

Impacts of Budget Deficit on Output, Inflation and Balance of Trade: A Simultaneous Equation Model Approach

Iftkhar Wakeel¹ and Kafait Ullah²

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Abstract

This paper tries to analyze the impacts of budget deficit on macroeconomic aspects of Pakistan. There are ways through which budget deficit is financed, can affect money supply, output, exchange rate and then foreign trade. Annual data for the period 1970-2010 has been taken for analysis. ADF test used for stationarity test, 3-Stage Least-Square method is adopted for estimation by using STATA-10 software. The study revealed the Output changes are positively related to BCP and Government expenditures but negatively with interest rate. Money supply is positively related to GBD, BCP and foreign reserves(R). So money supply does increase whenever we try to finance budget deficit through Government, private or external borrowing. On the other hand, changes in Exports and Imports depend on changes in ER and their relative prices respectively which are affected by money supply. But the changes in imports are bigger than changes in exports, pushing the balance of trade towards deficit. Our study has also measured the negative relation between Balance of Trade and Output. Study concludes that when government tries to use government expenditures to get higher output, deficit may come into existence and then financing the budget deficit results in inflation, trade deficit and afterwards affects output.

Key words: Budget Deficit, Economic Growth, Balance of Trade, Simultaneous Model

Introduction

The governments use fiscal policy tools, to achieve their desired goals. In that process deficit budget policy is a famous tool of fiscal policy in order to increase the rate of growth. Commonly when private and foreign investment becomes insufficient for optimal production, then government plans to spend available funds in different sector of economy. In recent years many developed and developing countries have experienced the budget deficits, believed to be the result of over-expansionary fiscal actions of policy-makers. In developing countries, the government depends upon deficit financing due to its inability to mobilize domestic resources sufficiently and system failure to manage the expenditures according to the revenues. Every year government announces budget in which expected expenditures and expected revenues are forecasted for next fiscal year. It is amazing to describe that we always fail to attain the projected goal of revenue collections but, we never fail to spend funds (the nation's capital) according to announced sum of expenditures. At the same time, role of government is of backbone importance in developing countries like Pakistan where there is lack of private and foreign capital. To stimulate the growth of economy, government makes the participation with private sector as well as makes expenditures for infrastructure and overall development of economy. But it is necessary to keep the expenditures and revenues in equilibrium in such a way that expenditures must not exceed over revenues. Say, government spending is useful but deficit spending is not. Once

¹ Graduate, Department of Economics, University of Gujrat, Pakistan

² Assistant Professor, National University of Science and Technology, Islamabad



the economy is trapped in deficit, it would become difficult to remove and control in next year.

Deficit is financed by six ways: First, by issuing new currency (borrowing from Central bank). As the each currency note printed is liability of Central bank because the bank has to get the responsibility to validate the value of that piece of paper. Federal Government accepts to repay that liability, if bank helps in financing the deficit. Second, by borrowing from banking and commercial institution i.e. government issues special notes and securities to commercial banks and other specified monetary institutions and collects funds to finance the deficit. Third, by borrowing from non-banking financial institutions and general public. In 1980's borrowing from central bank (issuance of new currency) was restricted in Pakistan. Then the method of borrowing from general public and commercial institutions came into existence i.e. Central Bank issues bonds, securities or public shares and offers interest as reward of holding those bonds, securities. Fourth, by borrowing from international financial institutions. Fifth, by consuming foreign reserves and Sixth, by selling public assets through privatization process.

However, the increased Government spending causes the Aggregate Demand to increase as well as the real GDP. But if expenditures exceed over revenues, it would negatively affect the economy. Monetary financing is direct increase in the money supply. And increase in the volume and circulation of currency leads towards inflation. Explaining that individuals have money in hand and they are ready to pay too much money for too few things. Borrowing from international institutions often results in circular debt.

To cover the deficit government has to borrow from general public, private sector, and from commercial banks by selling bonds or issuing securities. It deliberately increases the overall burden of borrowing on economy. Selling bonds will increase the national debt. Furthermore, Government has to pay specific amount of interest as outcome of bonds and securities. This has a high opportunity cost because it requires year by year interest payments. The unpaid interest amounts also add up into debt. This process causes the debt to increase by hitting down the Debt to GDP (Debt/GDP) ratio. Increase in Debt to GDP ratio shows the falling level of debt sustainability of the economy. Now we look into the relationship between foreign trade account as relation and deficit. As we have stated above that budget deficit changes the price level in the country due to money supply or other ways. Other things remaining the same, price level causes to change the supply of exports and demand of imports through relative prices of exports and imports. And the level of exports and imports are surely the very important components to change the foreign trade account.

So far, various studies have been conducted in analyzing the impacts of budget deficit on macroeconomic indicators. A number of studies have also been conducted in Pakistan but quite a few aspects are missing in those studies. For instance, they have limited their research by using simple OLS or by ignoring the problem of endogeneity and simultaneity biasness if simultaneous model used. This paper has tried to overcome such lags by examining the impacts of budget deficit on inflation, output and balance of trade by using 3SLS approach for simultaneous equation model.

The purpose of this study is to examine the budget deficit implications to inflation, output and balance of trade in Pakistan. The 3-Stage Least-Square method is applied to estimate the model, in which all variables are inter-related to each other and are simultaneously determined within the model. Annual data for 1970-2010 is selected for analysis. Augmented Dicky-Fuller test is used for stationarity check and then difference taken if necessary. Durbin-Watson test is used for checking autocorrelation.

The paper will follow in the following sequence. Section 2 tells about economic situation of Pakistan. Section 3 sheds light on literature which provides empirical evidences. Section 4 provides theoretical explanation about relationship between variables and process

of modeling. Section 5 contains on estimation and interpretation of findings. Finally, in section 6, conclusion is drawn on the basis of results.

Before going to literature and estimation, we should have a look at relative aspects of Pakistan economy.

Scenario of Pakistan

Pakistan has a history of macroeconomic imbalances and until recently has extremely high foreign (as well as domestic) debt, decreasing level of international reserves, depreciation of currency day by day, high inflation, high nominal interest rates, continuous budget and current account deficits with un-sustainable, low growth.

Output: The average economic growth over 40 years is around 4 percent. The main focus of any policy has been to achieve a sustainable growth pattern. However, due to a number of macroeconomic imbalances such as high budget deficits, high indebtedness, low savings and investment, lack of fiscal discipline, undeveloped financial markets, unstable exchange rates along with high population growth and huge defense expenditures made this task almost impossible. Some of these macroeconomic imbalances contributed to episodes of high inflation and unemployment. Gross Domestic Product (GDP) growth has been stuck at a level, which is half of the level of Pakistan's long-term trend potential of about 6.5 percent per annum and is lower than what would be required for sustained development.

Deficit: On average, deficit was 6% of GDP during the decade of 1970s. It was 7.6% of GDP in 1980s. During the year 2001-02, it has again surpassed 7% of GDP. For the sustainability of deficit several revenue measures were introduced in the successive budgets, along with reduction in development expenditures, however, all in vain. Budget deficit in Pakistan has varied between 5.4 to 8.7% of GDP during last two decades. Now government is trying to cut down the subsidies and struggling for improvement in tax collection process but still it is 5.4% in 2011-12 and is projected at 6.5 % of GDP for end 2012-13.

Public Debt: Pakistan's public debt stood at Rs. 12,024 billion as of March 31, 2012. During first nine months of current fiscal year, total public debt registered an increase of Rs. 1,315 billion which includes Rs. 391 billion consolidated by the Government into public debt against outstanding previous year's subsidies related to food and energy sectors. Public debt as a percent of GDP stood at 58.2 percent by end-March 2012. At the end of March 2012, servicing of the public debt stood at Rs.720.3 billion against the budget amount of Rs. 1034.2 billion. A major cause of this increased debt is year by year high deficit.

Reserves: Pakistan's foreign exchange reserves reached to \$ 16.5 billion at the end-April 2012 compared to \$ 17.0 billion at end-April 2011. The exchange rate averaged at Rs. 85.50/US\$ during July-April 2010-11, whereas it averaged at Rs. 88.55/US\$ during July-April 2011-12. The Pak Rupee depreciated by 3.4 percent during July-April 2011-12 over the depreciation of 2.2 percent in July-April 2010-11 period.

Inflation: Inflation has always been the one of major problems of Pakistan. Historically we can examine the trend of inflation, say, during 1973-1980; rate of inflation remained high at an average of 14.3 percent. During 1980s the economy experienced a comparatively moderate rate of inflation averaged at 7.2 percent per annum. But in the 90s it increased again having an average of around 10 percent per annum. In fact, fiscal sector indicators also moved in the same direction during the sub-periods mentioned earlier. Inflation is still in double digits (10.8), even more than target of 9.5%. Another matter to be noticed that, Pak Rupee depreciated by 3.4 percent during July-April 2011-12 over the depreciation of 2.2 percent in July-April 2010-11 period.

Balance of Trade: And finally the current account is showing the deficit of \$3.1 billion for the period July-March FY12, as compared to \$10 million in the last year. This deficit in the current account was largely caused by the widening of trade and services

account deficit. However, continued support from current transfers in the form of workers' remittances helped in containing further increase in the current account deficit during the period under review. The trade deficit expanded mainly due to the 14.5 percent growth in imports and the 0.1 percent increase in exports; thereby widening the trade deficit by 49.2 percent during the period.

Figures mentioned above are obtained from: {Chapter. Public Development, Growth, Inflation, Trade and Payments, Money and Credit (issues 2005-11), WorldWatch Institute (2002), World Trade Organization (Review report 2001-12), World Bank (1997), IMF Working paper (W/02/208), Chaudhary and Kiyoshi Abe.(1999), and SBP Publications (Annual Performance Reports)}.

Keeping the current and past economic situations of Pakistan in mind, we must try to find the reasons and suggestions to improve our economy. Our objective is to find the impacts of budget deficit on above mentioned macroeconomic variables. Literature will tell us the story of budget deficit as related to macroeconomic variables.

Literature Review

[Irving Fisher (1911) classical QTM] Monetary financing involves the resorting of government to central bank's resources, in other words the issuing of new currency in order to finance budget deficit, and it surely causes inflation. "Supposing an increase of money supply, while level of output and velocity is constant in short run. Now issuance of new currency just raises the level of prices".

$$M*V=P*Y$$

On the basis of this equation we can see that, at a given level of output, an increasing stock of money into circulation is directly reflected in raising level of prices because velocity of money is also assumed to be constant.

Shehnaz, et al.,(2006) examined the debt dynamics and its burden on Pakistan, over past three decades (1970-2005). Their results indicate that rising level of twin deficits, fluctuations in exchange rate and high interest rate payments are the three core variables responsible for rise in public debt and overall debt burden. Results also revealed that exchange rate factor has remained important throughout the period to increase the public debt ratio. And interest rate factor was marginally responsible towards rise in external debt to GDP ratio. Point to be noted is that, exchange rate and interest rate fluctuations are due to budget and current account deficit.

Barro (1989) Ricardian equivalence theory states that consumers are Ricardian, means that they are aware of government policy decisions and predict future on the base of past. When government faces the deficit because of increased expenditures, consumers know that this deficit needs to be financed by taxes and their future generations will have to pay higher taxes in response of government steps to remove deficit. So they reduce current consumption in order to save for future. In response to minimize the deficit in next periods, government has to plan about controlling it, either by increasing tax revenues or by cutting down the government expenditures. In both cases, economy suffers. Expenditures may be current or developmental, which simply means that low expenditures may lead to low development. And if we adopt second option of increasing revenues through high taxes, taxes decrease disposable income (capacity to consume) and incentives to work decrease by increasing taxes.

Cebula (1989) another impact of Budget deficit is that, if the government sells more bonds to finance the deficit, this is likely to cause interest rates to increase. This is because the government needs to increase interest rates in order to attract investors and compete with private institutions for the available funds. If government interest rates increase, this will push up other interest rates as well.

Aisen and Hauner (2008), on the basis of previous 30 studies and current estimation, they found the positive relationship between budget deficit and interest rates. According to classical school of thought, while defending the Laissez Fair concept for Economy. Classical say that government intervention is harmful for market efficiency because government spending causes the private investment to decrease. That's because the private investors dislike the government intervention in markets. Besides this, increased interest rates also discourage private investment in the economy. So we can say that budget deficit hits private investment through government borrowing and spending. This is called the "Crowding out" effect.

Premchand (1984) empirically estimated that deficit funding by public borrowing (bonds, securities) contributes to financial crowding-out of private investment due to high interest rate and government intervention.

Laurance and Mankiw (1995) while describing the impacts of budget deficit pointed out that decrease in national saving is major and most harmful impact of budget deficit. Savings keep the Consumption in balance and it is capacity to invest in future. Lower saving means the lower capital formation in the future. And in long run it will cause unemployment and capacity of production will severely go down.

Abell (1990) estimated impacts of budget deficit on trade deficit and examined that deficit financing through issuance of bonds and securities may put upward pressure on interest rate, higher interest rates attract foreign inflow, inflow trend of foreign investment enhances the foreign exchange value of domestic currency (low Exchange Rate), lower exchange rate discourages net exports and finally causes Trade Deficit.

Aghevli and Khan (1974) introduced the simultaneous model and utilize tests for causality to empirically analyze the relationship between budget deficit, inflation, money supply and output growth for four developing countries (Brazil, Colombia, the Dominican Republic, and Thailand) for period 1978-2009. It is found that deficits occurred due to revenue gaps and essential role of government expenditures. The empirics showed that the financing of government deficits increases money supply, thus generating inflationary pressure and in long run as, low real growth of economy.

Chaudhary and Kiyoshi Abe (1999) like most developing countries, a large and growing budget deficit in Pakistan is one of the major outstanding economic problems. It is held responsible' for high inflation, low growth, a current account deficit as well as the crowding out of private investment and consumption.

Vieira (2000) investigates the fiscal deficit and inflation relationship for six major European countries. The results obtained by the author provide little support for the proposition that budget deficit has been an important contributing factor to inflation in these economies over the last 45 years. On the contrary, where evidence exists of a long-run relationship between inflation and deficits, this evidence is more consistent with the view that it was inflation that contributed to deficits, rather than the reverse.

Motley (1983) had a research over the empirical relationship between money supply, real interest rate and budget deficit in San Francisco. Empirical results showed that real interest rates have risen sharply. It is widely argued that the need to finance increasing government deficits combined with a tight monetary policy. The empirical results of this paper suggest that this relation only held during the seventies and that even during this decade the effect was less significant when one took account of change in the money supply and the federal deficit that took place at the same time. He analyzed that on one side real interest is increasing as a factor to crowd out the private investment. And on the other hand money supply and money circulation is also increasing for enhancement of inflation in the economy.

Chaudhary and Ahmad (1995) suggest that domestic financing of the budget deficit, particularly from the banking system, is inflationary in the long run. The results provide a positive relationship between budget deficit and inflation during acute inflation periods of the seventies. They also find that money supply is not exogenous; rather, it depends on the position of international reserves and fiscal deficit and it has emerged as an endogenous variable.

The general conclusion is that the execution of monetary policy is heavily dependent on the fiscal decisions made by the government. In order to control inflationary pressure, government needs to cut the size of budget deficit.

Idress and Khan (2006) explore the relationship between budget deficit and inflation. Deficit is financed by issuing new currency, borrowing from banking and non-banking institutions, or from international monetary institutions. This all enhances the money circulation in economy and then results as inflation. Their analysis represents that there is a long-run relationship among inflation, fiscal deficit, and total bank borrowing by the government. Finally they conclude that inflation is affected by the total bank borrowing as well as fiscal deficit. Both fiscal deficit and total bank borrowing by the government sector are causing inflation. As a sufficient condition for fiscal dominance in Pakistan, fiscal deficits affect changes in seignorage rather than the other way round. Therefore, it is also concluded that inflation is a fiscal phenomenon in Pakistan.

Ahmed (1999) Criticized on simple OLS, Multiple regression model and ARIMA models as these techniques do not cover impacts of causality, endogeniety, exogeniety and are unable to provide authentic forecasts. He formulated simultaneous model and used VAR methodology for forecasting and measuring cyclical behavior of variables and assessment of the impacts of budget deficit on different macroeconomic factors. He checked stationarity (Dickey Fuller Test, ADF) and whiteness of residuals. Furthermore he made structural adjustment then checked the causality test, long run relationship (Johenson Co-integration) test. Results showed significant relationship between budget deficits. He revealed that inflation is caused by budget deficit through money growth. The results also proved the change in interest rate, economic growth, exchange rate and Balance of Trade, due to deficit. He also found long run relationship between budget deficit, money supply (inflation) and interest rate.

Chaudhary and Shabbir,(2005) tried to find the impacts of budget deficits on macro-economic variables using 2SLS technique. And the empirical evidence leads to the conclusion that fiscal and monetary variables are important to determine economic stability in the foreign sector of Pakistan. The changes in money supply affect trade balance through output which resultantly brings changes in foreign reserves. The increase in government budget deficit, partially due to an income inelastic revenue structure, leads to excessive expansion in domestic credit, which creates excessive supply of money over demand, and therefore leads to foreign reserves outflows.

Khan, et al (2008) critically analyzed the short-term effects of budget deficits on inflation, interest rate, output, private and public investment, unemployment, international reserves and balance of payments, on the basis of annual data for period 1960-2005. The study examined that money supply is positively related to international reserves. Money demand depends on income. Output is positively affected by private and public investment, government spending and balance of trade but negatively related with interest rate. Exports and imports are sensitive to exchange rate and their relative prices. Finally the study concludes that budget deficit can cause higher inflation, higher trade deficits, higher unemployment and higher interest rates, along with lower growth and low level of investment.

Gaber (2010) reveals important part of deficit financing. High debt, high interest rate is 1st impact of budget deficit and then it results as portfolio crowding out. Government spends assuming the multiplier effect i.e. through government expenditures and taxes they can have influence on aggregate demand of economy. But in real it results in crowding out effects i.e. change in aggregate demand is smaller than change in government expenditures. Then describes that how due to budget deficit, trade deficit also exists. After deficit government is bound to issue a large amount of bonds in order to finance the deficit. High interest rate attracts foreign investors along with domestic investors. Then high demand of domestic currency decreases the exchange rate. Lower exchange rate discourages the exports and encourages the importers (imports become cheaper). End result is twin deficit.

Easterly and Schmidt-Hebbel (1993), had a comprehensive analysis on implications of budget deficit on macroeconomic aspects of 10 developing countries and had a strong evidence that monetary financing leads to higher inflation and debt financing to higher interest rates. Further the evidence is provided about unfavorable impact of deficit on balance of trade. Empirics prove that trade deficit is followed by budget deficit as well as nominal exchange rate is also affected by budget deficit. However the crowding out effect is rejected in some developing countries, being non-sensitiveness of private investment to interest rate. And Ricardian Equivalence is rejected for some nations where conditions are not predictable. After describing and empirically proving major impacts of budget deficits they suggest that the healthy Growth makes the economy sustainable and makes deficits less harmful. Budget structure must be improved and some reforms must be adopted for private investment.

Literature reviewed above enables us to understand the impacts of deficit. And according to different scholars who analyzed the empirics of different countries, it can be proved that budget deficit causes the inflation to rise, interest rate to flourish, growth to screw up and balance of trade to diminish.

A rich literature on analysis of budget deficit and its implications on macroeconomic aspects is available. Many scholars have analyzed the significance of budget deficit as related to different macroeconomic aspects of economy like Output, Inflation, Balance of Trade, Interest rate and private investment as well. In Pakistan, past studies have been estimated for the period up to 2005 by using OLS, VAR Model or by 2SLS. But all these techniques have many disadvantages, especially when variables are simultaneously inter-related and endogenously determined within the model. So to avoid the problem of endogeneity and biasness, this study is based on 3SLS methodology and time period is also expanded up to 2010.

Material and Modeling

From the above literature variables are selected and time series data from 1970 to 2010 is obtained from Economic survey of Pakistan, World Development indicator and International Financial Statistics and Handbook of Statistics State Bank of Pakistan.

[(Chaudhary and Shabir,2005), (Chaudhary and Naveed,1995), (Qayyum and Nacem,2008), Hakro, 1999] have found the relationship between International Reserves, Government Borrowing and Private credit and proposed the money supply function is given as follows.

$$Ms=f(R, GBD, BCP)$$

Where Ms is the money supply; R is the international reserves; GBD is the government borrowing from the banking system (to finance the budget deficit) and BCP is the commercial banks credit provided to the private sector. And a rich literature is available

for money demand suggesting that, demand for real money balances is the function of real income and interest rate.

$$(Md)=f(Y, i)$$

Where Md is the demand for nominal cash balances: y = real income and i= rate of interest.

The real output is the function of real government expenditures (consumption plus investment), credit of banking system to the private sector, balance of trade and real interest rate.

$$Y=f(GE, BCP, BT, i)$$

Where, GE is the real government expenditure (investment plus consumption), *i* is real interest rate and BT is the balance of trade (export minus import).

The supply of real exports depends on real income, relative prices of exports and nominal exchange rate.

$$X=f(y, RP_x, ER)$$

Where y is the level of real income, RP_x is the relative prices of exports (p_x / p), and ER is the nominal exchange rate.

Finally the demand for real imports depends on real income, relative prices of imports, international reserves and nominal exchange rate.

$$M=f(y, RP_m, R, ER)$$

Where RP_m is the relative prices of imports and R are the international reserves.

The complete model can be written as following:

$$Ms = a_0 + a_1(R) + a_2(GBD) + a_3(BCP)"$$

$$Md = b_0 + b_1(Y) + b_2(i)"$$

$$Y = c_0 + c_1(GE) + c_2(BCP) + c_4(BT) + c_5(i)"$$

$$X = d_0 + d_1(Y) + d_2(RP_x) + d_3(ER)"$$

$$M = e_0 + e_1(Y) + e_2(RP_m) + e_3(R) + e_4(ER)"$$

[Khan, et al (2008), Shabbir (2005) and DeSilva (1977)] explain about similar simultaneous model and shed light on variables that how do these affect each other and become endogenous.

Money supply takes place due to (Government spending, financing of deficit) increase in Reserves, government borrowing and Credit provided by banks. And the Output level is also determined by Government expenditures and Credit by banks. Whereas a great literature is available to prove that, Money demand is positively affected by Income. So we can say that every change in GBD, Reserves and BCP will affect Money supply directly and the Money demand indirectly. Other remaining the same, change in domestic price level (inflation) depends on change in money demand and money supply say, price level will move upward if change in Ms is greater than Md and vice versa.

Now we see that supply of Exports and demand for Imports can be affected by relative prices of exports and relative prices of imports respectively. Point to be kept in mind is that, balance of Trade and Output are also inter-dependent, whereas BT is nothing more than difference between Exports and Imports. It is also important to be noted that, Balance of Trade definitely affects the level of Reserves, and Reserves have impact on Ms. So we can say that variables are inter-dependent in the model.

Method and Estimations

For the analysis of time series data, first of all Stationarity of data is determined by Augmented Dicky-Fuller test (ADF). The Shwarz Information Criterion is used to select the optimum ADF lag. Stationarity of variables is checked with intercept and with trend also.

Series which are non-stationary at level are made stationary by taking difference and then used for estimation.

DeSilva (1977) developed a simultaneous equation model and estimated the key equations separately with OLS method. In Pakistan, Chaudhary and Ahmed (1995, 1996) also estimated this model with the same estimation method as De Silva. Then Aslam and Shabbir criticized on prior techniques because OLS method gives biased results for simultaneous equation model, endogeneity problem exists there therefore, the estimates of these studies are not reliable. They used 2SLS technique to estimate the simultaneous model by escaping from the impact of endogeneity.

However the 2SLS is much better than all others but it is suitable only for one or two endogenous variables. In current model we have a lot of variables being determined within the model and independent variables can relate to the error term. So to abstain from endogeneity we are estimating the model by using 3 Stage Least Squares. 3SLS can be used in a system of equations which contains on endogenous variables, i.e. in each equation there are endogenous variables on both the left and right sides of the equations. It does two new things. First it specifies all the equations in the model because it has to calculate the covariance between error terms.

Three Stage Least Square Regression Results

Model Summary:

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
ms	39	3	3.40e+09	0.9709	1398.66	0.0000
md	39	2	4.89e+09	0.9400	617.06	0.0000
y	39	4	3.81e+09	0.9813	2132.50	0.0000
x	39	3	9.02e+08	0.9776	1777.15	0.0000
m	39	4	3.34e+09	0.8285	214.98	0.0000

Endogenous variables: ms, md, y, x, m

Exogenous variables: gbd, bcp, r, I, ge, bt, rpx, er, rpm.

Money Supply equation

$$Ms = 2.4 + 1.39 (R)^{***} + 0.236 (GBD)^{**} + 0.85 (BCP)^{*} + e1$$

R-Squared= 0.972

Adjusted R-Squared= 0.969

Durbin-Watson= 1.97

Money Demand Equation

$$Md = -566 + 0.722 (Y)^{***} - 7.733 (i)^{**} + e2$$

R-Squared= 0.94

Adjusted R-Squared= 0.93

Durbin-Watson= 1.36

Output Supply Equation

$$Y = 1.57 + 2.82 (GE)^{*} + 1.16 (BCP)^{**} + 1.54 (BT)^{*} - 1.30(i)^{***} + e3$$

R-Squared= 0.984

Adjusted R-Squared= 0.981

Durbin-Watson= 1.6

Export Supply Equation

$$X = -4.51 + 0.235 (Y)^{***} + 26.732 (Rpx)^{**} + 0.85 (ER)^{***} + e4$$

R-Squared= 0.98

Adjusted R-Squared= 0.97

Durbin-Watson= 0.52

Import Demand Equation

$$M = -7.45 + 0.35(Y)^{***} + 86.98(RPm)^{**} + 0.39(R)^{***} - 7.35(ER)^{***} + e5$$

R-Squared= 0.84 Adjusted R-Squared= 0.824 Durbin-Watson= 1.7

Regression Interpretation

Basic results of simultaneous equation model are reported above which is estimated by using 3-Stage Least-Square Regression. In general the results are reliable and logical because the model goodness of fitness explanatory indicators: R-Square and Chi-Square values are fairly high for each equation. Furthermore it is hereby stated that there is no serious problem of autocorrelation for each equation, except the “export supply equation” as confirmed by Durbin-Watson test. On the basis of above empirics, we can discuss the results and linkages separately as following:

Money Supply Equation

The results of money supply equation signify that Money Supply (MS) is positively related to credit provided to private sector (BCP) and Government borrowings (GBD) i.e. domestic sources of financing the budget deficit. As well as the foreign reserves (R) also positively contribute to money supply. Other things remaining same, the results indicate that 10 units increase in Reserves will lead to increase the Ms by 13.9 units. Ten units increase in GBD will cause the MS to increase by 2.3 units. And 8.4 units of MS will increase due to 10 units increase in BCP and vice versa.

Money Demand Equation

The results of this equation indicate that nominal Money demand (Md) is positively affected by real income (Y), describes that people demand for money when their real income goes up. And negatively related to interest rate say the opportunity cost of holding money. According to estimated results, one unit in income will lead to increase the money demand by 0.7 units. And one unit increase in interest rate will lead to decrease the money demand by 7.73 units by keeping other things constant.

Output Supply Equation

The estimates show that real output is positively related to Credit provided to private sector because it enhances the level of investment and then employment in the country. Output is positively related to Government expenditures and Balance of Trade but negatively with interest rate. Empirical findings show that one unit increase in Government expenditures (GE) will lead to increase 2.82 units of output. 1.15 units increase in output, in response to increase one unit of (BCP). And 1.5 units due to 1 unit of BT. On the other hand, one unit increase in interest rate will push the output down by 1.3 units.

The results of output equation suggest that credit provided to private sector and Government expenditures play a significant role in economy to boost up the level of real output through level of investment and higher productive capacity. Private investment is of key importance in any economy as well as in Pakistan. So the interest rate must also be kept low for the enhancement of domestic investment level. Ceteris-paribus condition is assumed.

Export Supply Equation

Regression results enabled us to explore the linkages of Exports with level of real output, Relative prices of exports and Exchange rate. Estimations show that exports also change by 0.23 units when one unit of output changes. Exports are highly sensitive to relative prices of exports, as production and supply of exports becomes more profitable when relative prices of export commodities move upward and exporters will try to expand exports rapidly. The positive sign of Exchange rate describes the positive relation with exports of goods and services.

Import Demand Function

Our results indicate that there is positive relationship of imports level with real output and negative with nominal exchange rate. Say one unit increase in real output will increase capacity to import 0.34 units. Equation shows the negative impact of exchange rate on import in the sense that one unit increase in nominal exchange rate will decrease the level of imports by 7.35 units. Implying that depreciation of domestic currency might have harmful impact on imports. And one unit increase in foreign reserves will increase 0.39 units demand for imports.

Now we discuss about negative impact of relatively prices of imports and exchange rate on demand of imports. Commonly it's true that a rational consumer (importer) must avoid importing because relative prices of imports are arriving above and must try to bring in country, the cheaper commodities. However sometimes in case of Pakistan, relative prices of imports and level of imports move in the same direction. That's just because unfortunately we are forced to import many commodities like petroleum products, heavy machinery, pharmaceuticals, edible oils, iron ore and steel and many other things however their prices are. We see the prices of petroleum products are continuously growing day by day but still, we cannot cut down the imports of such products. It tells us the story about balance of trade in Pakistan. Balance of trade remains negative in Pakistan because our exports are sensitive to prices but not the imports. Exports may move up as well as down, but our imports always go-up. Pakistan is import oriented country, depreciation of domestic currency may have effects on exports but imports cannot fall significantly.

Conclusion

The study was engaged to investigate the impacts of budget deficit on macroeconomic variables such as output level, balance of trade and inflation. Major conclusion drawn from this empirical estimation practice is that the government budget deficit has significant impact on inflation and balance of trade. The ways through which budget deficit can be financed, are inflationary. We have analyzed that the domestic borrowings of government helps the money supply to increase same like the credit provided to private sector gives boost to money supply. Reserves can also be used to finance for the deficit, so gathering the foreign reserves is accomplished with overall extra money supply. More alarming situation is that the government enforces central bank to print new currency for the sake of deficit fulfillment. This definitely tends to create upward pressure on inflation.

On the other hand, changes in money supply have indirectly affected the balance of trade and level of foreign reserves as well. Fluctuations in relative prices of imports and exports may exist due to fluctuations in money supply (inflation) and this may have impact on level of exports and imports. So we can say that due to budget deficit, balance of trade is also affected indirectly through relative prices and money depreciation/appreciation.

However the government spending are fruitful for economic growth but it costs much more than its benefits, when budget goes to deficit due to extra spending. For the moment we see an increase in growth due to government spending but after that many macroeconomic variables are disturbed by this activity. Above discussion and our estimated results also indicate that cost of low investment, higher interest rate, higher debt, unfavorable balance of trade and heavy depreciation of currency is bigger than the benefit of one time bigger growth.

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