecaster, it is called a conditional forecast. Lucas (1973) found the Adaptive Expectation Model faulty on the ground that it is subject to some systematic error because the latest information is not fully reflected in the model. If an economic agent has information in addition to a series of past observations of the variable to be forecasted, then the use of Adaptive Expectations would lead him to waste that information (Frisch, 1983). The Rational Expectations Hypothesis is also known as the Full Information Hypothesis (Gupta, 2004). The whole idea of forecasting comes from the utilization of all the available information by the economic agents as well as policy makers to understand events that may possibly occur in future.

The basic difference between the rational expectationists and the adaptive expectationists is that, the former visualize the development of modern information and technology contributing to achieve all the possible future and past information about the economic variables, while the latter believe in

utilizing only the past information of the variables. Rational expectationists assume that full information is available to the economic agents in the market. Under such circumstances, the actual rate of inflation rarely deviates from the expected rate of inflation. If the monetary policy tries to influence changes in aggregate demand by supplying more money thereby leading to a rise in the actual price level, in a short period of time, the expected rate of inflation is modified into actual inflation, resulting into neutrality of money supply in the short-run too. Therefore, rational expectationists argue that there is not only a neutrality of money supply to real income in the long-run as postulated by adaptive expectationists, but also that it is neutral in the short-run because of a lack of discrepancy between the actual and the expected rate of inflation.

The structuralists' approach to inflation, which gained rapid acceptance in developing countries, originated mainly from the economic events of Latin American countries. The structuralists argue that the rise in inflation can be attributed to the basic structural constraints experienced in the process of industrialization and development. Various structural factors, such as demand shift, export instability, agricultural bottleneck, foreign exchange scarcity and relative price changes result in inflation. (Pethe, 1994). In such a situation, demand management policies are inoperative and inflation is determined independent of market forces. In supply constrained economies, excess money supply cannot generate output because technology and real resources cannot be augmented by merely an increase in money supply. Structuralists argue that inflation in a developing economy is not a monetary phenomenon, in the sense that it is a result of a structural disequilibrium in the growth process and as such cannot be cured by monetary regulation.

In a modified structuralists' model, price level is assumed as changing due to changes in structural factors along with the changes in money supply. However, the direction of causation need not be from money to price (Pethe, 1994). Therefore, non-structural elements such as money supply combined

with structural factors significantly contribute to the acceleration of inflation in developing countries (Argy 1970, Wachter 1976). The necessary condition for the process of inflation generation is an accommodating monetary policy that allows the aggregate demand schedule to shift upwards in order to prevent the increase in unemployment (Khan, 1976). In such a situation, money supply in a closed economy is considered as an endogenous variable.

Inflation in a small open economy may be of both external and internal origin. The degree of openness has a significant influence on domestic inflation. The world inflation determines domestic inflation (Blejer, 1977). World inflation is transmitted to domestic inflation through a country's demand for tradables switching to domestically produced goods when their prices fall relative to the world price through goods arbitrage. The increased demand bids up the price of domestically produced goods. The smallness of the economy relative to that of the trading partner leads to the expectation of unidirectional causation of business activity (Bohara and McNown, 1989). In a small country, since it is being a price taker, a rise in prices in the trading partner leads to an increase in the import price of both the consumer goods and industrial equipments and raw materials. Further, higher prices in the trading partner country motivate flow of goods to trading partner creating an acute shortage of goods in the small country, causing inflation. Therefore, a change in the prices of goods and services in the trading partner leads almost an instantaneous effect on the import prices in a small country through arbitrageur.

The approaches of inflation analysis as explained above have significant importance in monetary policy formulation. They help to understand different sources of inflation and find appropriate tools of analysis. Classical and neo-classical economists talk about money supply as a leading explanatory variable of inflation in a closed economy. Keynesians argue about the factors of aggregate demand having impact on both the inflation and output in the short-run. It gives some guidelines to incorporate budget deficit, money supply as

well as GDP variables in inflation equation and to examine validity thereof. Monetarists suggest introducing inflation expectation as an additional explanatory variable in inflation equation. Adaptive expectationists argue about the dynamic formulation of inflation equation introducing lagged variables in inflation equation. Structuralists' model gives some additional sources of inflation for developing countries like Nepal, where money supply is not completely exogenous, suggesting the incorporation of additional structural variables in the monetarists' model. Inflation determination in an open economy suggests international inflation as an additional variable to understand international influence on domestic inflation. The rational expectationists model gives idea for inflation forecasting and its policy implication.

4. TRANSMISSION CHANNELS OF MONETARY POLICY

Theories of inflation provide some guidelines to understand the relationship between money supply and inflation, where money supply is one of the important determinants of inflation. The monetary policy, as a demand management policy, exerts influence on quantity, cost and availability of money and hence it affects goal variables. Inflation is one of the most important goal variables of monetary policy. A certain time lag occurs between the implementation of monetary policy and its impact on controlling inflation. Monetary policy affects inflation through different transmission channels. In a closed economy, according to Svensson (1999), transmission channels include an aggregate demand channel and an expectations channel. The monetary policy affects aggregate demand through its effect on the short-run and long-run real interest rates, with a lag. Aggregate demand then affects inflation, with another lag, through an aggregate supply equation (a Phillips curve). The expectation channel allows monetary policy to affect inflation expectation which, in turn, affects inflation, with a lag, through wage- and price setting behavior. Svensson (1998), using Adaptive Expectations Model, found that the

monetary policy affects the aggregate demand with a one-year lag and inflation with a two-year lag.

The quantity theory transmission channel emphasizes direct influence of money on the commodity market. Money, having general purchasing power, when increased, will flow into all other markets and push the demand for both bonds and goods and services upward. The Cambridge QTM did imply a transmission mechanism linking a discrepancy between actual and desired stocks of money with adjustments through changes in flows of expenditure. Assuming demand for money a proportional function of money income, any discrepancy between actual (supply of money) and desired stock of money (demand for money) led the public to try to spend less or more than before. As a consequence, the level of money income also changes.

The Keynesian transmission channel argues that the changes in money supply have an indirect effect on real income. The initial effect of the money supply is to change in interest rates, and the investment expenditure latter. Here, the investment expenditure is considered as one of the major components of the aggregate demand that contributes to real income. Therefore, money is supposed to influence the commodity market indirectly through the bond rate of interest as the cost of credit in the loanable fund market. Credit availability channel of monetary policy is based on the decision of the financial institutions' supply of credit (Gupta, 2001). Though there is no change in the rate of interest, banks and financial institutions' supply of credit is directly affected by the credit rationing (such as default-risk or credit rating of potential borrower. Similarly, the wealth effect channel works through the monetary policy changes. Changes in policies affect the net worth of the private sector and hence changes in real flow of expenditure (Leeuv and Gramlich, 1969).

In an open economy, there are additional channels for the transmission of monetary policy. There is a direct exchange rate channel for the transmission of

monetary policy to inflation. Monetary policy affecting the exchange rate may change the domestic currency prices of imported final goods, which enter in the Consumer Price Index (CPI), and hence in inflation. There is an additional exchange rate channel to inflation; the exchange rate will affect the domestic prices of imported intermediate inputs. Exchange rate also affects nominal wages through the effect of the CPI on wage-setting. In both cases, it will affect the cost of domestically produced goods, and hence lead to domestic inflation (inflation measured by the prices of domestically produced goods). The exchange rate is affected by the difference between domestic and foreign nominal interest rates and expected future exchange rates, through an interest parity condition. With sticky prices, the nominal exchange rate affects the real exchange rate. The real exchange rate will affect the relative prices between domestic and foreign goods, which in turn, will affect both the domestic and the foreign demand for domestic goods, and hence contribute to the aggregate demand channel for the transmission of monetary policy. Typically, the lag of this direct exchange rate channel is considered to be shorter than that of the aggregate demand channel (Svensson, 1999).

The effect of monetary changes is supposed to be distributed between price and balance of payments in the long-run with little or no effect on real output (Khatiwada, 1994). Real income in Nepal is mainly supply determined independently of demand conditions and changes in the quantity of money, in such a situation, affect the level of prices and the balance of payments. In a capital constrained economy like that of Nepal where informal market rates of interest are substantially higher than those in the formal sector and where formal financial sector can fulfil only a small portion of the overall credit demand, availability rather than cost of capital is the determinant of investment decision. Due to the underdeveloped secondary financial markets prevailing in Nepal, people hold financial assets in the form of currency and bank deposits. Therefore, wealth effect working through changes in interest rate is not very substantial in affecting aggregate expenditure. Considering money stock as a

part of net worth, there is a possibility that changes in the quantity of money will influence aggregate expenditure of the public, which can be analyzed under the framework of quantity theory of money.

5. APPROACH TO BUSINESS CYCLE

Business cycle is a fluctuation in the level of economic activity, which forms a regular pattern, with an expansion of activities, followed by a contraction, succeeded by further expansion (Pearce, 1992, Levacic and Rebmann, 1982). Short-run fluctuations in output and employment are called 'Business Cycles' (Mankiw, 2004). Business cycles are ups and downs in economic variables over time. A business cycle is referred to as a cycle of recession and recovery or a cycle of prosperity and recession. Accordingly, a business cycle is divided into four phases, viz., trough, recovery, peak and recession (Gupta, 2004).

Recession is a contractionary phase of the trade cycle which follows a peak of boom and ends with the trough. Expansion or prosperity is a state of affairs in which real income consumed and produced, and the level of employment are on the rise, so that, there are none or few idle resources or unemployed workers (Haberler, 1964). But with the passage of time resources which are already fully employed become scarce, output becomes less elastic, bottlenecks appear, costs rise, deliveries become difficult, the volume of money rises and price variation becomes irregular. All of these bring about an end of cumulative expansion or prosperity phase of the cycle and recession begins, giving way to contraction, depression or regular slump. Among the major components of a time series (secular, cyclical, seasonal and random) cyclical fluctuations imply business cycles, which are ups and downs in economic variables due to elections, wars, the weather, technical breakthrough, and significant changes in economic policies.

Business cycle theories focus on the factors that cause output to fluctuate around the long-term trends. Further, they focus on combinations of shocks and propagation mechanisms, that give rise to fluctuations in economic activity, on the basis of covariations among economic variables that are observed in practice (World Economic Outlook, 1998). The theory of economic growth, instead, is related to the pattern of long-term trends in output across countries. The Trade cycle is the regular recurrence of expansion and contraction in the process of long-run economic growth. Theories of the determination of output, unemployment, investment, inflation, interest-rate and other relevant variables play their role in explaining fluctuations in the general level of economic activity (Lavacic and Rebmann, 1982). Business cycles are caused by both demand and supply shocks. There are different schools of thought about the sources of business cycle. The approaches of different theories of business cycle are explained below.

The classical theory of business cycle emphasizes supply (real) shocks that trigger business cycles. The supply shocks are caused by nature, the workers, firms, the government, and factors like wars and terrorism. Keynesians stress the demand shocks that are dominant in creating business cycles. Demand shocks emanate from the behavior of the private sectors, the government and foreign sectors. The Keynesian explanation of trade cycles emphasizes the part played by disturbances in the real variables, particularly in private-sector investment. Their argument stems from the evidence of the market failure to coordinate economic activities creating trade cycles. Therefore, they postulate a rationale for active government intervention intended to stabilize the economy.

The Multiplier and Acceleration Principle of Business Cycles is based on the Keynesian proposition of business cycles where, business cycle are considered as the problem of real sector activities. The Multiplier shows the effect of the change in investment on income and employment where multiplier depends on propensity to consume. The accelerator shows the effect of a change in

consumption on investment. Multiplier depends on psychological factors; while the accelerator depends on technological factors. The accelerator shows the action (effects) of the growth of consumption on investment, while the multiplier shows the reaction of consumption to increased investment. Samuelson (1939) first merged the multiplier and accelerator principle of business cycles to construct cumulative upward and downward movements in real output.

The monetarists, unlike the Keynesians, see the changes in money supply, which originate from the actions of monetary authorities as the cause of business cycles (Levacic and Rebmann, 1982). According to the monetarists', money supply has no output effect in the long-run, and hence money is neutral in creating business cycles. However, in the short-run, monetary disturbances can exert an influence on output. Therefore, short-run monetary fluctuations are associated with similar fluctuations in real output resulting in business cycles (Friedman and Schwartz, 1963). However, Hawtrey (1962) argues that business cycles are essentially a monetary phenomenon. An expansion of money supply is one of the sources of an increase in effective demand, and hence in creating business cycles. Policy and non-policy induced shocks are obvious reasons for explaining fluctuations in aggregate output (World Economic Outlook, 1998).

New Keynesian models of business cycles stress the crucial role played by demand shocks in causing economic fluctuation which was related to microeconomic foundations. In an environment of imperfect information due to slow adjustment of wages and prices in the economy, markets for both goods and labour fail to clear instantaneously, and a variety of aggregate demand shocks can cause fluctuation in economic activity.

The new classical model offers two explanations of business cycles: Friedman-Lucas Model and Real Business Cycles Model (RBCM). The Friedman-Lucas Model of business cycles assumes that the monetary impulses as a major factor

in creating business cycles. Any change in money supply, which is a source of enhancing aggregate demand, increases output or decreases unemployment in the short-run, creating short-run business cycles. However, in the long-run, output and employment revert back to natural path.

According to the Real Business Cycle Theory (REB), the technology, supported by the inter-temporal substitution of leisure, is emphasized as the sole significant source of business cycles. A positive technology shock in period-*t* represents a higher than average growth rate of total factor productivity. Higher productivity raises wages, so labour supply in period-*t* increases as workers find work more profitable than leisure. Thus, two effects serve to raise period-*t* output: the direct effect of higher productivity and the indirect effect of higher labour input. The return to capital increases as well, but the capital stock in period-*t* is pre-determined. Thus, if the technology shock in period-*t* had been foreseen, the implied increase in the period-*t* return to capital could also have led to higher investment in previous periods, thus raising output in period-*t* through a third, indirect channel (Kydland and Prescott, 2004). The RBCM relies on the real or supply side factors generating business cycle.

Stabilization policies play a significant role in moderating business cycles. These policies are not neutral to income, employment, inflation and other real magnitudes. Economists have different views on stabilization policies regarding these being policies conducted actively or passively, or in other words through a set of rules or discretion. But there is a consensus that at least one of the macroeconomic policies (fiscal or monetary policies) is always available to tame business cycles (Gupta, 2004). Business cycles are neither a purely real nor a purely monetary phenomenon; rather, they are a mixed phenomenon. Constraints like measurement problem, forecasting techniques, variable policy lags, incompatible priorities and political costs of policies

determine the effectiveness of fiscal and monetary policies to tame the business cycles.

6. FORECASTING OF INFLATION

How can the monetary policy be used for economic stabilization? The answer to this question raised a debate of rules versus discretion in monetary policy formulation to achieve economic stabilization. Monetary rules means operating monetary policy according to a predetermined rule, largely independent of prevailing economic circumstances. Discretionary monetary policy signifies operating monetary policy instruments in the direction, manner and extent considered appropriate by the monetary authorities in the light of the relevant economic circumstances and the desired economic goals. Monetarists favour monetary policy rule on the ground that it enables the monetary authorities to resist political pressures, provides criteria for judging its performance, and ensures certainty about economic policy for private agents, so that, it reduces economic instability. Further, the length of time and their variability, that decreases the potency of monetary policy, provide support for the adoption of monetary rules (Friedman 1968, Pierce and Shaw, 1974). Rules are regarded as enhancing the predictability of policy actions and thereby improving the private sector's ability to make efficient resource allocation.

In contrast to the Monetarists, the Neo-Keynesians favour the discretionary monetary policy on the ground that policy makers should be given discretion to design policies to combat anticipated shocks which is more stabilizing than that of fixed rules. They do not expect policymakers' errors of judgment. Therefore, discretionary policies are considered in attaining more stable economic performance than would be the case with fixed policy rules.

New classical economists follow the route of the monetarists' for different reasons. Monetarists favour policy rules on account of the uncertainties and

difficulties in obtaining accurate and timely information about the economic conditions. They perceive the inability and inefficiency of the policy makers in adjusting policies quickly. New classicists, in contrast, favour policy rule to ascertain the true nature of policy in the private sector. If the private sector is fully efficient and rational, policy effectiveness is mitigated. Therefore, for social welfare motives, policymakers may commit to one thing in a policy announcement but do different things at the time of implementation. This is the situation of dynamic inconsistency problem in the literature of monetary policy, which gives rise to discretionary policy.

Because of the dynamic inconsistency problem that arises due to the discretionary monetary policy; the adoption of policy rules has dominated the macroeconomic policies since the seventies. The dynamic inconsistency problem arises when a policy announcement for some future period is no longer thought to be optimal at the time of implementation (Kydland and Prescott, 1977). For example, the public may not believe the monetary authority's promise of controlling money supply to combat inflation, if the authority's promise is broken at the time of implementation in order to achieve higher economic growth. Achievement of the higher rate of growth combined with lower rate of inflation are the conflicting goals of monetary policy as postulated by the short-run Phillips curve (Fischer, 1990).

Independent central banks play a role in solving the problem of dynamic inconsistency. The credibility and reputation of the central bank is another criterion to solve this problem (Kydland and Prescott, 1977). Further, the central bank should be independent from politics according to the theory of "Political Business Cycle" (Nordhaus, 1975, Dornbusch, Fischer and Startz, 2000). By the late 1980s, some industrialized countries achieved disinflation through the inflation targeting rules on reputation and credibility grounds (Froyen, 2003). The move to an inflation targeting regime, for the last decade

and half, coincides with the grant of greater independence to the central bank for their instruments while keeping them accountable for their goals.

Monetary policy actions affect the economy with significant lags. It affects inflation with lags of 18 months or more (Kahn and Parrish, 1998). In an inflation targeting regime, the central banks, seeking to achieve a target inflation, need to forecast inflation and adjust policy in response to the forecast deviations of inflation from target. Svensson (1997a) suggests that, because of the long lags in the monetary transmission mechanism, inflation targeting is actually inflation forecast targeting. Debelle, Masson, Savassano and Sharma (1998) argue that the targets of inflation must be forward looking. For example: if inflation forecast is to rise above the target in future, policymakers might need to take action now to tighten the current stance of monetary policy so that it helps to reduce inflation to the target level. Waiting to see inflation rise before tightening policy may result in missing the inflation target. The use of inflation forecasts is an essential feature of inflation targeting because of the lags between monetary actions and their ultimate impact on inflation (Schaechter, Stone, and Zelmer, 2000).

7. CORE INFLATION

Among the likely candidates of monetary policy objective, price stability is the most important one. Monetary policy formulation, which relied on intermediate targets such as monetary aggregates or exchange rates, before few decades, broke down with the emergence of inflation targeting to control inflation through monetary policy (Debelle, Masson, Savastano and Sharma, 1998). Inflation targeting is an announcement of official target ranges for the inflation rate at one or more horizons and an explicit acknowledgement that low and stable inflation is the overriding goal of monetary policy (Bernanke and Mishkin, 1997). Inflation targeting provides a monetary policy framework

within which policy actions are guided by expected future inflation relative to an announced inflation target (Green, 1996).

Inflation targets can be set by the government jointly with the central bank, or can be set by the central bank alone. The ultimate rationale of inflation targeting is to help the central bank achieve a desired long-run level of inflation (price stability). It helps the central bank to achieve long-run price stability in three principal ways: by providing a nominal anchor for monetary policy, by improving the transparency and accountability of monetary policy, and by enhancing the central bank's inflation-fighting credibility (Kahn and Parrish, 1998).

In an inflation-targeting regime, future inflation is the final target, but the current inflation is a determinant of future inflation and thus can be used as one of the indicators to suggest whether the current policy should be tightened or loosened in order to achieve the final target in future (Hogan, 2000). Such considerations raise the question of what measure of inflation would be the best to use as an indicator. Most countries, adopting inflation-targeting, employ a definition of 'core' or 'underlying' inflation that seeks to capture the underlying trend in inflation.

Core inflation is generally associated with expectations and demand pressure components of measured inflation, and it tries to exclude supply shocks (Roger, 1998). Therefore, core inflation and trend inflation are essentially synonymous. The core inflation rate should exhibit more persistence or less variability than the aggregate measured inflation. Supply shocks are the most important sources of relative price changes. Therefore, supply-driven relative price changes affecting the aggregate inflation should only have a transient impact on the aggregate inflation. Bryan and Cecchetti (1994), Cecchetti (1997) agreed on the working of core inflation that captures the component of price changes that is

common to all items and exclude changes in the relative prices of goods and services.

Folkertsam and Hubrich (2001) disagree about using CPI for monetary policy purpose because it is a noisy signal of the inflation pressure (seasonal influences, changes in the indirect tax, purely relative price changes) in an economy; (b) monetary policy operates on inflation with a long and variable time lag, therefore, a measure of inflation would be useful that is a leading indicator of future CPI from the perspective of policymakers; (c) credibility is crucial to the central bank's performance, so that, an operational inflation concept (like core inflation) which only reflects price level movements for which the monetary authority is accountable.

To sum up the background section of this study, a broad consensus among writers from Classical and Monetarist schools is that excess supply of money leads to inflation. Thus, quantity theory of money states that the central bank, which controls the money supply, has ultimate control over inflation. If the central bank keeps the money supply stable, the price level remains stable. If the central bank increases the supply of money, the price level also rises. The Monetarists are different from the Keynesian on the argument that they assume predictable relationship between money supply and inflation given stable demand for money function. The Keynesians assume unstable demand for money function and hence doubt the predictable relationship between these variables. The Keynesians argue about the factors of aggregate demand having impact on both the inflation and output in the short-run. Structuralists contend that besides monetary variables there are structural factors contributing to inflation.

Availability of credit is found to be relevant in the determinant of investment decision because formal credit sector is able to fulfill only a small portion of overall credit demand in Nepal. Real income is mainly supply determined

independent of demand conditions. Thus, changes in the quantity of money affect the level of prices and the balance of payments given real income constant. The changes in the quantity of money influence aggregate expenditure of the public, which can be analyzed under the framework of quantity theory of money.

The Classicals emphasized on supply (real) shocks that trigger business cycles while the Keynesians see changes in the supply of money as a primary factor causing business cycles. Among the several monetary policy objectives, price stability is a most important one. Therefore, the central bank needs to forecast inflation and adjust policy in response to actual deviations of inflation from target inflation.

8. STATEMENT OF THE PROBLEM

Nepal is a landlocked country, wedged between China and India. It has a population of 23 million. Almost ninety percent of the population lives in rural areas and is dependent on subsistence farming. More than forty percent of the total population lives below the poverty line. The agricultural sector still occupies a predominant position in the Nepalese economy, contributes approximately 40 percent of the GDP. The average annual rate of growth of gross domestic product (GDP) in real term (base year 1994/95) for the last 28 years (1975-2003) is 4.3 percent. The annual growth of agricultural and non-agricultural GDP during the period stood at 2.5 and 6.3 percent respectively. Agricultural growth of 2 percent, combined with population growth of 2.3 percent has effectively concealed the growth achieved by developmental activities.

Inflation is a major issue in macroeconomics. Low inflation combined with high growth of output is the single most important objective of macroeconomic policies (Ghosh, 2000). Not only that, inflation control is also one of the most

controversial subjects in economics. The monetarists and the non-monetarists are the two broad approaches to inflation that have dominated the history of inflation theory. However, as of now, there does not seem to be any consensus emerging to solve this problem. The basic contention of the monetarists is that inflation is essentially a monetary phenomenon: the result of excess supply of money over demand for it. The non-monetarists argue that rise in price level is a much more complex phenomenon. Thus, it cannot be controlled by mere regulation of money supply growth (Bhattacharya and Lodh, 1990).

The overall inflation, measured by annual variation in national urban consumer price index (base year 1995/96) in Nepal, during 1975-2003 rose at an average annual rate of 8.5 percent. Inflation increased in double digits for nine years out of twenty-eight. The rates of growth in individual years range from 21 percent in FY1991/92 to negative 0.6 percent in FY1975/76. On balance, it appears that inflation in Nepal has remained moderate rather than hyper.

The trend of inflation during different five years development plan of the government of Nepal shows a rising from fifth plan (1975-80) to seventh plan (1985-90) and falling trend in the plans afterwards. Inflation during the fifth plan (1975-80) was 5.2 percent and it increased to 9.7 percent in the sixth plan (1980-85). This is attributed to the combined effects of abrupt rise in both the food and non-food index. During the seventh plan, inflation increased moderately and marked at the highest of 11.6 percent. Only food index fuelled overall inflation during the plan because the non-food index was in a declining trend. The rates of inflation declined gradually from 8.3 percent to 5.7 percent and further to 4.8 percent in eighth (1983-97), ninth (1997-02) and tenth (2002-) plans respectively.

In Nepal, the factors attributable to the highest rate of inflation seem to be both internal and external. Excess money supply over demand is one of the major factor determinants of rising inflation. The peaked rate of inflation in seventh

plan (1986-90) is attributable to the highest rate of growth of both the M1 and M2 monetary aggregates. During that period, inflation increased by 11.6 percent and excess money growth in terms of M1 monetary aggregate was 14.4 percent. Further, Real GDP, during the sixth, seventh and eighth plan period remained almost stable and declined in later plans. Therefore, the factors affecting price escalation up to the eighth plan were: sustained rise in money supply combined with more or less stable growth in output of the economy.

In an economy with under full employment, the impact of changes in aggregate demand is distributed between changes in inflation and output. According to Keynes, transaction and precautionary demand for money is determined by real income and speculative demand for money is determined by the rate of interest. Demand for money is found less interest elastic in an economy with an underdeveloped financial market. Demand for money is determined by transaction of goods and services available in the economy or real income. If the real income is constant, actual money supply (supply of money by the central bank) exceeds demand (desired for transaction purpose) for it raises inflation. Excess supply of money can be calculated after deducting the growth of money supply from the growth of real GDP. The excess supply of money over the real GDP in Nepal, over the last 28 years (1975-2003), ranges between 7.5 to 14.4 percent in case of M1, and between 12.1 to 16.2 percent in case of M2. Therefore, excess supply of money over demand led an increase in the total expenditure of the public and hence to a rise in both the inflation and the output under less than full employment situation.

According to classical economists, given constant supply of output, any pressure on demand on the economy ultimately gets reflected on the general price level proportionately in closed economy. However, Keynesians argue that, because of the economic rigidities, the money-price relationship is direct but less than proportionate. Therefore, there are a number of controversies regarding proportional effect of money supply to inflation theoretically as well

as empirically. Examining the monetarists' and non-monetarists' hypotheses of inflation to explain its trend in Nepal and testing their stability is an important area of interest that needs to be addressed.

Since the characteristic of the Nepalese economy are that it is neither a completely closed nor a completely open one, the effect of monetary changes is supposed to be distributed between price and balance of payments in the long-run with little or no effect on real output (Khatiwada, 1994). Real income in Nepal is mainly supply determined independent of demand conditions, and changes in the quantity of money; in such a situation, affect the level of prices and the balance of payments. The smallness of the economy relative to that of the trading partner leads to the expectation of unidirectional causation of business activity (Bohara and McNown, 1989). It implies that the rise in inflation in Nepal is not only created by domestic demand pull inflation but also by imported inflation. The small country, being a price taker, a rise in the prices in trading partner leads to an increase in the import price of consumer goods in a small country through arbitrageur (Levacic and Rebmann, 1982). It motivates the flow of goods to the trading partner country creating acute shortage and ultimately rises in price in the small country. Similarly, the import price of industrial raw materials and capital goods causes cost-push inflation. Therefore, high rate inflation in India is directly or indirectly transmitted into Nepal's inflation. Keeping this in view, Indian inflation as well as several other structural factors are responsible for triggering inflation. Examining the structuralists' hypothesis to explain the inflation trend of Nepal is another area of interest to be dealt with.

Particularly in case of developing countries, it is found that there is a significant relationship between the variability of inflation and inflation rates (Rao, 1992). If the volatility of the inflation rate increases with rising inflation, the expectations of the future course of inflation become uncertain. People's expectations are not realized under the situation of uncertainty in expected rate

of inflation. In Nepal, the five years mean inflation was 5.2 during 1975-80 and it increased to highest of 11.6 during 1986-90. It marginally declined to 11.3 percent in 1991-95. From 1995-96 onwards it started declining and fell to 3.4 percent during the last three years of the study. However, the standard deviation, which measure of volatility of inflation, is quite erratic during the subsequent periods. Keeping these things in view, the measurement of variability of inflation is an important empirical issue in this field.

Analyzing money-price relationship is an important issue that this study also deals with. In this respect, whether the monetary policy is responsible in creating business cycles of inflation is an important issue that needs to be addressed. If the monetary policy really creates the business cycles, it needs to be analyzed whether inflation in Nepal is pro-cyclical or counter-cyclical. If the rise in inflation is associated with the rise in output, then inflation is considered procyclical, and if there is negative association, countercyclical inflation holds true. A variable is procyclical (counter cyclical) if it has predominantly positive (negative) and statistically significant correlation coefficients with another variable. A variable displays cyclical (non-cyclical) behaviour if the correlation coefficients display (do not display) a pronounced peak. If such a peak occurs when the variable has one period lead (lag) relative to inflation, we will refer to it as a lagging (leading) variable. Generally, inflation tends to rise in booms and fall in recession. Identifying lead and lag variable has an important policy implication.

Monetary policy is mainly a direct or indirect tool of demand management. The objectives of monetary policy in the Nepalese economy are to secure both domestic price and the balance of payments (BoP) stability for sustainable economic growth and maintaining financial sector stability, soundness and credibility (Nepal Rastra Bank, 2002). Monetary Policy aims at attainment of maximum feasible output through aggregate demand management that may change due to monetary growth. Assignment of price stability as a single

objective of monetary policy, the empirical strength of money-price relationship plays a crucial role for policy formulation. If empirical results show a strong and robust relationship between money supply and prices, then the central bank can opt for price stability as its single objective (Nepal Rastra Bank, 2001). Inflation targeting provides a monetary policy framework within which policy actions are guided by expected future inflation relative to an announced inflation target. In this situation, inflation forecasting is a handy tool. If inflation is forecast to rise above target in the future, policymakers might need to take action immediately to tighten the current stance of monetary policy so that it helps to reduce inflation to the target level. Therefore, examining a good forecasting model of inflation is another concern of monetary policymakers.

Financial sector reform began with partial deregulation of interest rate in 1984. Reforms were in terms of withdrawing Statutory Liquidity Ratio (SLR) in 1986 and auctioning of government securities in 1988. By 1989, there was a complete deregulation of interest rate, initiation of prudential norms for banks and setting up of Credit Information Bureau (CIB) (Nepal Rastra Bank, 1996). Financial reforms, being a continuous process, are still carried forward for the conduct of monetary policy, institutional building and, supervision, monitoring and evaluation of financial institutions. The trend of inflation after the adoption of liberalization policy by the government is gradually declining. In this context, the impact of policy changes on acceleration of inflation is another issue to be dealt with.

Private sector's expectations, with respect to policy changes, affect the structural coefficients of the model. The new classical writers pointed out that because of the changing structural coefficients of the model, estimated coefficients cannot be treated as invariant (Levacic and Rebmann, 1982). If policy makers introduce shifts in policy conduct, people's expectations about future policies may change and so would their decision rules (Chari, 1998).

Expectations depend upon the nature of the policy regime and they are likely to be changed systematically with the regime (Lucas, 1976). If structural coefficients do vary with policy changes, it invalidates econometric models which are used for forecasting and policy analysis. Therefore, the frequent breakdowns and drift of coefficients in the model is not surprising. In this context, the liberalization policies initiated by the government of Nepal during the mid-eighties may have brought about the issue of stability and robustness of macroeconomic models. The problem of spurious regression and model's stability condition is also another issue to be dealt with. Keeping the above statement of the problem in view, the objectives of the study are set in the following section.

9. OBJECTIVES OF THE STUDY

The objectives of the study are;

A) To examine the monetarists' and non-monetarists' hypotheses of inflation in order to explain its trend in Nepal,

B) To identify a statistically robust and stable model of inflation in Nepal, and

C) To identify forecasting model of inflation.

10. LIMITATION AND DATA SOURCES

The main sources of data for the present study include Quarterly Economic Bulletin, Main Economic Indicators, Urban Consumer's Price Index published by Nepal Rastra Bank (the central bank), Central Bureau of Statistics, Various Budget speeches of His Majesty's government, Ministry of Finance, International Financial Statistics, World development indicators 2003, etc. The present study is based on secondary data frequency

The study spans 28 years, starting from FY1975/76 to FY2002/03. The reason for selecting 28 years of data is to incorporate more than two business cycles in the whole period so that trend and cyclical fluctuations (long-run and short-run) can be analyzed. The said period of study is neither too long nor too short. The selection of the first year of the study period corresponds to the initial availability of disaggregated data. Time series of monetary aggregates and price indices are available in disaggregated form. However, for other variables, annual data have been taken for analysis. Therefore, the analysis of the study is made both on the basis of annual and quarterly data frequency. The whole sample period of the study is divided into two parts breaking the whole sample period from FY 1989/90. The reason for dividing the whole sample into two is that the former period entails pre-liberalization and the latter post-liberalization era of the Nepalese economy. According to the Nepali calendar new fiscal year starts from mid-July of the English calendar. Therefore, every annual data are taken from mid-July as available in above-mentioned publications.

11. CHAPTER SCHEME

This study is divided into seven chapters. The first chapter is an introductory chapter. It includes the business cycles in Nepal, approaches of inflation, transmission mechanism of monetary policy, statement of the problem, objectives of the study and limitation and data sources of the study. The second chapter discusses about macro economy of Nepal followed by monetary policy and inflation measurement in Nepal. The third chapter attempts to review the literature relating to various models of inflation followed by some empirical studies of inflation and its determinants in developed and developing countries of Asian and Nepal.

The methodology of the study is presented in fourth chapter. This chapter consists of hypotheses, specification of models, testing of the hypotheses and period of analysis. The fifth chapter estimates and analyzes various models of inflation in Nepal. The sixth chapter attempts to investigate better forecast model of inflation in Nepal. The seventh chapter is the concluding chapter.