Chapter 2: Review of Literature

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2.1 Introduction

Inflation in an open economy can be influenced by both internal and external factors. Internal factors include, among others, the government budget deficit, monetary policy and structural regime changes (revolution, political regime changes, etc.). External factors include terms of trade and foreign interest rate, as well as, the attitude of the rest of the world (sanctions, risk generating activities, wars, etc.) toward the country. The relationship between budget deficit and macroeconomic variables such as inflation rate represents one of the most widely debated topics among economists and policy makers in both developed and developing countries. An extensive theoretical and empirical literature has been developed to examine the relationship between the government budget deficit and macroeconomic variables. At a theoretical level, much of the literature [e.g. Friedman (1968); Sargent and Wallace (1981); Miller (1983); among others] has focused on the relationship between budget deficit and inflation. The main purpose of this Chapter is to conduct an overview, both theoretical and empirical, of the relationship between budget deficits and inflation rate in order to derive substantive conclusions to such a relationship, which can be used to construct or develop a macroeconomic model for analysing the impact of the budget deficit on inflationary process.

The remainder of this Chapter is organized as follows. Section 2.2 overviews various theories of inflation phenomenon. Section 2.3 discusses about budget deficit in the public finance literature. Section 2.4 presents a theoretical framework for analysis of relationship between budget deficit and inflation. Much empirical controversy exists in the literature as to the relationship between budget deficit and inflation; section 2.5 reviews previous empirical studies and final section presents concluding remarks of this Chapter.
2.2 Theories of Inflation

Much theoretical and empirical controversy exists in the literature as to the forces shaping the inflation phenomenon. In this section, we argue about various theories of inflation.

2.2.1 The Classical Theory of Inflation

The view of classical economists, Jean Bodin, Richard Cantillon, John Locked, David Hume, Adam Smith and William Petty is called collectively as the ‘Classical Theory of Inflation’. This theory is based on the classical quantity theory of money. The first and the comprehensive version of the classical theory of inflation were propounded by Irving Fisher in 1911. According to the classical theory, inflation occurs in direct proportion to increase in money supply, given the level of output. The classical theory of inflation is derived directly from the classical quantity theory of money. \(^1\) By Fisher’s equation,

\[
MV = PT,
\]

and

\[
P = \frac{MV}{T}
\]

This equation can also be written in terms of percentage changes.

\[
m + v = p + y
\]

\[
p = m + v - y
\]

Where, \(p\) = per cent rate of inflation, \(m\) = per cent rise in money supply, \(v\) = per cent increase in velocity of money, and \(y\) = per cent increase in real output.

For example, if there is full employment and money supply (\(M\)) increases by four per cent, \(v\) and \(y\) remaining constant, the rate of increase in the general price level will be five per cent. The greatest shortcoming of the classical quantity theory of money is that it does not explain the process by which an increase in money supply causes the rise in the price level. Wicksell, a classical economist, however, explained of loans and advances made by the banks to the businessmen to finance the new investment. The increase in investment demand increases the aggregate demand.

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economy being in the state of full employment, additional resources are not available at the prevailing prices. The additional resources are therefore, acquired by bidding higher prices to acquire the resources. This marks the beginning of the rise in the price level. The rise in the input prices (especially wages) leads to increase in money incomes. This leads to rise in the demand for consumer goods. Under the condition of full employment, the supply of consumer goods does not increase. Therefore, higher prices are bid to acquire goods. As a result, prices increase till the entire increase in aggregate demand is absorbed by the rise in prices. This is how increase in money supply causes inflation.

Another version of the classical theory of inflation, known as Neo-Classical Theory of Inflation, was later developed by the Cambridge economists also known as Neo-Classical Theory of Inflation. While classical school considered increase in the supply of money as the cause of inflation, the Cambridge school postulated increase in demand for money as the cause of inflation. Recall the Cambridge version of quantity theory of money: \( M_D = kRP \) (where \( M_D \) = amount of money demanded; \( R \) = real output; \( P \) = general level of prices; and \( k \) = a constant proportion of total income people want hold in the form of money). The Cambridge equation yields the price level equation as \( P = M_D / kR \). This equation implies that the general level of price increases in proportion to an increase in demand for money, given \( k \) and \( R \).

2.2.2 The Keynesian Theory of Inflation

Keynes’s theory of inflation ‘is only a little more than an extension and generalization’ of Wicksell’s view. Keynes, however, made an important departure from the classical view. While classical economists considered an increase in money supply as the only cause of an increase in the aggregate demand and only cause of inflation, Keynes postulated that aggregate demand can increase also due to an increase in real factors.

Keynes expressed his view on inflation in his book, *How to Pay for the War* (1940), wherein he gave the concept of inflationary gap. Inflationary gap is defined as the planned expenditure in excess of output available at full employment. The British Chancellor of Exchequer defined the inflationary gap in budget speech of 1941 as
“the amount of the government’s expenditure against which there is no corresponding release of real resources of manpower or material by some other members of the community”. The ‘inflationary gap’ is so called because it causes only inflation, without increasing the level of output. It is important to note here Keynes linked inflationary gap and the consequent inflation to full employment output. It implies that the expenditure in excess of output at less-than-full-employment level is not inflationary even if prices increase. For, such increase in price generates additional employment and output. The additional output absorbs the excess demand ultimately without causing inflation.

2.2.3 The Monetarist View on Inflation

The modern monetarist view is a modified version of the Classical Quantity Theory of Money. The modern monetarism is therefore, sometimes called ‘Modern Fisherianism’. The modern monetarists hold that the general level of price rise only due to an increase in money supply. To this extent, monetarists subscribe to the classical quantity theory of money. However, the modern monetarists make the following deviations from and modifications to the classical quantity theory of money.

(i) They do not subscribe to the classical view that there is a proportional relationship between the stock of money and the price level. In Friedman’s own words, “In its most rigid and unqualified form the quantity theory asserts strict proportionality between the quantity of what is regarded as money and the level of prices. Hardly anyone has held the theory in that form”.

(ii) The modern monetarists do not agree with classical proposition that ‘the supply curve is vertical in short-run’. “Monetarists such as Friedman argue that a reduction in the money stock does in practice first reduce the level of output, and only later have an effect on prices”.

(iii) Unlike the classical economists, modern monetarists distinguish between the short run and long-run effects of change in the stock of money. They argue that, in the short-run, changes in the stock of money ‘can and do
have important’ effect on real output. But in the long-run, in their opinion, change in money stock remains neutral to the real output. “They argue that in the long-run money is more or less neutral. Changes in the money stock, after they have worked their way through the economy, have no real effects and only change prices…”

2.2.4 Modern Theory of Inflation

The modern approach to inflation follows the Theory of Price Determination. The price theory tells us that, in a competitive market, price of a commodity is determined by the market demand and the supply of the commodity and variation in the price of the commodity is caused by the variation in the demand and supply factors. Likewise, the aggregate price level is determined by the aggregate demand and aggregate supply and variation in the aggregate price level is caused by the variations in the aggregate demand and aggregate supply.

The modern theory of inflation is, in fact, a synthesis of Classical and Keynesian Theories of Inflation. The modern analysis of inflation shows that inflation is caused by both demand–side and supply-side factors. The demand–side factors are called demand-pull factors, and supply-side factors are called supply-side or cost-push factors. Accordingly, there are two kinds of inflation:

(i) Demand-pull inflation.
(ii) Cost-push inflation.

1 Demand-Pull Inflation

The demand-pull inflation occurs when the aggregate demand increase much more rapidly than the aggregate supply. The demand-pull inflation caused by monetary and real factors are provided here separately.

(a) Demand-Pull Inflation due to Monetary Factors. An important reason for demand-pull inflation is increase in money supply in excess of increase in potential output. Whether increase in money supply in excess of output is the cause of inflation
is a controversial issue. In reality, however, monetary expansion in excess of increase in real output is one of the most important factors causing demand-pull inflation.

As regards the empirical evidence of this kind of inflation, German inflation of 1922-1923 is often cited as an example of demand-pull inflation caused by the increase in money supply. During 1922-1923, the German government had fallen under heavy post-war debts and reparations payment obligations. The government, left with no option, asked its central bank to meet government payment obligations. When the German Central Bank printed and circulated billions and billions of paper currency, the general price level raised a billion-fold. In recent times, the excess supply of money caused demand-pull inflation in Russia in 1990s ‘when the Russian government financed its budget deficit by printing roubles.’ Due to rapid increase in money supply, the general level of prices had raised in Russia during the early 1990s at an average rate of ’25 per cent per month.’

(b) Demand-Pull Inflation due to Real Factors. The real factors that cause demand-pull inflation are those that cause upward shift in the IS curve. The factors that cause upward shift in the IS curve is:

(i) Increase in government spending given the tax revenue
(ii) Cut in tax rates without change in the government expenditure
(iii) Upward shift in the investment function
(iv) Downward shift in the saving function
(v) Upward shift in export function
(vi) Downward shift in the import function

2 Cost-Push Inflation

Inflation is not caused by the demand-side factors alone. There are numerous instances of inflationary movement of prices which could not be fully explained by the demand-side factors. The 1958-recession in western countries is a famous instance. During this period of recession, aggregate demand had declined. Therefore, the general price level should have decreased but it did not. In recent times, it is a
common experience that prices generally do not decreased during the period of recession. Furthermore, even when there is stagflation in the economy and there is no inflationary pressure, the general price level generally continues to increase, with a high rate of unemployment. The search for explanation to this kind of phenomenon, particularly for the 1958-puzzle, has lead to the emergence of supply-side theories of inflation, popularly known as cost-push theory and supply-shock theory of inflation.

The cost-push inflation is caused by the monopoly power exercised by some monopoly groups of the society, like labor unions and firms in monopolistic and oligopolistic market setting. It has been observed that strong labor unions often succeed in forcing money wages to go up causing prices to go up. This kind of rise in price level is called wage-push inflation. Not only labor unions, the firms enjoying monopoly power have also been found causing rise in the general price level. The monopolistic and oligopolistic firms push their profit margin up causing a rise in the general price level. This kind of inflation is called profit-push inflation. Yet another kind of cost-push inflation is said to be caused by supply shocks. Thus, the cost-push inflation may be classified on the basis of supply-side factors as follows.

(i) Wage-push inflation
(ii) Profit-push inflation
(iii) Supply-shock inflation

To these may be added some other kinds of supply-side factors, such as minimum-wage legislation and administered prices. The minimum-wage legislation is an intervention with the labor market. This prevents the downward adjustment in wages during the period of recession. Administered prices, for instance, fixing a minimum price for some sections of producers prevent downward adjustment in prices during the period of good harvest and keep the prices artificially high for socio-political reasons.

(i) **Wage-Push Inflation.** Wage-push inflation is attributed to the exercise of monopoly power by labor unions to get the money wages enhanced above the competitive labor market wage rate. The logic of wage-push inflation
is simple. Labor unions exercise their monopoly power and force firms, the employers, to increase their money wages above the competitive level without a matching increase in labor productivity. Increase in money wages causes an equal increase in the cost of production. The increase in cost of production causes the aggregate supply curve shift backward. A backward shift in the aggregate supply causes an upward movement in the price level.

(ii) **The Profit-Push Inflation.** Another supply-side factor that is said to cause inflation is the use of monopoly power by the monopolistic and oligopolistic firms to enhance their profit margin, which results into rise in price and inflation. It is important to note here that the existence of monopolistic and oligopolistic firms and the use of their monopoly power to increase their prices is a necessary condition for profit-push inflation. A realistic market situation all over the world is characterized by imperfect market conditions. Monopoly, monopolistic competition and oligopoly account for almost all manufacturing industries. Therefore, a profit-push type of inflation has a great theoretical possibility. It is argued that in imperfect markets, prices are largely administered prices determined by the management rather than market determined. The administered prices are adjusted upward in a greater proportion than the rate of increase in input prices or even without increase in input prices. When monopolistic and oligopoly firms increase the administered prices with a view to increasing their profit margin, it leads to rise in prices and takes the form of profit-push inflation.

(iii) **Supply-Shock Inflation.** Another variant of cost-push inflation is the supply-shock inflation. Supply shock is a sudden, unexpected disturbance in the supply position of some major commodities or key industrial input. The supply-shock inflation occurs generally due to sudden rise in the prices of high-weight age items in the price index number, for instance, food prices due to a crop failure, and prices of some key industrial inputs like, coal, steel, cement, oil and basic chemicals. The rise in the price may
be caused by supply bottlenecks in the domestic economy or international events (generally war) causing bottlenecks in the movement of internationally-traded goods and causing, thereby, shortage of supply and rise in the prices of imported industrial inputs. The sudden rise in the OPEC oil prices during 1970s due to Arab-Israel war is the famous example of the supply shock (Dwivedi, 2004).

2.2.5 New Classical Theory of Inflation

Origins: The classical foundations of the Monetarist school provide a first point of departure for the New Classical approach to macroeconomics. There are a few important characteristics of monetarism that should be clarified in order to show more clearly the unique qualities of the New Classical tradition. In general, the monetarist critique of Keynesian economics arose out of the period of stagflation during the 1970’s and 1980’s. The Phillips curve, adapted into the Keynesian framework, was unable to explain or account for the co-existence of two seemingly inconsistent phenomena; inflation and unemployment should be trade-off consequences of demand management. In 1968, a few years before stagflation ever became an issue, the monetarist Milton Friedman portended a few serious limitations with the Keynesian framework and specifically the Phillips curve. Rather than showing a simple inverse relationship between inflation and unemployment, the curve should relate unemployment to real wages rather than nominal prices. In showing changes between the inflation and unemployment rates, the relationship was implicitly oversimplified into a trade-off that appeared static rather than dynamic. Also among his contributions was the natural rate hypothesis, which proposed a stable equilibrium rate of unemployment to which “the stable private economy tends to return once disruptive influences” is removed.

This theory implies that there is no real tradeoff between unemployment and inflation, but rather any short-run tradeoff reflects that economic agents have made a mistake in their expectations of future inflation. In doing so, workers have succumbed to a ‘money illusion’ because they have confused absolute and relative price changes. In the short-run the aggregate supply curve is upward sloping because workers have
not yet adjusted to real changes in wages. Over time, the incorrect expectations of the workers gradually adapts to coincide with the actual level of prices; the short-run aggregate supply curve shifts upward until the wage increase translates entirely into a proportional increase in the price level. We have again reached the classical formula: every increase in spending or wages will translate into an equivalent change in the price level. Even amongst the monetarists there is no clear consensus about how long this corrective period lasts. For monetarists in general, however, we can see that the problem of ‘money illusion’ arises from limited information about relative wages, and expectations that are always retrospective, or ‘adaptive.’

Although involuntary unemployment is something that comes about in disequilibrium, Friedman’s theory of unemployment was an equilibrium approach. How is this when unemployment is a disequilibrium phenomenon? The money illusion can only have an impact on unemployment, insofar as workers have been mistaken in their expectations about the future rate of inflation. When there is an unexpected fall in aggregated demand, the price level and price of output will also fall. Employers will hire more workers as the marginal cost per worker increases, and as the real wage are perceived to decrease, so will the aggregate supply of labor. At the end, unemployment falls. Frictional unemployment comes about as workers move between jobs and adjust to nominal price changes. Therefore, unemployment happens in the economy when workers have mistaken expectations even while they are struggling to maximize their utility. This is not an ideal situation because under different circumstances the aggregate income could be high, but it is the best situation given the set of constraints.

**The New Classical Theory:** In early 1970s the classical economics underwent its own “revolution”: the rational expectation hypothesis was incorporated in the general equilibrium models.\(^2\)

Although initially developed by Muth (1961), the rational expectation hypothesis was incorporated into macroeconomic theory mainly through the works of Lucas

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2. Rational expectation hypothesis supposes that economic agents know the stochastic process which determines the behavior of the variables in each period of time. See, for instance, Muth (1961).
These authors, so called New Classical economists, aim at presenting an alternative view to the mainstream neoclassical Keynesian macroeconomics, i.e. IS-LM analysis, and at criticizing Friedman’s version of the expectations-augmented Philips curve.

The New Classical became dissatisfied with neoclassical Keynesian models due to the fact that they could not provide a logical explanation for the “stagflation” process, i.e., both high unemployment and inflation, of the world’s economy in the early 1970s. Given that neoclassical Keynesian models have some econometric failures because they cannot predict the value of certain economic variables (e.g. the levels of output, employment, and the prices), the New Classical argue Keynes’s theory is not a good guide for monetary and fiscal policies.

In contrast to the neoclassical Keynesian models, the New Classicals investigate the micro foundations of macroeconomic theory. The New Classical approach to macroeconomics presents three main hypotheses:

(i) The rational expectation hypothesis
(ii) The hypothesis that prices and wages are set at market-clearing levels
(iii) The aggregate supply hypothesis. \(^3\)

Regarding the criticism of Friedman’s model, the new classical analysis concentrated on the following question: How are the expectations of economic agents formed? According to New Classicals, expectations about the future value of inflation are not necessarily a stable function of its past values. At this point, the new classical models introduce the idea that the expectations are rational. Mathematically, rational expectations can be represented as follows:

\[
P^{\hat{e}(\hat{\lambda})} = E(P_{t+I} \mid I_t), \hat{\lambda} \in \{0, 1, 2, ..., \}
\]

\(^3\) There are two microeconomics assumptions related to the aggregate supply hypothesis: (i) workers and firms optimize their behavior, and (ii) the supply function of labor and output by workers and firms upon relative prices.
Where $P_{t+\lambda}$ is the expected rate of inflation in period $t+\lambda$, $P_{t+\lambda}$ is the mathematical expectation of the rate of inflation in period $t+\lambda$ and $I_t$ is the available information set at the end of period $t$.

The introduction of the rational expectation hypothesis into the macroeconomic models permitted, according to Lucas, “…a treatment of the relation of information to expectations which is in some ways much more satisfactory than is possible with conventional adaptative expectations hypotheses” (1972, p.104). Thus, the analysis of the existence of a trade-off, either temporary or permanent, between inflation and unemployment, are questioned and rejected by the new classical approach. In this context, when the expectations are not persistently erroneous, the New Classicals argue that anticipated monetary and fiscal policies do not have impact in the levels of output and employment even in the short-run. In other words, the New Classicals emphasize the real supply-side factors rather than monetary and fiscal impulses.

Given that demand shocks are neglected, how do the New Classicals explain the observed fluctuations on output and unemployment levels in the real world? According to New Classicals, cyclical fluctuations in real output can be explained as real business cycle due to technological and productivity changes in the economy.

In conclusion, considering that cyclical fluctuations are explained by aggregate supply and taking into account the fact of new classical models suppose that economic system is always self-correcting, there is no doubt that the classical and new classical theories have the same basic foundations: Say’s Law and/or Walras’s Law and Quantity Theory of Money, i.e., money is neutral. It follows from this conclusion that New Classicals have attempted to bring back the same assumptions of “old” classical economics that Keynes’s general theory criticized and rejected sixty years ago.

2.3 Budget Deficit in the Public Finance Literature

This section is divided into two sub-sections: sub-section 1 reviews alternative definitions of the budget deficit, whereas sub-section 2 presents budget deficit and macroeconomic variables.
2.3.1 Alternative Definitions of the Budget Deficit

The term “budget deficit or budget balance” appears regularly in news articles, in government policy documents - usually with the warning that it is very undesirable.4

The measurement of budget balances also raises a host of conceptual and practical issues, which are compounded by the lack of uniformity in usage countries. For instance, the conventional budget deficit can be measured on cash basis or an accrual (or payment order) basis. In the first case, the deficit equals the difference between total cash flow expenditure and fiscal revenue. In the second case, the deficit reflects accrued income and spending flows regardless of whether they involve cash payment or not. Accumulation of arrears on payments or revenue is reflected by higher deficit when measured on an accrual basis compared with a cash-based measure (Agenor and Montiel, 1999).

According to economic literature and practices by institutions such as the World Bank and the IMF, a couple of different ways to measure the conventional budget deficit exists. The most commonly accepted measure used by government world-wide to define the conventional budget deficit is the resources utilized by the government in a fiscal year that need to be financed after revenues were deducted from the expenditure. According to Tanzi in Blejer and Cheasty (1993), the conventional deficit can therefore, usually be defined as the difference between current revenues and current expenditures of government. It thus reflects the financing gap that needs to be closed by way of net lending, including lending from the Central Bank.

The World Bank defined the conventional budget deficit as the difference between expenditure items such as salaries and wages, expenditure on goods and services including capital expenditure, interest on public debt, transfers and subsidies, and revenue items including taxes, user charges, grants received, and profits of non-financial public enterprises and sale of assets.5

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The IMF stated in its 1980 Manual on Government Finance Statistics that the budget deficit equals the following fiscal deficit:

\[
\text{Fiscal deficit} = \{(\text{revenue} + \text{grants}) - (\text{expenditure on goods and services} + \text{transfers}) - (\text{lending} - \text{repayments})\}.
\]

The conventional budget deficit on each basis is defined as the difference between total government expenditure (including interest payments on public debt but excluding any amortization payments) and total cash receipts (including taxes and non-tax revenues plus grants, without loans). It does not, however, provide a direct measure of monetary expansion nor of the pressure as a result of increased demand for financial instruments in the short-term markets. This definition of a conventional budget deficit is therefore, independent from the maturity schedules of outstanding domestic public debt and the reasons related to monetary policy. But it also poses a problem: public debt management and open market transactions can, in the end, greatly influence the size of the budget deficit.

The conventional budget deficit was originally developed in an effort to provide a measure of the government’s contribution to aggregate demand in the economy and the lack of equilibrium on the current account of the deficit of payments, or to measure ‘the crowding-out of the private sector in the financial markets. Another definition the conventional budget deficit could be measurement of the extent to which government expenditures (for policy purposes) exceed government revenues without incurring new liabilities’, as proposed by Leviathan in Blejer and Cheasty (1993).

Heller et al. (1986) described the conventional measurement of the deficit as a reflection of the current cash flow position of government-calculated by only using the cash receipts and cash expenditure in a given time period. Expenditure includes interest payments but excludes repayments of public debt.

Alternative indicators to measure the different interpretations of fiscal policy have increasingly been used by a large group of countries and international organizations such as the IMF, the World Bank, the OECD and the European Union (EU). Countries use different definitions of the budget deficit mainly because of convention, relationships with other levels of government and the structure of their
budgets. Mexico and UK further analyse the public sector borrowing requirement; while Australia, Canada and Germany focus on central or federal government activities; with Japan following a much narrower approach by considering the central government only in part.

In summery, the conventional budget deficit can be regarded as the resources needed during a fiscal year after government income has been deducted from total expenditure. The latter expenditure total includes interest payments but not any amortization of public debt.

Thus, the choice of a budget deficit is mainly focused on the interpretation and management of fiscal policy. There is no single superior measure of the budget deficit—rather a set of different budget deficits measurements, each applicable to specific condition.

2.3.2 Budget Deficit and Macroeconomic Variables

Fiscal policy plays a very important role in determining internal and external economic development in any economy. In many countries the government is directly accountable for a significant part of economic activity, and may indirectly influence the allotment of the resources in the private sector. There is no unique way to assess the sustainability of a government’s fiscal position, but there exist a number of ways that can be helpful in showing different aspects of the fiscal picture. In particular, the budget deficit is useful indicator of macroeconomic impacts on the economy and is important for macroeconomic management. Consequently, to give a proper diagnosis to the economic problems and to find sound fiscal policies, it is important to measure the government financial position in an appropriate way.

Are budget deficits bad for an economy? This question has perplexed economists for centuries. Historically, several schools of thought have emerged on this matter. The purpose of this section is to briefly review some of the major theoretical arguments regarding the linkage between a budget deficit and macroeconomic variables.  

6. The effect of budget deficit on inflation (theoretical and empirical background) will be discussed later in this Chapter separately (see sections 2-4 and 2-5).
2.3.2.1 Budget Deficit: Crowding-out and Crowding-in Effects

After analysing the literature on the effects of budget deficits on private investment one finds three distinct schools of thought, these are Neoclassical, Keynesian, and Ricardian equivalence, each providing different paradigms. Bernheim (1989) provides a brief summary of the three paradigms. The Neoclassical school considers individuals planning, their consumption over their entire life cycle. By shifting taxes to future generations, budget deficits increase current consumption. By assuming full employment of resources, the Neoclassical school argues that increased consumption implies a decrease in saving. Interest rates must rise to bring equilibrium in the capital markets. Higher interest rates, in turn, result in a decline in private investment.

In addition, there are Keynesian who provide argument to the crowd in effect by making reference to the expansionary effects of budget deficits. They argue that usually budget deficits results in an increase in domestic production, which makes private investors more optimistic about the future course of the economy resulting them in investing more. This is as the “crowd-in” effect. It is worth noting here that the traditional Keynesian view differs from the standard Neoclassical paradigm in two fundamental ways. First, it permits the possibility that some economic resources are unemployed. Second, it presupposes the existence of a large number of liquidity constrained individuals. The second assumption guarantees that aggregate consumption is very sensitive to changes in disposable income.

Many traditional Keynesians argue that deficits need not crowd-out private investment. Eisner (1989) is an example of this group, who suggests that increased aggregate demand enhance the profitability of private investments and leads to a higher level of investment at any given rate of interest. Hence, deficits may stimulate aggregate saving and investment, despite the fact that they raise interest rates. He concludes that “The evidence is thus that deficits have not crowded-out investment. There has rather been crowding-in”.

It is worth noting that it is argued that public capital crowds-out or crowds-in private capital, depending on the relative strength of two opposing forces: (1) as a substitute in production for private capital, public capital tends to crowd-out private capital; and (2) by rising the return to private capital, public capital tends to crowd-in private capital. Therefore, on balance, public capital will crowd-out or crowd-in private capital, depending on whether public and private capital are gross substitutes or gross complements (see, for example, Aschauer (1989b)). Furthermore, Aschauer (1989a, 1989b) argues, on the hand, that higher public investment raises the national rate of capital accumulation above the level chosen (in a presumed national fashion) by private sector agents; therefore, public capital spending may crowd-out private expenditures on capital goods on an *ex ante* basis as individuals seek to re-establish an optimal intertemporal allocation of resources. On the other hand, public capital, particularly infrastructure capital such as high ways, water system, sewers, and airport, is likely to bear a complementary relationship with private capital. Hence, higher public investment may raise the marginal productivity of private capital and, thereby, “crowd-in” private investment.

Finally, there is the Ricardian equivalence approach advanced by Barro (1989), who argues that an increase in budget deficits, say due to an increase in government spending, must be paid for either now or later, with the total present value of receipts fixed by the total present value of spending. Thus, a cut in today’s taxes must be matched by an increase in future taxes, leaving interest rates, and thus private investment, unchanged. This theory, introduced by David Ricardo (the famous English classical economist), states that far-seeing tax-payers will increase their savings in response to the increased government borrowing, and that would keep the interest rates stable. This idea is known as Ricardian equivalence, and has been recently developed by the American economist Robert Barro.8

Macroeconomists [e.g. Bailey (1971); Buiter (1977); among others] are interested in the relationship between private investment and public expenditures mainly because of the crowding-out effect of public spending. The “crowding-out” effect reduces the ability of the government to influence economic activity through

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fiscal measures. Furthermore, Yellen (1989) argues that in standard Neoclassical macroeconomic model, the method selected by the government to finance its spending program affects the levels of consumption, investment and net exports. Such models assume that aggregate consumption is higher and national (private plus public) saving lower, if a given government-spending program is financed by issuing bonds rather than through current taxation.\(^9\) If resources are fully employed, so that output is fixed, higher current consumption implies an equal and offsetting reduction in other forms of spending. Thus, investment and/or net exports must be fully “crowded-out”. It is worth noting that it is important to distinguish between “financial” crowding-out which has been mentioned before and “resource” crowding-out which occurs when the government competes with the private sector on purchasing certain resources (skilled labor, raw materials and so on). When the government sector expands, the private will contract because of the increase in prices on these resources due to an excess demand by the government, hence this leads to a fall in investment and consumption by the private sector. Thus, the government sector’s expansion crowds-out the private sector. It is worth noting here as well that resource crowding-out is an important issue to take into account especially in developing countries where resources are scarce even sometimes to the private sector, so any excess demand for these resources by the government will severely impinge private sector productivity (Salman Saleh, 2003).

Furthermore, Premchand (1984) asserts that financing the budget deficit by borrowing from the public implies an increase in the supply of government bonds. In order to improve the attractiveness of these bonds, the government offers them at a lower price, which leads to higher interest rates.\(^10\) The increase in interest rates discourages the issue of private bonds, private investment, and private spending. In turn, this contributes to the financial crowding-out of the private sector.

Heng (1997) utilised an Overlapping-Generation (OLG) model to provide a theoretical framework to analyse the “crowding-in” issue of private capital by public capital. The author shows that public capital crowds-in private capital through two

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channels, namely, via its impact on the marginal productivity of labor and savings, and via (gross) complementarity/substitutability between public and private capital. Kelly (1997) argues that public investment and social expenditures may promote economic expansion by reducing social conflict and, hence, creating a climate conductive for investment in human and physical capital. He also contends that social expenditures enhance growth by fostering welfare and productivity improvements. Kelly (1997) continues to argue that the complementarity of public and private action is likely to be important in developing nations where such factors as severe income disparity, asset concentration, the disparate nature of production in the agricultural and industrial sectors, and fragmented financial markets which characterize most developing countries, may warrant substantial public investment programs. In such instances, public investment is likely to be a central determinant of successful private sector activity and economic growth (e.g. infrastructure capital; social expenditures). The complementary hypothesis is a crucial because it implies that public investment has direct and indirect influences on economic growth. These indirect effects may be channeled through private investment and national output. Public investment may directly raise growth by adding to the stock of total social capital. Public investment may indirectly enhance growth by improving the climate for private investment through public good provision. Furthermore, public investment may increase current national output, which in turn stimulates higher private investment and higher growth. The author also departs from conventional approaches by emphasizing that public investment programs may assist nations channel saving (and borrowing) to productive use. While even the crowding-out literature has recognized that a limited amount of public investment may contribute to growth, that literature has tended to view social programme, with the exception of education as unproductive. Hence, the literature recently has largely ignored the effects of social expenditures other than education on economic growth. 11

2.3.2.2 Budget Deficit, Wealth and Spending Effects

There are many ways in which a government’s choice of fiscal instruments may influence the country’s net wealth (and the current account balance as part of change in that net wealth). The most obvious way in which governments can use fiscal measures to affect net wealth and the current account balance is by their own expenditure (see Salman Saleh, 2003).

Barth et al. (1986) suggests that, as long as the rate of growth of output \((y)\) exceeds the rate of interest \((i)\), public debt is unambiguously net wealth. The reason is that, in such circumstances, future taxes are not necessary to service the debt. Economic growth will accommodate indefinite deficits without jeopardizing the tax raising capacity of the economy. If \(y\) is less than \(i\), then the status of debt is ambiguous. Government debt will be considered “net wealth only to the extent that current generation do not fully discount the increase in future tax liability to service the debt, which in this case cannot be serviced solely with revenues generated by economic growth” (Barth et al., 1986). If \(i\) exceeds \(y\), and there is no primary surplus (revenues less outlays net of interest payments), then federal debt will grow more rapidly than the economy (Abizadeh and Yousefi, 1996).\(^{12}\)

In addition, Aschauer (1985) argues that government spending of various sorts may affect employment, output, consumption, and investment by altering the wealth or by directly affecting the marginal productivity of labor and private capital. He also pointed out that the negative wealth effect associated with the temporary rise in government purchases induces the agent to decrease consumption and increase labor supply.

Barro (1989) argues that the Ricardian results depend on “full employment”, and surely do not hold in Keynesian models. In standard Keynesian analysis, if everyone thinks that a budget deficit makes them wealthier, the resulting expansion of aggregate demand raises output and employment and thereby actually makes people wealthier. This result holds if the economy begins in a state of “involuntary unemployment”. There may even be multiple rational, expectations equilibrium,

where the change in actual wealth coincides with the change in perceived wealth. This result does not mean that budget deficits increase aggregate demand and wealth in Keynesian models. Barro (1989) argues that if we had conjectured that budget deficits made people feel poorer, the resulting contractions in output and employment would have made them poorer. Similarly, if we had started with the Ricardian notion that budget deficits did not affect wealth, the Keynesian results would have verified that conjecture. The odd feature of the standard Keynesian model is that anything that makes people feel wealthier actually makes them wealthier (although the perception and actuality need not correspond quantitatively). This observation raises doubts about the formulation of Keynesian models, but says little about the effects of budget deficits (Barro, 1989).

Ball and Mankiw (1995) argue that in the long-run, an economy’s output is determined by its productive capacity, which in turn is partly determined by its stock of capital. When deficits reduce investment the capital stock grows more slowly than it otherwise would. Over a year, or two, this crowding-out of investment has a negligible effect on the capital stock. But if deficits continue for a decade or more, they can substantially reduce the economy’s capacity to produce goods and services. Moreover, recall that budget deficits, by reducing national saving, must reduce either investment or net exports. As a result, they must lead to some combination of a smaller capital stock and greater foreign ownership of domestic assets. If budget deficits crowd-out capital, national income falls because less is produced; if budget deficits lead to trade deficits, just as much is produced, but less of the income from production accrues to domestic residents.\(^\text{13}\)

In addition to affecting total income, Ball and Mankiw (1995) argue that deficits also alter factor prices: wages (the return to labor) and profits (the return to the owners of capital). According to the standard theory of factor markets the marginal product of labor determines the real wages, and the marginal product of capital determines real profits. When deficits reduce the capital stock the marginal product of

labor falls, for each worker has less capital to work with. At the same time the marginal product of capital rises, for the scarcity of capital more valuable. Therefore, to the extent that budget deficits reduce the capital stock, they lead to lower real wages and higher rates of profit. Hence, according to Ball and Mankiw (1995) the accumulated effects of the deficits alter the economy’s output and wealth.

Perkins (1997) argues that if a government attempts to improve the current account balance by reducing its own spending on useful infrastructure, the consequent decline in net wealth is likely to exceed whatever benefit arises from the stronger current account. If the government reduces its expenditure overseas-on such items as defense or diplomatic activity-that will tend to strengthen the current account (and to that extent increase national net wealth) without reducing its outlays within the country, so that there is no general presumption that this form of reduction in government outlays will reduce the level of activity or domestic real investment.

In general, government spending on productive capital (including human capital) in large and highly industrialized countries probably has relatively low import content (apart from those forms of capital investment associated with overseas military spending). A reduction in the general level of government spending on goods and services will often tend to reduce domestic activity more than imports (the UK is probably an example of such a country). On the other hand, for countries that have to import much of their capital equipment, a rise in government outlays on infrastructure may well be expected to lead to a larger current account deficit at any given level of activity. It is, moreover, possible that the strengthening of the country’s exchange rate consequent on the reduction in the government’s claims for foreign exchange will have adverse effects on the profitability of domestic industry. This may reduce output below capacity and have adverse consequences for the country in terms of both its level of employment and real output, and also of its net wealth (Perkins, 1997). Furthermore, Perkins points out that the effects on the current account, or national net wealth, from different fiscal measures to stimulate investment are likely to vary greatly with the extent to which a country produces its own investment goods. This is likely to be a much more important consideration than whether the stimulus to
investment is brought about by higher government infrastructure or by an increase in tax concessions to private investment.

Devereux and Love (1995) investigated the impact of government spending policies in a two-sector endogenous growth model developed by King and Rebelo (1990) and Rebelo (1991), extended to allow for an endogenous consumption leisure decision. Devereux and Love (1995) concluded that there is a positive relationship between lump sum financed government spending and growth rates. The explanation of this, as in many “endogenous growth” models, is that the rate of growth is positively related to the rate of return on human and physical capital accumulation. The return on human capital accumulation is higher; the greater is the fraction of time spent working, in either sector. A higher rate of government spending generates negative wealth effects (as in Aiyagari, Christiano, and Eichenbaum, 1992), leading to a reduction in leisure and a rise in hours worked. Consequently, the rate of growth rises. Although government spending raises the long-run growth rate; it reduces welfare since government spending is less than perfect substitute for private spending (were they perfect substitutes, the growth rate would be unaffected).  14

Moreover, when government spending is financed with an income tax, or by a wage tax, the negative wealth effect of the rise in spending on labor supply conflicts with a substitution effect, leads to a reduction in labor supply. In this case, the spending increase always reduces the growth rate. In this literature on the output effects of government spending, a temporary spending policy has only temporary effects on the level of output (Devereux and Love, 1995).

There are several major ways of financing budget deficit: printing money, external borrowing, the use of foreign reserves, and domestic borrowing. The effects of budget deficits on economic performance are not precisely understood. Economists point out positive and negative impacts of large budget deficits. In particular, the described above ways of financing budget deficits may have negative impacts on the real of financial sides of the economy. Printing money may result in high rate of

inflation. External borrowing can end in excessive external debt that makes the country’s access to international capital markets harder and increases the probability of a government’s default on its external debt obligations. The use of foreign reserves may lead to the balance-of-payments crises. Domestic borrowing is usually associated with the increase in real interest rates.\textsuperscript{15}

2.3.2.3 Budget Deficit and Trade Balance

A positive association between the government budget and trade balance can be shown in the context of a simple Keynesian open-economy model (see Salman Saleh, 2003). In an open economy gross domestic product, $Y$ is the sum of private consumption, $C$, gross private domestic investment expenditures, $I$, government expenditures, $G$, and exports, $X$, over imports, $M$:

$$Y = C + I + G + X - M$$  \hspace{1cm} (2-1)

Alternatively, $Y$ equals private consumption expenditures, $C$, savings, $S$, and taxes, $T$:

$$Y = C + S + T$$  \hspace{1cm} (2-2)

Substituting (2-2) in (2-1) rearranging terms yields:

$$(X-M) = (S-I) + (T-G)$$  \hspace{1cm} (2-3)

Equation (2-3) suggests net exports equal private and public savings. Assuming there is a balanced fiscal budget ($T-G = 0$) and balanced trade ($X-M = 0$, that is, net exports are 0), then (2-3) suggests that private domestic saving equals private domestic investment. This is necessarily the case in a closed economy where domestic investment is constrained by domestic saving. However, in an open economy, such a relationship may not always exist. An economy with a foreign sector has access to international financial markets. Studies on the twin-deficits relationship generally proceed from one of two theoretical bases. The hypothesis that increase in

\textsuperscript{15} For a more extensive discussion, see Section 2-4-2.
the government’s budget deficits leads to an increase in the trade deficit follows directly from the Mundell-Fleming model (Fleming, 1962; Mundell, 1963). It is worth noting here that the Mundell-Fleming model is an open economy extension of the IS-LM model. As such, it is not fully “rational”; the assumptions made regarding expectations formation are static. In the Mundell-Fleming framework, an increase in the government’s budget deficit can generate an accompanying increase in the trade deficit through increased consumer spending. By increasing the disposable incomes and the financial wealth of consumers, the budget deficit encourages an increase in imports. To the extent that increased demand for foreign goods leads to depreciation in the exchange rate, the effect on net exports is mitigated. However, the larger budget deficit also pushes up the interest rate (in large open economies) because this appreciates the exchange rate, which encourages a net capital inflow and a larger decline in net exports. The size of the effect is an empirical matter (Shojai, 1999).

Volcker (1987) argues that budget deficits lead to trade deficits. And both hinder economic growth in the long-run. Fieleke (1987) provided the theoretical basis for the relationship between the budget deficit and the trade deficit. He argued that “the dominant theory is that an increase in government borrowing in a country will, other things being equal, put upward pressure on interest rates (adjusted for expected inflation) in that country, thereby attracting foreign investment. As foreign investors acquire the country’s currency in order to invest there, they bid up the price of that currency in the foreign exchange markets. The higher price of the country’s currency will discourage foreigners from purchasing its goods but will conversely encourage residents of the country’s current account will move toward a deficit (or toward a larger deficit). In addition, any increase in the country’s total spending resulting from the enlarged government deficit will go partly for imports and for domestic goods that would otherwise be exported, also worsening the current account balance”.16

Moreover, the Keynesian absorption theory suggests that an increase in the budget deficit would induce domestic absorption and hence import expansion,

causing a current account deficit. Feldstein and Horioka (1980) found that savings and investment are highly correlated, causing budget deficits and current account deficits to move together. An alternative view is that the “twin deficits” are not related in the simple manner depicted by conventional economists. The link from the budget deficit to the current account deficit can be weak or nonexistent. Therefore, there may not exist any predictable or systematic relationship between the two deficits given that there could be many other factors that might serve to make the “twin” relationship doubtful. One such factor concerns the stability of saving and investment over time (Khalid et al., 1999).

2.4 Budget Deficit and Inflation: Theoretical Background

The impact of government budget deficits and debt financing on inflation rate can be thought of through different channels. Higher government budget deficits result in higher interest rate which then leads to lower domestic investment. Crowding-out effect of deficits will eventually translate into a lower formation of capital and lead to a lower aggregate supply and a higher price. However, the impact of deficit on interest rates is still debatable. For example, Bradley (1986) lists twenty-one studies on the deficit-interest rate link and finds that only four provided supporting evidence for a positive and statistically significant impact of the deficit on interest rates. The rest of the studies finds either no evidence of a significant impact or produces mixed results, including the absence of any linkage. The literature on the deficit-interest rate link for a small-open economy under capital mobility is limited to theoretical studies. Empirical studies pertain to either large open, or closed economy models.17

The second channel is the wealth effect of deficits/debt financing. When deficits are financed by issuing bonds and bondholders do not consider bonds as future taxes (a non-Ricardian view), the wealth of the nation is perceived to have gone up. A higher wealth effect increases the demand for goods and services and drives prices up. However, Tekin-Koru and Ozmen (2003) find no support for the linkage between the budget deficit and inflation through the wealth effect in Turkey. Instead, they

found that deficit financing leads to a higher growth of interest-bearing broad money, but not currency seigniorage.

The third channel in which government budget deficit and debt financing can affect the inflation rate is through the monetisation of the deficit. Generally, budget deficit *per se* does not cause inflationary pressures, but rather affects price level through the impact on money aggregates and public expectations, which in turn trigger movements in prices.

\[ \Delta \text{Budget Deficit} \rightarrow \Delta \text{Monetary Aggregates}, \Delta \text{Expectations} \rightarrow \text{Inflation} \]

Money supply link of causality rests on Milton Friedman’s famous thesis that “Inflation Is Always and Everywhere a Monetary Phenomenon”. This thesis means that continuing and persistent growth of prices is necessarily preceded or accompanied by a sustained increase in money supply.\(^{18}\)

The expectations link of causality works through the intertemporal budget constraint, which implies that a government with a deficit must run, in present value-terms, future budget surpluses.\(^{19}\) One possible way to generate surpluses is to increase the revenues from seigniorage, so the public might expect future money growth.

### 2.4.1 Aggregate Supply and Aggregate Demand Analysis

In the monetarist perspective, this link looks as follows *(see Figure 2-1)*. Suppose money supply is continually increasing, whereas, at the outset, economy is in equilibrium (point A) at full employment and with output at the natural level. If monetary policy is accommodative to budget deficit, money supply continues to rise for a long time, the aggregate demand schedule will shift to the right (AD1 \(\Rightarrow\) AD2), thereby causing output to increase above natural level (point A’). However, growing labor demand then pushes wages up, which in turn leads to the shift in aggregate supply leftwards until it reaches AS2 position (AS1 \(\Rightarrow\) AS2). In point B the economy has returned to the natural level of output, however, at the higher price level (P2 instead of P1).

---


If the money supply keeps on growing the next period, aggregate demand will again shift to the right (AD2 $\Rightarrow$ AD3). Then after a while the AS schedule will move to the left up to the AS3 position. At the same time, the economy has passed the way from B to point B’, and then to point C. Output has temporarily increased above the natural level, but eventually has declined, while the price level has climbed up to the new height (from P2 to P3).

Keynesian analysis of the situation predicts the same movements in aggregate demand and aggregate supply curves. The only difference lies in the timing: monetarists stress that the reaction of AS would be quick so that output would not remain above its natural level for a long time, while Keynesians believe this adjustment to be much slower.

Fiscal policy or supply-side shocks *per se* cannot produce consecutive increases in price level. If changes in government expenditures are one shot and not ever-increasing, then such a policy can generate only a temporary increase in the inflation rate. Moreover, negative aggregate supply shocks cannot produce continually increasing price levels, provided that money supply and thus aggregate demand remain unchanged. Basically, these negative supply shocks will bring the economy
below the natural level of output and employment and at a higher price level only temporarily. Soon, however, with labor market adjustment the process will go backwards, so that the economy will end up sliding along aggregate demand curve to the initial price level and natural level of output and employment. 

Thus, we seem to have established that high inflation can only take place along with a high growth of money supply.

2.4.2 Sources of Financing and Money Decomposition

Approaching the first part of the link we try to explain, and ask the question: How it may happen that budget deficits generate movements in money. If the public sector spends more than it receives, such a deficit must somehow be financed in order for the government to pay its bills.

The budget constraint of the government can be expressed as follows:

\[
\text{DEF} = D^g - D^g_{-1} = P \cdot (G + I^g - T) + i \cdot D^g_{-1}
\]

Where, \( D^g - D^g_{-1} \) is the change in government debt between the current and the previous period, \( P \) is the price level, \( G + I^g \) - government expenditures, \( T \) - taxes, \( i \cdot D^g_{-1} \) - interest payments on previously issued debt.

Government debt, in the form of either bonds or credits, can be held by the public (domestic and foreign) and by the Central Bank. Let’s assume for the purpose of the present study that the Central Bank’s credit to banking system doesn’t alter over time. Then the change in monetary base \( (Mh - Mh_{-1}) \) equals the change in the stock of government debt held by Central Bank \( (D^g_c - D^g_{c-1}) \) plus the change in foreign exchange reserves \( E \cdot (B^* - B^*_{-1}) \), where \( E \) stands for the nominal exchange rate, we obtain:

\[
(D^g - D^g_{t-1}) = (Mh - Mh_{t-1}) + (D^g_p - D^g_{p-1}) - E_t^c (B^e_t - B^e_{t-1})
\]  

(2-5)

Equation tells us that in essence, there are three ways to cover a budget deficit:

- by “monetisation” of the deficit (i.e. by increasing monetary base or by so called “printing” money);
- by increase in the public’s (foreign and domestic) holdings of debt;
- by running down foreign exchange reserves at the Central Bank.

According to Ouanes and Thakur (1997), there exist five different ways of financing budget deficit, closely corresponding to the above version: 22

1. Borrowing from the Central Bank (or “monetisation” of the deficit);
2. Borrowing from the rest of the banking system;
3. Borrowing from the domestic non-bank sector;
4. Borrowing from abroad, or running down foreign exchange reserves;
5. Accumulation of arrears.

2.4.2.1 Borrowing from the Central Bank

In other words borrowing from the Central Bank is called “monetising” the deficit. Because this method always leads to the growth of monetary base and of money supply, it is often referred to as just “printing money”. As can readily be seen from equation (2-5), here increase in the high-powered money is the source of financing budget deficit.

Monetisation occurs (i) when the Central Bank directly finances budget deficit by lending funds needed to pay government bills; or (ii) when the Central Bank purchases government debt at the time of issuance or later in the course of open market operations.

---

\[
DEF = \left( D^g - D^g_{-1} \right) = \left( Mh - Mh_{-1} \right) + \left( D^g_p - D^g_{p-1} \right) - E \cdot \left( B^*_c - B^*_c_{-1} \right)
\]

If the Central Bank just lends funds or purchases newly issued government debt, it simply pushes up the stock of high-powered money. It may also be the case that the government first borrows from public or from commercial banking system. However, if the Central Bank then intervenes and either buys out the debt from the public by means of open market operations or accommodates additional demand for liquidity from banking system, the equivalent amount of reserves gets injected into the economy as if the government originally borrowed from the Central Bank. In either case budget deficit (DEF) is financed, as can be seen from equation above, by increases in high-powered money.

Now assume that the government for some reasons can borrow only from the Central Bank (it has lost the public’s confidence and foreign exchange reserves are near the critical level). Then our budget deficit financing equation will look like:

\[
DEF = \left( Mh - Mh_{-1} \right) - E \cdot \left( B^*_c - B^*_c_{-1} \right)
\] (2-6)

If we follow the assumptions of Sachs and Larrain (1993) that Purchasing Power Parity (PPP), as well as, quantity theory of money hold, then, under a fixed exchange rate regime, one reaches the following conclusion: even if government tries to borrow from the Central Bank, and it starts printing money, the bank in effect is running down already depleted foreign exchange reserves, because it has to intervene in foreign exchange market to maintain the fixed exchange rate. This in turn will lead to a reversal of the money supply increase, i.e., ultimately \( DEF = E \cdot \left( B^*_c - B^*_c_{-1} \right) \) will hold. Although the money supply seems not to have grown much, the resulting upward pressure on exchange rate, stemming from persistent need of financing and entire foreign exchange reserves exhaustion, may end up in currency devaluation, which would then greatly increase inflation.

Under a floating exchange rate regime the outcome is different. Let’s now distinguish the nominal (DEF) from real (DEFr) value of budget deficit so that
\[ DEF = DEFr \cdot P. \] We also assume that the government cannot borrow from public and foreign exchange reserves are zero. For simplicity of presentation, we may approximate the change in high-powered money by the change in money supply (because we know the rapid change in the former necessarily causes the change in latter). Consequently, our equation (2-6) becomes

\[ DEFr \cdot P = M - M_{-1} \] or if we rearrange terms \[ DEFr = \frac{M - M_{-1}}{P}. \]

In other words, the real value of the deficit is now equal to the real value of the change in money supply. The budget deficit in such a situation is said to be financed by collecting seigniorage. In Dornbusch and Fisher’s words (1998), seigniorage refers to “the government’s ability to raise revenue through its right to create money”. The amount of seigniorage \( S \) is then given by the expression: \( S = \frac{M - M_{-1}}{P} \). If we rearrange components in this formula and introduce percentage growth in nominal money supply \( \mu = \frac{M - M_{-1}}{M} \) and real money balances \( m = \frac{M}{P} \), then we obtain that \( S = \mu \cdot m \).

Interestingly, the amount of seigniorage can usefully be decomposed into the “pure seigniorage” and “inflation tax” part. It can be shown\(^{23}\) that:

\[ S = \Delta m + \left( \frac{P - P_{-1}}{P_{-1}} \right) \left( \frac{P_{-1}}{P} \right) \cdot m_{-1}. \] If we denote the inflation rate as \( \pi = \frac{P - P_{-1}}{P_{-1}} \), then we would have: \( S = \Delta m + \left( \frac{\pi}{1 - \pi} \right) \cdot m_{-1}. \) The first term is referred to as “pure seigniorage” and represents the change in real balances. The second term is called “inflation tax” with \( \left( \frac{\pi}{1 - \pi} \right) \) being a tax rate and \( m_{-1} \) being a tax base.

\[^{23} \text{See Dornbusch and Fisher (1998) for details.}\]
In the words of Dornbusch and Fisher (1998), “inflation acts just like a tax because people are forced to spend less than their income and pay the difference to the government in exchange for extra money. The government thus can spend more resources and the public less, just as if the government had raised taxes to finance extra spending”. When government finances a deficit by printing money, there are good reasons to believe that public seeks to maintain real balances so as to offset the effects of inflation. The public therefore, chooses to hold more and more nominal money from period to period, so as to keep real balances and thus purchasing power constant in the long-run. If this is the case, then $\Delta m = 0$, i.e., the government collects no pure seigniorage, but rather finances the budget deficit entirely through the inflation tax.

Thus, we may conclude that under a pure floating exchange rate regime, budget deficit ends up in inflation and, as shown above, the size of the deficit and inflation rate are very closely connected. According to the formula, higher deficits entail higher inflation rates (Sachs and Larrain, 1993).

In passing we should note the implication that macroeconomic theory derives about financing a budget deficit through inflation tax: a sustained increase in money growth and in inflation ultimately leads to a reduction in the real money stock (Dornbusch and Fisher 1998). With respect to transition economies, the rationale behind such an implication may be that public adjusts to the higher inflation by switching from heavily taxed domestic currency to a different hard and stable currency (e.g. U.S. dollar).

So far we have basically considered the most essential mechanisms of financing a budget deficit. However, one additional strong statement that seems appropriate and relevant here should be made. A sustained inflation may stem only from a persistent rather than a temporary budget deficit that is eventually financed by printing money rather than by borrowing from public.  

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2.4.2.2 Borrowing from the Public

Borrowing from the public can be exercised either domestically or internationally. The ultimate domestic purchasers of government debt, as pointed out by Ouanes and Thakur (1997), could be: (i) non-bank public; or (ii) banks. The essential difference comes from the likely impact of the operation on money supply and inflation.

- If the government debt is acquired by non-bank domestic public and then the government immediately spends the proceeds by paying its bills, then monetary base remains unchanged, there is no influence on money supply and therefore, no room for inflation. Still, borrowing from public by issuing debt might cause certain inconveniences for policymakers. For example, bond finance of budget deficit may push up interest rates thereby putting pressure on private sector finance and on economic growth. Additionally, the cost of borrowing at such high rates surely increases debt service payments thus adding to future budget expenditures (Piontkivsky et al., 2001).

- If banks acquire the government debt, the consequences with respect to monetary base and money supply may differ. No doubt, government borrowing puts additional pressure on banks’ reserves and banks may demand more liquidity from the Central Bank. If such an extra demand for credit from banks is accommodated and the Central Bank supplies banks with additional reserves, then in fact monetary base increases, thereby causing a rise in money supply through deposit multiplication and thus fueling inflation. However, if the Central Bank does not accommodate the extra demand, banks will be forced to reduce credit to the private sector in order to meet the higher demand for government credit by purchasing debt (Ouanes and Thakur, 1997). This reduction is often referred to as crowding-out of private spending. The impact of budget deficit on money supply when government borrows from foreign public crucially depends on the exchange rate regime.

- If the Central Bank adheres to a fixed exchange regime, then any foreign borrowing must be sterilized in foreign exchange market so as to maintain the exchange rate at the prescribed level. But this means that the Central Bank has to
increase the monetary base by buying up the excess supply of foreign exchange in return for additional reserves that are injected into the system.

- Yet, when floating exchange rate regime dominates in the economy, external borrowing to finance budget deficit allows the government to avoid the increase in monetary base and money supply and thus prevent inflationary developments. Among consequences of such policy are the appreciations of exchange rate and negative pressures on tradable goods sector due to deterioration of its competitiveness in international markets.

2.4.2.3 Running down Foreign Exchange Reserves

Financing of budget deficit by running down foreign exchange reserves occurs when the Central Bank first purchases government debt on primary or secondary market (or simply grants a loan to the government) thereby injecting additional reserves to the economy and then trades available foreign exchange reserves for domestic currency to offset the increase of monetary base and money supply.

As long as the foreign exchange reserves are available, government can confidently finance the deficit. However, when foreign exchange reserves dry up and approach the level that the private sector believes to be critical, the result can be capital flight and the exchange rate depreciation that adds to inflationary pressures (Ouanes and Thakur, 1997).

2.4.2.4 Accumulation of Arrears

Many contemporary researchers argue that there exists a special form of dealing with budget deficit that in essence aims to hide it. In practice, the part of government spending gets deferred through the accumulation of arrears and is supposed to be disbursed later in coming fiscal years.

Government expenditure arrears, which indicate delays in government payments to suppliers or creditors, have become an important fiscal issue in many transition economies. Arrears can lead to underestimates of spending and of the size of the fiscal problem facing a country. Since arrears are a form of forced deficit financing,
the government’s borrowing requirement is also understated, which leads to a distorted picture of the sources of credit expansion in the economy. While deficit financing can allow the government to absorb more of the economy’s resources than would otherwise be possible, this initial effect is offset as the rest of the economy responds by raising supplier’s prices or holding back payments for taxes and fees. Unfortunately, expenditure arrears raise the cost of providing government services.\footnote{25. Chu, K.Y., Hemming, R., 1991. Public Expenditure Handbook. Washington, D.C.: International Monetary Fund.}

Arrears may also adversely affect the private sector’s expectations about the future development of the economy. Economic agents may thus anticipate an increase in tax pressure, higher inflation, as well as, overall deterioration of financial conditions. These negative expectations are likely to amplify the conventional “deficit-money-inflation” effects that we have already reviewed. Furthermore, the arrears accumulated in previous periods may pose a threat to be carried over to the future periods thus only postponing inflationary pressure

2.4.3 Specific Theoretical Hypotheses

2.4.3.1 Olivera-Tanzi Effect

It appears that the “budget deficit-inflation” link in fact exhibits a two-way interaction, i.e., not only budget deficit through its impact on money and expectations produces inflationary pressure, but also high inflation than has a feedback effect pushing up budget deficit (see Piontkivsky et al., 2001).

Basically, this process works through significant lags in tax collection. The problem lies in the fact that the time of tax obligations’ accrual and the time of actual payment do not coincide, with payment usually made at a later date. In view of this, high inflation during such a time lag reduces the real tax burden. We may therefore have the following self-strengthening phenomenon: persistence of budget deficit props up inflation, which in turn lowers real tax revenues; a fall in the real tax
revenues then necessitates further increase in budget deficit and so on. In economic literature this is usually referred to as the Olivera-Tanzi effect.26

As Sachs and Larrain (1993) shows, the evidence from developing world in the 1980s supports the conclusion that this self-strengthening process may well destabilize an economy and leads to a very high inflation.

**2.4.3.2 Deferred Inflation Effect**

Some researchers also argue that budget deficit financing by means of accumulating domestic debt seems to just postpone the inflation tax. If government finances its deficit by printing money now, then in the future the burden of servicing existing stock of government debt will be easier. Interest payments that otherwise add to the next periods’ government expenditures will not exert additional pressure on fiscal authority and the deficit will not increase over time. As Sachs and Larrain (1993) put it, “borrowing today might postpone inflation, but at the risk of even higher inflation in the future”.

Sargent and Wallace (1981) observed that when fiscal authority sets the budget independently, the monetary authority could only control the timing of inflation.

Let’s assume that initially there is no public debt yet and government budget is balanced. Then, however, for some reasons (tax legislation or increasing expenditures) the government starts running a deficit. If it is financed by selling domestic debt to the public, then, provided that primary deficit remains unchanged, the overall deficit will grow because of the mounting interest burden on the debt.

Later, as Sargent and Wallace (1981) stress, it may be well the case that public will be reluctant to acquire more government debt, because they will doubt the government’s ability to service it. They refer to this phenomenon as an assumption of an upper limit on the real stock of debt relative to the size of economy. Then the only option is to use money printing and to collect seigniorage. Provided that fiscal policy

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26. This phenomenon was observed and documented for many countries. For example see, Alavi Rad, A., 2003. The Effect of Inflation on Government Revenue and Expenditure: The Case of the Islamic Republic of Iran. *OPEC Review* 27, 331-341.
determines constraints for monetary policy (i.e., both policies are coordinated so as to finance the budget deficit), the monetary authority will be unable to control money supply and therefore, inflation forever. In other words, taking into account the extensive bond financing of the deficit that proceeded the critical moment (stock of debt has reached upper limit), “sooner or later, in a monetarist economy, the result is additional inflation”.\(^{27}\) It is so because the principal and interest on the debt accumulated up to now and issued to fight inflation must be financed, at least partially, by seigniorage.

However, it seems noteworthy that public-debt-financed deficits do not necessitate a future increase in inflation. The reason is that the government may temporarily defer inflationary pressure so as to implement some sort of restructuring (expenditure cuts or tax increases) before the economy closely approaches the upper limit on public debt.

### 2.4.3.3 New Fiscal Theory of Price Level

Recently a new direction of theory has emerged, which may also be seen as an extension of the deferred inflation hypothesis. According to the new fiscal theory of the price level\(^{28}\), there can be two regimes for price determination. Under so called “monetary dominant” regime, monetary policy determines the price level, and fiscal policy remains reactive. The government balances its intertemporal constraint taking the inflation as given. In the “fiscal dominant” regime, in contrast, the price level is determined by the intertemporal budget constraint. If the future surpluses fall short of financing the deficit, the price level must adjust – increase, reducing the real value of the government debt. Monetary policy is reactive in “fiscal dominant” regime: money supply just reacts to price level changes to bring the money demand equation in balance (see Piontkivsky et al., 2001).

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2.5 Budget Deficit and Inflation: Empirical Studies

As discussed earlier, an extensive theoretical literature has argued that government budget deficit is a cause of inflation. Furthermore, extensive empirical studies have been developed to examine the relationship between the government budget deficit and inflation in both developed and developing countries. Today, there is a vast body of research that examines the relationship between government budget deficit and inflation. The purpose of this section is to review some of empirical studies. This section is divided into two sub-sections: sub-section 1 reviews some of the major empirical studies regarding the linkage between government budget deficit and inflation in both developed and developing countries, whereas sub-section 2 presents empirical studies in Iran.

2.5.1 Empirical Studies in Developed and Developing Countries

Aghveli and Khan (1978) investigated the existence of bilateral relationships between inflation and government deficits in developing countries. An equation system presented by these authors indicates relationships among general level of prices, government expenditures, government revenues and money supply. They estimate the model and examine the stability of the equation system for relevant courtiers. However, because of the different structure of economic and social conditions, this model may no be applied for oil-exporting countries including Iran (see Alavi Rad, 2003).

Barro (1979) used regression approach to explain the effect of government expenditure on money growth in U.S. Research results during 1954-1976 showed that government expenditures played remarkable role in increase in money growth.

Levy (1981) studied role of government budget deficit on money growth in U.S. He used an econometric model based on IS-LM model between 1952 and 1978. Empirical results showed that there is a significant relationship between monetary base, government budget deficit and inflation.

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Hamburger and Zwick (1981) examined the influence of deficits on monetary growth in U.S. They found that the effect of deficits on the growth of money was operative from 1961 to 1974 and again in 1977 to 1978. Hamburger and Zwick concluded that a combination of an expansionary fiscal policy and the Federal Reserve’s attempts at moderating interest rate movements, begun in the mid-1960s, had principally caused a persistent drift toward higher U.S. inflation rates.30

Darrat (1985) examined empirically the link between deficits and inflation in the U.S. during the post-1960 period. The estimation results, using the OLS technique, suggested that both monetary growth and federal deficits significantly influenced inflation during the 1960s and 1970s. In addition, he concluded that federal deficits bore a stronger and more reliable relationship with inflation than monetary growth.

Ahking and Miller (1985) modeled deficits, money growth, and inflation in the U.S. over the period 1950-1980 as an autoregressive process. It is also worth noting that their results treated government deficits, base money growth, and inflation as endogenous variables in the autoregressive model. This study found that, a two-way causal relationship occurs for the 1950s and the 1970s between government budget deficits and inflation. Thus, government deficits appear to be inflationary in 1950s and 1970s but not in 1960s.

De Haan and Zelhorst (1990) investigated the relationship between government budget deficits and money growth in the developing countries for which reliable data exist. It is sometimes suggested that it is more likely that money growth follows debt growth in developing countries, due to the embryonic state of capital markets and because the Central Bank generally comes under direct control of the minister of finance. Their results provide only mixed support for this contention, however. In the majority of countries, in their sample, there is no evidence that government deficits affect money growth. For high-inflation years there seems to be more support for a relationship between deficits and money growth.

Choudhary and Parai (1991) used the rational expectations macro model of inflation to examine the impact of the anticipated budget deficits on inflation rates by

using the quarterly data of Peru for the period 1973:1 to 1988:1. They found that budget deficits, as well as, the growth rate of money supply, have significant impacts on inflation.  

Dogas (1992) analysed the relationship between government budget deficit and inflation in Greece. This paper considers the relationship between cointegration and causality and uses tests of cointegration as pre-test for Granger tests of causality. Empirical evidence suggest that there is a long-run relationship between government budget and price level and support the hypothesis of a bidirectional causality between the two variables.

Hondroyiannis and Papapetrou (1994) used bivariate cointegrated systems to test the hypothesis of a relationship between the government budget deficit and inflation using annual data for Greece for the period 1960-2002. This study employed as a measure of the budget deficit the public sector net borrowing requirement as a percentage of gross domestic products (PSBR), and investigated the direction of causality between the growth of the PSBR and the inflation rate. The major findings of this study suggested that there is a long-run relationship between the PSBR and the price level in the Greek economy. In addition, it observed, using the Granger-causality test, that there is bidirectional causality between the two variables. The results of the Error Correction Model (ECM) suggest that an increase in the public sector net borrowing requirement results in an increase of the inflation rate with a lag of one period.

Chaudhary and Ahmad (1995) studied about the issue of money supply, deficit and inflation in Pakistan. They use an extensive model based on Quantity Theory of Money to examine relationship between budget deficit, money supply, and inflation in Pakistan. Research results show that financing budget deficit from internal source, especially with the use of banking system increase inflation rate in long-run. On the other hand, the results obtained confirm the hypothesis of presence of positive relationship between budget deficit and inflation during the period of inflationary in Pakistan in 1970s.

For Turkey, Metin (1995) analysed the inflationary process in Turkey covering the period from 1950-1988, using a general framework of sectoral relationships. It is worth noting here that the government in Turkey shifted from monetization of the deficit to bond financing in the mid-1980s. The short annual sample on Treasury bonds precluded sorting out the effects of this alternative means of deficit financing. However, this study found that fiscal expansion was a determining factor for inflation. The excess demand for money affected inflation positively, but only in the short-run. On the other hand, imported inflation, the excess demand for goods, and the excess demand for assets in the capital markets had little or no effect on inflation. A key policy implication of Metin (1995) is that Turkish inflation could be reduced rapidly by eliminating the budget deficit. Metin (1998) examined the relationship between the public sector deficit and inflation using a parsimonious, conditional, single-equation model for inflation, in which inflation depends on the budget deficit, the real growth rate of income, and base money. He found (using annual data for Turkey over the period 1950-1987) that budget deficits (as well as real income growth and debt monetization) significantly affect inflation in Turkey. 32

Darrat (2000) utilised an ECM to investigate if high budget deficits have any inflationary consequences in Greece over the period 1957-1993. Empirical results found that the deficit variable exerts a positive and statistically significant impact upon inflation in Greece. He concludes that “besides money growth, higher budget deficits have also played a significant and direct role in the Greek inflationary process”. 33

Piontkivsky et al. (2001) studied the impact of budget deficit on inflation in Ukraine. They analysed the dynamics of the Ukraine budget deficit and inflation with the choice of the class non-structural Vector Auto Regression (VAR) models. Based on the monthly data from 1995 to mid-2000 their major finding in VAR specification

is the implicit conclusion, that fiscal imbalance, apart from other, purely monetary factors, does play a role in the inflation determination.  

Table 2-1 summarises the results from empirical studies on the relationship between budget deficits and inflation in both developed and developing countries. These studies are included in the Table because they appear to provide considerable evidence towards a relationship between government budget deficit and inflation as they utilize time series data.

Table 2-1: Studies of Budget Deficit and Inflation in Developed and Developing Countries

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Country</th>
<th>Methods</th>
<th>Major finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aghevli and Khan (1978)</td>
<td>Developing</td>
<td>3SLS</td>
<td>There is positive relationship between government budget deficit and inflation.</td>
</tr>
<tr>
<td>Barro (1979)</td>
<td>USA</td>
<td>OLS</td>
<td>Government expenditure played a remarkable role in increase in money growth.</td>
</tr>
<tr>
<td>Levy (1981)</td>
<td>USA</td>
<td>3SLS</td>
<td>There is a significant relationship between monetary base, government budget deficit and inflation.</td>
</tr>
<tr>
<td>Hamburger and Zwick (1981)</td>
<td>USA</td>
<td>OLS</td>
<td>Budget deficits between 1961 and 1978 did have a significant impact on money growth.</td>
</tr>
<tr>
<td>Darrat (1985)</td>
<td>USA</td>
<td>OLS</td>
<td>Money growth and government budget deficit after 1960 have increased inflation.</td>
</tr>
<tr>
<td>Ahking and Miller (1985)</td>
<td>USA</td>
<td>VAR</td>
<td>Government budget deficit was effective in creating inflation in 1950s and 1970s.</td>
</tr>
<tr>
<td>De Haan and Zelhorst (1990)</td>
<td>Developing</td>
<td>Regression</td>
<td>For high-inflation years there seems to be more support for a relationship between deficits and money growth.</td>
</tr>
<tr>
<td>Choudhary and Parai (1991)</td>
<td>Peru</td>
<td>OLS</td>
<td>Budget deficit in Peru was effective in creating hyperinflation.</td>
</tr>
<tr>
<td>Dogas(1992)</td>
<td>Greece</td>
<td>Cointegration</td>
<td>There is positive relationship between government budget deficit and inflation.</td>
</tr>
<tr>
<td>Hondroyiannis and Papapetrou (1994)</td>
<td>Greece</td>
<td>Causality Test</td>
<td>There is long-run relationship between government budget deficit and inflation.</td>
</tr>
<tr>
<td>Metin (1995)</td>
<td>Turkey</td>
<td>ECM</td>
<td>This study found that fiscal expansion was a determining factor for inflation.</td>
</tr>
<tr>
<td>Metin (1998)</td>
<td>Turkey</td>
<td>OLS</td>
<td>Government budget deficit lead to increase inflation.</td>
</tr>
<tr>
<td>Darrat (2000)</td>
<td>Greece</td>
<td>ECM</td>
<td>During 1957 to 1993 budgets deficit has a significant impact on inflation.</td>
</tr>
<tr>
<td>Piontkivsky et al. (2001)</td>
<td>Ukraine</td>
<td>VAR</td>
<td>Fiscal imbalance, apart from other, purely monetary factors, does play a role in the inflation determination.</td>
</tr>
</tbody>
</table>

Note: Source of all studies is reported in list of references.

Studies on the issue have been carried out by many economists. A similar analysis was done by McMilan and Beard (1982), Miller (1983), McCllum (1984), Burnhart and Darrat (1988), Hafer and Hein (1988), Siddiqui (1989), Buiter and Patel (1992) and Sowa (1994).

2.5.2 Selected Empirical Studies in Iran

Hadian (1991) used regression approach to show that there are different ways to cover a budget deficit that some of them can effect on inflation. He concluded that financing budget deficit by borrowing from the Central Bank in Iran was inflationary.\(^{35}\)

Jafari-Samimi (1992) studied the relationship between budget deficit and inflation in Iran during 1979-1991 and showed that the deficit play a major role in stimulating inflation in Iran. This study was carried out by using traditional methods of econometrics and survey only the effect of budget deficit on inflation.

Ahrabi (1996) estimated a simultaneous equations model to explain the relationship between price level, government expenditures, government revenues and money supply in Iran. He concluded that government budget deficit play an important role on money supply.

Maruf-Khani (1998) used the Granger causality test approach to examine the relationship between government budget deficit and inflation for Iranian economy. He concluded that there is the causal link between government budget deficit and inflation in Iran.\(^{36}\)

The literature on inflation in Iran is relatively extensive. Part of the literature focuses on conventional money demand functions. In fact, among several alternative hypotheses, the monetary explanation, with its emphasis on the role of money supply growth, has perhaps most of the attention in Iran. On the other hand, there are a number of studies concerning the analysis of inflation with different approaches. Here few of them are been summarised.

Bahmani-Oskooee (1995) applies cointegration analysis to a sample of annual data over the period 1959-1990, and identifies two cointegrating vectors, one for the price level, and the other for the exchange rate. The former identifies money, real output, the exchange rate, and import prices as the determinants of the equilibrium price level in Iran.


Jalali-Naeini (1997) used the Ordinary Least Squares (OLS) method to study the inflationary trend in Iran. He showed that fluctuation of exchange rate effect on inflation in Iran.

Samimi (1997) utilised a small macroeconomic model to examine the relationship between government budget deficit, liquidity (M2) growth and inflation in Iran. Estimated model showed that the government budget deficits increase inflation rate in long-run short-run.

Becker (1999) used a common trend model to study the behavior of prices, the exchange rate, and real output over a sample of annual data for the period 1959/1960 to 1996/1997. Monetary shocks are found to have short-run effects on output, but permanent effects on the price level and the exchange rate.

Tavakkoli and Karimi (1999) utilised the VAR model to find out the effective factors on inflation in Iran. They concluded that inflation of import goods has the most effect on inflation.  

Peasaran (2000) estimated a demand equation for real money balances on annual data before (1960/1961-1978/1979) and after the revolution (1979/1980-1998/1999) and found evidence of structural change, with slower adjustment to disequilibrium in the post-revolutionary period. He also found that the expansion of credit to both the public sector and private sector largely explains the growth of M2 over the same period.

Celasun and Goswami (2002) estimated a similar function on quarterly data over the period 1990:Q2-2002:Q1, where inflation and depreciation of the parallel market exchange rate proxy the opportunity costs of holding money. After identifying a long-run equilibrium condition in the money market, they found a strong impact of money and the exchange rate in the short-run inflation equation.  

Bonato (2007) identified a long-run relationship between the price level and money, its rate of return, real output, and the exchange rate in Iran. Using new national accounts series released by the Central Bank of Iran, a parsimonious error

correction model (ECM) is estimated for the period 1988:Q4-2006:Q1. He concluded money has a prominent role in determining the equilibrium price level. Moreover, money growth drives inflation even in the short-run, with lags of up to four quarters.39

On the other hand, studies such as Nili (1985), Makkian (1990), Tabatabai-Yazdi (1991), and Taiebian (1995) examined the determinants of inflation without considering the integration properties of the relevant variables. The presence of non-stationary variables may lead to spurious regression. Also even if the relationship is cointegrated, standard inference procedures are inappropriate. Consequently, these studies must be considered with some skepticism.

Table 2-2 summarises the results from empirical studies on inflation in Iran. The studies on relationship between government budget deficit and inflation are given less attention than the studies on other causes of inflation in Iran. Thus, some of the empirical studies presented in Table 2-2 focus on the relationship between other macroeconomic variables such as money supply, exchange rate and inflation process in Iran.

Table 2-2: Selected Empirical Studies of Budget Deficit and Inflation in Iran

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Country</th>
<th>Methods</th>
<th>Major finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hadian (1991)</td>
<td>Iran</td>
<td>OLS</td>
<td>Financing budget deficit by borrowing from the central bank in Iran was inflationary.</td>
</tr>
<tr>
<td>Jafari-Samimi (1992)</td>
<td>Iran</td>
<td>OLS</td>
<td>Deficit played a major role in stimulating inflation.</td>
</tr>
<tr>
<td>Bahmani-Oskooee (1995)</td>
<td>Iran</td>
<td>Cointegration</td>
<td>Money, real output, the exchange rate, and import prices as the determinants of the equilibrium price level.</td>
</tr>
<tr>
<td>Ahrabi (1996)</td>
<td>Iran</td>
<td>3SLS</td>
<td>Government budget deficit played an important role on money supply.</td>
</tr>
<tr>
<td>Jalali-Naeini (1997)</td>
<td>Iran</td>
<td>OLS</td>
<td>Fluctuation of exchange rate effect on inflation in Iran.</td>
</tr>
<tr>
<td>Maruf-Khani (1998)</td>
<td>Iran</td>
<td>Causality Test</td>
<td>There is the causal link between government budget deficit and inflation.</td>
</tr>
<tr>
<td>Tavakoli and Karimi (1999)</td>
<td>Iran</td>
<td>VAR</td>
<td>Inflation of import goods has the most effect on inflation.</td>
</tr>
<tr>
<td>Becker (1999)</td>
<td>Iran</td>
<td>Cointegration</td>
<td>Monetary shocks are found to have short-run effects on output, but permanent effects on the price level and the exchange rate.</td>
</tr>
<tr>
<td>Peasaran (2000)</td>
<td>Iran</td>
<td>ARDL</td>
<td>He found evidence of structural change, with slower adjustment to disequilibrium in Iran.</td>
</tr>
<tr>
<td>Celasun and Goswami (2002)</td>
<td>Iran</td>
<td>Cointegration</td>
<td>They found a strong impact of money and the exchange rate in the short-run inflation equation.</td>
</tr>
<tr>
<td>Bonato (2007)</td>
<td>Iran</td>
<td>Cointegration</td>
<td>The estimations confirm the strong relationship between money and inflation when M1 is used, with no evidence of a structural change.</td>
</tr>
</tbody>
</table>

Note: Source of all studies are reported in list of references

As was mentioned above, there is little attention to the relationship between the government budget deficit and inflation in Iran and this study attempts to focus on it. Also, there have been few attempts to detect the effect of budget deficit on inflation in Iran directly. This study follows the approach proposed by Choudhary and Parai (1991), where the price level is considered as a function of the government budget deficit and money supply. Moreover, we examine the effect of exchange rate factor on price level. In fact, this study compares the effect of fiscal, monetary, exchange rate, and political factors on price level in long-run and short-run in Iran. Finally, this study uses different advance multivariate and univariate cointegration tests with a large enough sample size (1963-2002).

2.6 Concluding Remarks

In this Chapter we have discussed about theoretical framework to analyse relationship between budget deficit and inflation. In addition, we reviewed some of the earlier empirical studies both in developed and developing countries and in Iran. Generally, the main results can be summarized as follows:

- There are two distinctly different views which are: The monetary economics approach and the cost-push approach, which often identify the reasons for inflationary pressures. However, various other approaches can be found in between these two extremes. First, there is the monetarist claim that inflation is a purely monetary phenomenon and that in the long-run the rate of inflation equals the rate of monetary expansion in excess of the growth of capacity output. Second, economists based on the cost-push approach believe that sources of inflationary pressures are basically non-economical. According to them, social and political, as well as, worker units can temporarily impact the price level.

- According to the Keynesian theory, the economic outcome of fiscal action, either a surplus or deficit, is one of the most stimulating factors in the economy. Furthermore, fiscal policy is the major mechanism that can move the economy from equilibrium to another. The traditional point of view is that deficits cause a decline in national savings, contribute to
higher interest rates, which in its turn leads to the crowding-out of private investment, therefore, slowing down economic growth. The reduction of private investment as a result of government borrowing is a key assumption in the neoclassical analysis. The traditional view is not accepted by all economists.

- As discussed earlier, an extensive theoretical literature has argued that government budget deficit is a cause of inflation. The impact of government budget deficits and debt financing on inflation rate can be thought of through different channels.

- Extensive empirical studies have been developed to examine the relationship between the government budget deficit and inflation in both developed and developing countries.

- Many economists have studied the relationship between budget deficit, money supply and inflation in both developed and developing countries. There are two groups of studies. In the first group, budget deficit variable is directly entered into the model and the relationship with inflation has been studied. The second group has indirectly studied the relationship between budget deficit and inflation. In addition, some of the studies have included both monetary and fiscal variables in the econometric model.

- Many studies found that budget deficits have significant impact on inflation. However, some studies do not support the relationship between budget deficit and inflation.

- The literature on inflation in Iran is relatively extensive. Part of literature focuses on conventional money demand functions. Other part of literature looks at the determinants of inflation with different approaches. However, the studies on relationship between budget deficit and inflation are given less attention than the studies on other causes of inflation in Iran.

- Last conclusion, drawn from the survey of literature, is that different methods are used in the estimation of inflation models. In addition, cointegration techniques are widely used in empirical studies.