

Domestic Debt and Inflationary Effects: An Evidence from Pakistan

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Abstract

Inflation is a severe problem in many countries, especially of the less developed countries. This study investigates the impact of domestic debt on inflation in Pakistan for the period 1972 to 2009. The study observes that domestic debt and domestic debt servicing enhance the price level in Pakistan. The effect of the volume of domestic debt and domestic debt servicing on price level is found to be positive and statistically significant. Floating debt i.e. treasury bills comprise a large part of total domestic debt, which are short-term securities and have a high return in the form of interest rate. Therefore, due to their high and certain return, banks or non-bank public entities procure treasury bills and receive a high return on them, enhancing income, aggregate demand and price level. Further, the interest rate i.e. the cost of domestic borrowing or debt servicing is one of the major reasons for the budget deficit in Pakistan. So, the government has to rely on various sources to finance the budget deficit which leads to inflation. The study also proposes policies to reduce the domestic debt, namely enhancing the tax base and lowering expenditures through structural reforms.

Key Words: Domestic Debt, Inflation, Money Supply, Budget Deficit, Indirect Taxes

I. Introduction

Inflation is the persistent and continuous rise in the general or average price level of commodities. As the general price level rises in an economy, the value of money or purchasing power of money decreases. Inflation is a key macroeconomic indicator of a country, providing an important insight into the state of the economy. A low and stable inflation rate uplifts the poor and vulnerable citizens and gives a nurturing environment for economic growth. Domestic debt is a fundamental tool used by the governments in both developed and less developed countries to finance internal and external gaps. Proper and efficient utilization of the resources in the form of debt may enhance productive capacity and economic growth through development related projects. However, if the debt is not effectively utilized and managed, it creates problems for the economy. The relationship between domestic debt and inflation is direct and evident. Government can acquire domestic debt from different sources i.e. the central bank, commercial banks and non-bank financial institutions.

Borrowing from the central bank has no direct cost but carries a serious risk of inflation due to excess aggregate demand caused by an increase in money supply. Therefore, if the government borrows directly from central bank, it is alike to printing money. It is a very inflationary approach and is not usually encouraged. Moreover, if the government has a loan from central bank to finance its expenditures and meet financial difficulties, it has to issue some treasury bills in exchange for debt. If the government fails to collect revenues through tax or non-tax sources i.e. current revenues and can not service the debt, the money stock may increase excessively, involving inflationary issuing of money.

There would be no inflationary risk in the case where government borrows directly from commercial banks. But inflation can result when the central bank is involved in this mechanism indirectly.

When a commercial bank lends to the government, its cash and deposits with the central bank are decreased. This results in a withdrawal of private purchasing power and an addition to public purchasing power simultaneously. In this way, the impact of government debt or expenditures is non-inflationary. Here there are two main points of concern. Firstly, to know how the commercial banks get the cash to lend to the government and secondly, how will banks' future operations be affected as a consequence of giving debt to government?

If a bank lends to the government by investing in government securities and keeps no surplus cash, the required cash flows for loan subscriptions to the government may be attained by two ways: the proceeds of maturing loans or maturing investments in government securities. In this case, the new financial instruments replace the old ones and there would no change in the aggregate volume of the bank's assets and liabilities. So, this channel would be non-inflationary.

On the other hand, the commercial banks may obtain cash through fresh deposits for investing in government securities to lend government. With this mechanism, the acquisition of additional funds from depositors and loans to the government happens without lessening the bank's existing investment in government securities and existing volume of loans. Thus, this channel of providing debt to government is potentially inflationary.

When the government borrows from non-bank financial institutions (NBFIs), the result is inflationary. If the NBFIs invest by purchasing the government securities and face a shortage of liquidity, they have no option but to turn to the central bank. Again the central bank provides the link between governments borrowing and inflation. This paper examines the inflationary effects of domestic debt in Pakistan. The paper is arranged as follows. Different theories about inflation are discussed in section 2. A concise review of the empirical literature is given in section 3. The econometric specification is discussed in Section 4. The discussion of the data, methodological issues and empirical results is presented in Section 5. Finally, the conclusions are presented in Section 6.

2. Theoretical Background of Inflation

There are numerous schools of thought to be found within literature with differing views on the subject of inflation. A variety of theoretical and empirical models have been used to explore the causes and impacts of inflation. According to the Classical school of thought, inflation is a monetary phenomenon. The Quantity Theory of Money proposed by Classical economists suggests a direct and proportional relationship between the money supply and the price level. The theory argues that the money supply has an influence only on the nominal variables i.e. prices and nominal wages while real variables do not change.

The Demand pull inflation approach suggests a positive relationship between aggregate demand and the price level at a constant level of output. Another view of inflation is that increases in costs (supply shocks) enhance inflation. Besides demand pull and cost push inflation, the Keynesian approach considers that costs of production raise the price level. In addition, the Keynesians believe that the behavior of the price level in the future would not change if past and expected price level depend on past price level.

The monetarists are of the view that the inflation is a monetary phenomenon. They believe that expansionary monetary policy increases output for a time. In the long run however, money affects mainly the price level. The real variables i.e. employment, real output etc are affected only by real factors. Therefore, monetarists argue that while in the short run both real GDP and price level increase due to an increase in money supply, only the price level goes up in the long run.

Julio Oliver (1964) presented another theory known as structural inflation theory. This theory states that inflation occurs when the structure of internal demand of a country changes, while the aggregate demand of a country does not change. According to the theory, when demand for commodities in some sectors increases, this is accompanied by rises in prices and wages; but in other sectors where demand for commodities declines, but prices and wages do not generally go downward. Furthermore, resources do not shift from those industries whose demand shrinks to those industries whose demand expands. Hence the overall trend of prices tends to rise in an economy.

Another theory is Laffer's Supply side theory which considers that in the short run there is no trade-off between inflation and unemployment. This theory argues that both the diseases of inflation and unemployment can be reduced at the same time in the short run only through better policy. A decrease in taxes enhances the investment level which thereby increases the output and employment level. Phelps and Friedman's perception on inflation is that it is the result of adaptive expectations which are in fact based on past experiences. If the price level keeps on in the economy, people have the expectations that inflationary trend will continue in future. Therefore, workers and firms adjust inflationary expectations over the contract period when they bargain.

The new classical economists Lucas (1973) and Sargent (1973) assume rational expectations to explain inflation rather than adaptive expectations. According to rational expectations hypothesis, people form their expectations on the basis of all available relevant information about concerned variables. They are of the view that there is no choice between inflation and unemployment in short run.

Some economists believe that only aggregate analysis has been used to explain the behavior of general price level in earlier theories. Therefore, it is very important to do the economic analysis at a disaggregated level. There is also a need to analyze the components of inflation separately to grasp the process of inflation.

The bottom line of the various theoretical stances on inflation is that demand and supply disturbances, monetary shocks and inflationary expectations are the major ingredients of price escalation.

3. Review of Assorted Empirical Studies

In section one it was observed that there is a close link between domestic debt and inflationary effects. However, very few empirical studies have been conducted regarding this link. We have reviewed them for the present research. Most studies examine the impact of domestic debt on economic growth. Sheikh et al (2010), for example, applying the OLS technique for the period of 1972 to 2009, observe that the stock of domestic debt affects economic growth positively but domestic debt servicing is inversely related to economic growth in Pakistan. [See also Singh (1999), Uzochukwus (2003), Schclarek (2004), Abbas and Christensen (2007), Maana et al (2008), Adoufu and Abula (2009), Checherita and Rother (2010)].

Wheeler (1999) investigates the macroeconomic impacts of government debt in US by applying variance decompositions and impulse response functions for the period of the 1980s and 1990s. The author tests the Ricardian Equivalence hypothesis by examining the impact of government debt on output, price level and interest rates. The results of the study show that government debt has a negative and significant impact on interest rates, price level and output.

Bildirici and Ersin (2007) examine the relationship between domestic debt and inflation for those countries that have high inflation. The findings show that the cost of domestic debt increases on account of inflation. Consequently, the increasing debt to GDP ratios led these countries to borrow at higher cost and with low maturity. The study concludes that the increasing cost of borrowing is due to non-Ricardian fiscal policies.

Obi and Nurudeen (2009) make an effort to determine the effects of fiscal deficits and government debt on interest rates in Nigeria by applying a Vector Auto-regression approach for the period of 1981 to 2006. The interest rate in the model is a function of the fiscal deficit and government debt. The findings of the study show that fiscal deficits and government debt have a positive impact on interest rates. The authors suggest that the government should increase the revenues and should decrease unnecessary spending.

Kannan and Singh (2009) trace out policy conduct and stability of public debt in India by capturing the dynamic interaction of deficits and debt with macroeconomic variables such as inflation, interest rate, trade gap and output by applying a 2SLS simulation technique for the period of 1971 to 2006. The study finds that fiscal deficits and debt have an adverse impact on all the macroeconomic variables under consideration in the medium to long run. In nutshell, a vast knowledge on the behavior of domestic debt and inflation is not available as there are few studies on the topic. Nonetheless, basic economic logic should give us the idea that internal borrowing is likely to increase the price level. The few studies reviewed that address the issue give the same message as well.

4. Data Sources and Methodological Issues

The data used in the present study have been taken from the various issues of the *Annual Reports* of the State Bank of Pakistan and the *Economic Survey* of the Ministry of Finance of the government of Pakistan covering the period 1971-72 to 2008-09. All the variables have been expressed in millions rupees except CPI and Exchange Rate.

The present study has used the OLS estimation technique. The general regression model is given by the following equation:

$$Y = \beta_1 + \beta_2 X_1 + \beta_3 X_2 + \dots + \beta_k X_k + \epsilon_i \quad (1)$$

ϵ_i satisfies all the OLS assumptions. Based on the general model, the following equations are specified in order to examine the effects of domestic debt or domestic debt servicing on inflation. In these equations, we include domestic debt as a stock variable and domestic debt servicing as a flow variable alternatively as the independent variables.

The econometric equations specified in linear forms along with their possible signs are given as follows:

$$CPI = \alpha_1 + \alpha_2 M_2 + \alpha_3 TDD + \alpha_4 IP + \alpha_5 EX + \alpha_6 GE + \epsilon \quad (2)$$

$$CPI = \beta_1 + \beta_2 BD + \beta_3 INT_DD + \beta_4 IT + \beta_5 ER + \epsilon \quad (3)$$

$$\alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \beta_2, \beta_3, \beta_4, \beta_5 > 0$$

Where:

CPI = Consumer Price Index

M_2 = Money Supply

TDD = Total Domestic Debt

IP = Private Investment

EX = Exports

GE = Government Expenditures

BD = Budget Deficit

INT_DD = Interest Rate on domestic debt

IT = Indirect Taxes

ER = Exchange Rate

ϵ = Error Term

5. Results and Discussion

The results of estimation are arranged in Table 1. The econometric model specified in equation 2 has six variables. CPI is dependent variable whereas money supply, total domestic debt, private investment, exports and government expenditures are independent variables. We have included M2 variable in the light of Quantity theory of money while to show the demand pull inflation effects, the variables of private investment, exports and government expenditures have been incorporated in the specified model.

The expected direction of relation of each explanatory variable with CPI is positive. Problems regarding Heteroscedasticity, Multicollinearity and Serial correlation are handled by White test, VIF and AR(1) respectively. From the table, we observe that value of coefficient of money supply is 1.54, which shows that one million additions in money supply increase the price level by 1.54 percent. The regression coefficient of money supply is positive and statistically significant.

This exhibits that result is consistent with the theoretical expectation that the relationship between money supply and price level is positive as explained by the Quantity theory of Money. Now coming towards the variables in which we are more concerned and interested. The value of regression coefficient of total domestic debt is 2.95, demonstrating that if domestic debt goes up by one million; price level goes up by about 2.95 percent. The impact of domestic debt on price level is positive and highly statistically significant. The reason may be that when government borrows directly from central bank to finance its expenditures, money supply increases then price level increases as explained in theory of demand-pull inflation.

We observe that the regression coefficient of private investment is negative and statistically significant in estimated CPI equation. The value of regression coefficient of private investment is 2.31, which means that a one million increase in private investment decreases the price level by 2.31 percent. This result contradicts with the theoretical expectation that private investment should contribute to aggregate demand, which increases price level. A possible interpretation of this contradictory result may be that if due to increase in private investment, the production increases which results in increasing the aggregate supply and reduces the price level.

The regression coefficient of government expenditures is 1.35, which implies that if government expenditures increased by one million, price level on average will increase by 1.35 percent. This result is compatible with the theoretical underpinning. Similarly value of regression coefficient of exports is 0.001, which means that an addition of one million in exports increases the price level by 0.001 percent. This effect of exports on price level is positive and minute but statistically significant. The positive sign of both coefficients is according to Demand-pull inflation theory. As both exports and government purchases are part of aggregate demand, when there is an increase in the components of aggregate demand, the price level increases.

The value of R^2 is 0.89. Thus our model explains about 89 % of variation in the CPI function. The problem of autocorrelation has been removed with the help of autoregressive process, which is an efficient technique to tackle this problem. The DW-statistic is 1.8. This value is close to 2. Thus, as a rule, we can accept the null hypothesis that autocorrelation is absent from the regression errors.

We now come to the econometric model specified in equation 3. The model have five variables. CPI is dependent variable, which is used to show price level. Budget deficit, domestic debt servicing, indirect taxes and exchange rate are used as independent variables. We have included the variable of indirect tax in the specified model in the light of cost push inflation because indirect tax is a considerable part of cost of production. The variable exchange rate has been added under the theory of devaluation. The variable of Budget deficit has been incorporated according the Keynesian and neoclassical framework.

**Table 1: Parameters Estimates of CPI Equation
(Dependent variable is CPI)**

Independent Variables	Equation 2	Equation 3
Intercept	22.17239 (3.704231*)	668044.6 (8.35E-05)
Government Expenditures	1.35E-05 (2.660684*)	-----
Total Domestic debt	2.95E-05 (5.905910*)	-----
Debt servicing on Total Domestic debt	-----	0.000119 (6.461064*)
Exchange Rate	-----	0.092249 (0.435096**)
Indirect Tax	-----	7.55E-05 (4.837646*)
Private Investment	-2.31E-05 (-2.989192*)	-----
Exports	0.001087 (1.755121**)	-----
Monetary Aggregate (M2)	1.54E-05 (2.600561*)	-----
Budget Deficit	-----	1.29E-05 (2.037835*)
AR (1)	0.878350 (13.78064*)	0.999997 (29.39551*)
R ²	0.89	0.82
DW Statistic	1.8	1.9
Sample Size	37	37

Note: The t-statistics (in parenthesis) significant at 5% and 10% levels are indicated by * and ** respectively. All the estimations are carried out by Eviews.

The expected direction of relation of each explanatory variable with CPI is positive. The value of coefficient of indirect taxes is 7.55, which indicates that for every one million increase in indirect taxes, price level go up by about 7.55 percent. The value of coefficient is positive and statically highly significant. The economic reason of such findings may be that a rise in indirect taxes like sales tax, excise duty etc increases the cost of production, which translates in cost-push inflation.

The value of coefficient of budget deficit is 1.29, which represents that one million increase in budgetary deficit results in price level to increase by 1.29 percent. This effect is positive and statistically significant. The link may be that a pro-inflation pressure may come from fiscal deficit, with different ways of financing it i.e. bonds sold to the market or the central bank etc. Choudhary and Parai (1991) have found that budget deficits and money supply have significant impacts on inflation. Ahking and Miller (1985) have explored that government deficits are inflationary.

Similarly the value of coefficient of exchange rate is 0.09 suggesting that one dollar increase in exchange rate enhances the price level by 0.09 percent. This effect is minor and statistically insignificant. The reason of this result may be that if there is a depreciation/devaluation in the value of currency, our exports would become cheaper for abroad, but our imports would appear to be more expensive if Marshall-Lerner conditions are satisfied¹.

¹ Marshall-Lerner condition should be satisfied for the success of devaluation. According to this condition, "devaluation will improve the trade balance if the sum of export and import elasticities of demand is more than unity.

$$\varepsilon_{D_X} + \varepsilon_{D_M} > 1$$

The prices of exports (P_x) would decrease and prices of imports (P_M) would increase due to devaluation. So, the demand for exports of a country increases and demand for imports of a country decrease. Due to increase in exports, shortage may be created domestically. As a result, their domestic prices will increase. This would create inflation in the country. The prices of imports (P_M) would increase due to devaluation. Therefore, imported goods, raw material and machinery become expensive and cost of production would increase. Cost-push inflation will be created in the country and this would lead towards unemployment and reduction in productivity. Our results are compatible with Piana (2001) who has found that exchange rate has contributed positively to inflationary pressure.

Now we discuss to the value of regression coefficient of our concern variable that is domestic debt servicing. The value of coefficient is 0.0001, which shows that an increase in one million of debt servicing increases the price level 0.0001 percent. Though the effect of debt servicing on price level is very small but is statistically highly significant. The reason is that debt servicing is burden on budget, when debt servicing increase then burden of budget deficit will increase, so price level increase. Melike and Omer (2007) has shown that cost of borrowing creates inflation.

The value of R^2 is 0.82. Thus our model explains about 82 % of variation in the CPI function. The autocorrelation problem has been removed with the help of autoregressive process. The DW-statistic is 1.9 which is very close to 2. Thus, we can accept the null hypothesis that autocorrelation is absent.

6. Conclusions

The main objective of this paper was to study the inflationary effects of domestic debt in Pakistan for the period 1972 to 2009. The study finds that domestic debt and domestic debt servicing increase price level in Pakistan. In the CPI function, the volume of domestic debt has positive and significant effect on price level. The effect of domestic debt servicing on price level is also positive and it is statistically significant. In Pakistan, treasury bills constitute major portion of domestic debt, which are short-term securities, and interest rate on them is also high. So, banks or non-bank public purchases the treasury bills and earn high return on them, which enhance the aggregate demand and price level. Based on these results, we conclude that the volume of domestic debt and servicing of the domestic debt have significant positive effects on the price level. Moreover cost of domestic borrowing is a huge burden on budget and to finance budget deficit government has to resort to different sources and deficit financing leads to decrease in value of currency, ultimately creates inflation.

Government must come up with policies and structural reforms to increase the revenue and lower its current expenditure. The rise in domestic debt in Pakistan is attributed to government extra budgetary activities which most often are not used for the proposed project. Commitment to budget should be encouraged for fiscal discipline on the part of the government and its agencies.

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