2016 APPLIED SOCIAL SCIENCE ASSOCIATION (ASSA) CONFERENCE

DOES FINANCIAL REPRESSION HELP REDUCT THE BUDGET DEFICIT? EVIDENCE FROM EGYPT

Sara El-Ezaby
American University in Cairo - Department of Economics
Commercial International Bank

Abstract: Among the main pillars of Egypt's latest five-year macro-economic strategy, is the careful management of its public debt and reduction of the burden associated with it, to control its budget deficit. The Egyptian government has relied heavily on the local banking sector to finance its growing budget deficit, accumulating a substantial stock of domestic public debt over many years. Egypt's debt currently stands at EGP 2.5 trillion, 85% of which is domestic debt which represents 88% of GDP to record one of the world's highest debt-to-GDP ratios. This puts the reduction of the cost of domestic debt on top of the government's list of priorities.

Egyptian risk-free sovereign yields are exceptionally higher than lending rates, creating disincentives for riskier private lending. One famous path the government usually opts to, in order to reduce its debt burden, is an expansionary monetary policy that cuts down lending rates, to encourage private investment and limit the crowding out effect of government borrowing from banks. This is expected to lower yields on sovereign securities, relieving some of the burden of public debt and signaling a healthy economic environment that is conducive to investment. The question for the case of Egypt remains, however; is a falling interest rate environment expected to lower the budget deficit? Would financial repression be successful in liquidating debt or will it only be a tax on bondholders, mainly banks, through lower interest rates? Are sovereign yield cuts expected to lead to the desired outcome of public debt burden relief and ultimately to a shrinkage in Egypt's budget deficit?

Visual inspection shows that, historically, lower interest rates and sovereign yields have not been accompanied with a lower budget deficit for Egypt. In this paper, a VAR model is built to estimate the impact of sovereign yield movements on Egypt's budget deficit, using quarterly data over the period from Q4 2004 to Q3 2015. Based on the model results, the decision to adopt an expansionary monetary policy will be evaluated in terms of its effectiveness to boost Egypt's economy. There is weak evidence that lowering the rates on government securities would kind of free some of Egypt's debt burden or narrow its budget deficit.

JEL Classification: E4, E5, H3, H5, H6
Keywords: Budget deficit, Interest rates, Sovereign yields, Vector Autoregressive Models

I. Introduction and Motivation

The budget deficit and government debt are two interrelated terms that are often confused together. Simply put, the main difference between deficit and debt is that debt can be regarded as a stock variable while the deficit is the flow variable that accumulates over years to the already existing stock of government debt. The budget or fiscal deficit could be regarded as the government's demand for loanable funds, which if increases would exert an upward pressure on interest rates. The ultimate outcome would be influenced by many factors, including monetary policy variables. (Somers, 1992)

Debt reduction is a topic that has received substantial attention worldwide and especially in developing countries. Debt-reduction channels have historically included economic growth, fiscal adjustments and a steady dosage of financial repression together with other channels. The hope that substantial debt be reduced by growth does not seem to be practical, as empirical evidence shows that high levels of public debt appear to be associated with lower growth rates rather than otherwise (Reinhart and Rogoff, 2010). Most empirical studies have focused on the role of fiscal adjustments, namely taxes and government expenditure, while seemingly forgetting about the financial repression system that prevailed worldwide from 1945 to the early 1980s and its role in reducing large stocks of debt that accumulated during World War II in many advanced countries including the United States. Reinhart and Sbrancia (2015) suggest that financial repression may be part of the toolkit deployed to reduce the amount of outstanding debt. The term "financial repression" used to describe the emerging market financial systems prior to the widespread financial liberalization that started in the 1980s. One main feature of financial repression is the explicit or implicit cap or ceiling on interest rates, particularly those on government debt.

One famous path the government usually opts to, in order to reduce its debt burden, is an expansionary monetary policy that cuts down lending rates, to encourage private investment and limit the crowding out effect of government borrowing from banks. This is expected to lower yields on sovereign securities, relieving some of the burden of public debt and signaling a healthy economic environment that is conducive to investment. The theoretical and empirical evidence on the relationship between budget deficits, public debt and interest rates is, however, inconclusive. In addition, most of the literature has focused on the relationship going from public debt to budget deficit to interest rates rather than in the reverse direction. The impact of budget deficits on interest rates is expected to be minimal in developing countries as the financial sector, especially the banking system, has continuously been subject to extensive government intervention.

The case of Egypt is one clear example of that, whereby interest rates are set by the Central Bank, and thus one would expect to find only a weak impact of the budget deficit on interest rates (Shetta and Kamaly, 2014). One, however, may be tempted to investigate the reverse relationship as to the effectiveness of movements in interest rates and sovereign yields, which usually follow interest rates, on the budget deficit. The Egyptian government has relied heavily on the local banking sector to finance its growing budget deficit, thereby accumulating a substantial stock of domestic public debt over many years. Egypt's budget deficit for fiscal year 2014-2015 stood at EGP 279 billion, representing 11.5% of GDP. Interest payments on government debt represent around 70% of the fiscal deficit. Government

debt, both external and domestic, stood at EGP 2.5 trillion for the same fiscal year. Domestic debt, mainly treasury bills and bonds, represents 85% of total government debt and 88% of GDP, among the world's highest debt-to-GDP ratios. This puts the reduction of the cost of domestic debt on top of the government's list of priorities.

In the aftermath of the 25th of January revolution, monetary policy officials faced a number of challenges between weak growth, rising inflation, depreciating domestic currency and a shrinkage in international reserves. Government debt papers came under pressure due to the massive sell-off by foreign investors in the domestic debt market, increasing these papers' supply, thereby placing an upward pressure on yields. Despite the cautious stance that foreign investors had towards Egypt's debt market, the government, faced by an increasing fiscal deficit, increased its issuance of debt papers at unprecedented yield levels, motivating domestic banks to increase their holdings of government securities (Emam, 2012). The Egyptian banking system's holdings of government securities currently constitute 43% of its total balance sheet. Egyptian risk-free sovereign yields are exceptionally higher than lending rates, creating disincentives for riskier private lending. The average yield on treasury bills reached 11.45% in 2015 year-end compared to 10.3% by end of 2010 prior to the revolution and to 7% in 2007 and 2008, increasing the level of public spending and widening the fiscal deficit even further.

The question for the case of Egypt remains, however; is a falling interest rate environment expected to lower the budget deficit? Would financial repression be successful in liquidating debt or will it only be a tax on bondholders as rates fall? Are sovereign yield cuts expected to lead to the desired outcome of public debt burden relief and ultimately to a shrinkage in Egypt's budget deficit? Visual inspection shows that, historically, lower interest rates and thus lower sovereign yields have not been accompanied by a lower budget deficit for Egypt. Most of the studies that reviewed this topic were cross-country based analyses that produced mixed results, making it difficult to have some kind of a general consensus as to the exact relationship between fiscal and monetary variables. This study provides a one-country time series analysis on the case of Egypt to investigate the relationship between the budget deficit and interest rates and to evaluate the decision of adopting cutting down rates in the mean time.

The rest of the paper is organized as follows: Section two briefly reviews the relevant literature. Section three presents the sample and the methodology. Section four comments on the obtained results and finally section five concludes and gives a few policy implications.

II. Literature Review

Although there is a significant existing literature about the relationship between fiscal deficits, public debt and interest rates, the diversity of findings renders the relationship between these variables somewhat controversial and inconclusive. The direction of the relationship is another puzzling story. There are widespread existing theoretical foundations on this relation going from the budget deficit to interest rates, while only limited theoretical stories suggest a reverse direction of the relationship. With regards to the impact of budget deficit on interest rates, two opposite viewpoints exist in the literature; The *Ricardian Equivalence Hypothesis* (REH) and The *Conventional Keynesian Proposition* (CKP). According to the Ricardian Equivalence introduced by Barro in 1989, budget deficit does not matter,

because an increase in the budget deficit is equivalent to a future increase in taxes to compensate the principal and interest payments of the government debt, implying that budget deficits do not influence macroeconomic variables and suggesting "a deficit neutrality" hypothesis. Conversely, the Keynesian theory states that changes in budget deficit do influence interest rates and other macroeconomic variables. This conventional model implies that government borrowing to cover budget deficits does compete with private sector borrowing over private sector savings. This usually bids interest rates up, thus crowding out private sector investment and reducing economic growth (Kormendi and Protopapadakis, 2005; Gale and Orszag, 2004; Odionye and Ebi, 2013).

It is generally believed, however, that fiscal and monetary policy variables, in general, usually exhibit some bi-directional causal relationship. On an empirical basis, results from studies on the connection between the fiscal deficit and monetary policy variables were mixed. Most empirical studies presented results that did not support the Ricardian Equivalence Hypothesis suggesting a positive relationship between budget deficits and interest rates that mainly exists due to the fear that government debt may crowd out private investment bidding interest rates upward (Shetta and Kamaly, 2014). Gale and Orszag (2004) found evidence that sustained budget deficits reduce national saving and thus raise interest rates by economically and statistically significant quantities in the United States, suggesting that the Ricardian view is not a reasonable approximation to reality.

Lozano (2008) studied the relationship between inflation, money growth and fiscal deficit for the Colombian case. Using a Vector Error Correction (VEC) model with quarterly data of over 25 years, the study found a close relationship between inflation and money growth on one hand, and between money growth and fiscal deficit on the other.

Baldacci and Kumar (2010) examined the impact of fiscal deficit and public debt on interest rates for a panel of 31 advanced and emerging market economies over the period from 1980 to 2008. Results suggest that higher deficits and public debt lead to a significant increase in long-term interest rates, putting substantial upward pressure on sovereign bond yields.

Laubach (2011) used a Structural Vector Autoregression (SVAR) to measure the effects of fiscal policies on interest rates and other variables in the United States prior to the onset of the financial crisis. Results from the estimated model had a Keynesian flavor. Fiscal tightening, defined as either increasing the surplus or decreasing the deficit, was found to reduce interest rates because as real activity and inflation decline, the Fed reduces short-term interest rates in response, to encourage investment and consumption.

Odionye and Ebi (2013) empirically examined the relationship between the budget deficit and interest rates in Nigeria using a Vector Error Correction (VEC) model for the period from Q1 1970 to Q4 2010. An impulse response function was also employed to determine the effect of shocks in the model caused by changes in the budget deficit. Two relevant variables have been included in the model to further support causality inferences; inflation rate and money supply. Budget deficit reported a positive and significant impact on interest rate, supporting the Keynesian proposition.

Only a few studies supported the existence of the Ricardian equivalence in reality. Kormendi and Protopapadakis (2005) examined the impact of budget deficits on US real interest rates and found no substantial evidence of the so-called "crowding-out" effect of budget deficits that is supported by the conventional hypothesis. Bayat et. al (2012) studied the causal relationship between budget deficit, and its ratio to gross domestic product, and interest rates in the Turkish economy during years between 2006 and 2011, employing the linear Granger type causality test. Results show that there is no causal relation between budget deficits, or the budget deficit ratio to gross domestic product, and nominal interest rates, supporting the existence of the Ricardian equivalence hypothesis. Chakraborty (2012) examines whether there is any evidence of the fiscal deficit determining interest rates in India over the period from 2006 to 2011 using an asymmetric vector autoregressive model. Results suggest that an increase in the fiscal deficit does not cause a rise in interest rates. However, a reverse causality is detected from real interest rates to the fiscal deficit, as high interest rates trigger the accumulation of more debt and a widening deficit due to the increase in interest payments and the resulting debt-deficit spiral.

The empirical literature investigating the relationship between the budget deficit and monetary policy variables in Egypt is very limited and that investigating the reverse relationship of the impact of interest rate and sovereign yield movements on the budget deficit is even non-existent. Despite limited empirical evidence, some studies provided evidence that trigger the question of whether interest rates do actually have any impact on the budget deficit. Fayed (2012) presents a co-integration approach to investigate the relationship between government borrowing and private credit. There is evidence that government borrowing from domestic banks does crowd-out private investment, reflecting the domestic banks' preference to invest in a low-risk high-return investment. Shetta and Kamaly (2014) estimated a Vector Autoregressive Model using quarterly data from Egypt from the first quarter of 1970 to the second quarter of 2009. Results suggest a significant crowding-out effect of government borrowing from domestic banks on private credit.

III. The Model and Data Description

This section presents the sample and describes the methodology used to examine empirically whether or not a fall in the yields on sovereign securities does constitute a relief to the budget deficit. The country under study is Egypt and the sample is a time series of 43 quarterly observations that start from Q4 2004 up until Q3 2015.

Visual Inspection

Before moving on to the methodology used, it is important to observe the behavior of sovereign yields and budget deficit during the period of study. Graph 1 shows a quarterly trend of the average yield on treasury bills[1] and of the budget deficit as a percentage of GDP. Looking closely at both trends, one would observe that a drop in the rates on treasury bills is not usually followed by a decrease in the budget deficit percentage of GDP, or at best the impact is only in the short-run, lasting for one or two quarters as a maximum. This observation is in fact the main motivation behind this research. If lowering

[1] Calculated as the average yield of treasury bills across different maturities at the end of each quarter

the rate on treasury bills does not really lower the budget deficit, then it would only be a tax for bondholders, which in the case of Egypt are mainly banks, that may not actually find it tempting in that case to go for riskier investments as their profit margins then become lower. Shetta and Kamaly (2014) found that the willingness of domestic banks to increase their government debt holdings increases as private credit increases, reflecting the desire of banks to balance their portfolio by holding relatively less risky government debt after extending more private credit. This may be an explanation why lowering rates on sovereign securities may be a hindrance rather than conducive to growth in private sector credit and in total output.

The methodology used in this paper is analogous to that used in the studies presented by Lozano (2008), Odiyone and Ebi (2013), and Laubach (2011) in which they employed the Vector Autoregressive (VAR) and Vector Error Correction (VEC) models to estimate the relationship between interest rates, inflation rates and the budget deficit. In this paper, however, focus is on yields on sovereign securities rather than lending interest rates, in order to draw a more direct relation with the budget deficit bearing in mind that sovereign yields and interest rates usually move together and in the same direction. VAR and VEC models are commonly used as non-structural approaches to modeling the relationship between interrelated time-series of several variables. Both approaches treat every endogenous variable in the system as a function of the lagged values of all other endogenous variables. In this sense, VAR and VEC models are consistent with economic theory and at the same time applicable for economic policy analysis.

The mathematical representation of a VAR is:

$$Y_t = A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + \varepsilon_t$$

Y_t is the vector of endogenous variables which includes the budget deficit as a percentage of GDP, the average yields on treasury bills, gross domestic debt as a percentage of GDP and the inflation rate. $A_1, \ldots. A_p$ are matrices of coefficients to be estimated and ε_t is a vector of innovations that may be contemporaneously correlated but uncorrelated with their own lagged values and all of the right hand-side variables. With this structure of equations, OLS is efficient and yields consistent estimates. Each of the variables chosen has a direct or indirect effect on the other variables in the model. Prior to running the VAR and VEC models, the lag length has to be specified. One way of doing that is selecting the regression with the lowest value of the Akaike Information Criterion (AIC) or the Shwartz Criterion (SC). After performing the regression with different numbers of lags, the best model specification is the one with two lags, as shown in table (1) in the appendix.

The main equation of interest is the equation for the budget deficit as a percentage of GDP, which is definitely influenced by a number of macroeconomic variables. The model attempts to capture the major factors behind changes in the budget deficit besides the yields on sovereign securities. Domestic debt is the major component of government debt and thus is expected to strongly influence the budget deficit through the debt service burden of principal and interest payments. Inflation is another factor that is believed in theory to have an impact on the budget deficit. It has been argued that, in developing countries, inflation materializes when governments face large and persistent deficits that are financed

through the creation of money. In other words, inflation appears to emerge as a "fiscal-driven monetary phenomenon". And as inflation increases, real tax revenues would drop, thus increasing the budget deficit which now ends up being endogenous to inflation. In this sense, changes in inflation could influence the fiscal authority's decisions with regards to the budget deficit which in turn would have implications on inflation and money growth. The relationship between inflation, money growth and fiscal deficit can be explained by one of four alternative hypotheses; *Monetarist Hypothesis (MH), Sargant and Wallas Hypothesis (SWH), Fiscal Theory of Price Level (FTPL)* and the *New Keynesian Hypothesis*, all of which suggest a causality that goes from budget deficit to inflation.

An extension to the unrestricted VAR model that would be helpful for the question this research is interested to investigate, is the impulse response function. This refers to the impact of a known "shock" on the system, which would better assist in the interpretation of dynamic policy analysis. A shock to one variable not only directly affects that variable over time but is also transmitted to all of the other endogenous variables through the lag structure of the VAR. An impulse response function traces the likely response of current and future values of the endogenous variables over time (i.e. at times (t, t+1, t+2 …)) to a unitary exogenous shock in one variable at time t.

Adjusting the VAR model to account for the non-stationarity of variables, a VEC model is estimated. The VEC model is a restricted VAR designed for use with non-stationary series that are known to be cointegrated. Accounting for this cointegration relationship as an error correction term establishes the causal long-term or equilibrium relationship among a set of variables, while allowing for the evaluation of short-term adjustment dynamics when an unexpected shock results in any variable of the system deviating temporarily from equilibrium (Lozano, 2008). Prior to implementing VEC, a unit root test has been performed for all variables, all of which turned out to be non-stationary or integrated of the first order, as shown in table (2). The Johansen cointegration test indicated the existence of two co-integrating relationships at the 5% significance level, as shown in table (4).

IV. Comments on the obtained results

Results of the unrestricted VAR model are shown in table (3) in the appendix. With regards to the equation for the budget deficit, variables in the equation explain 43% of the variance in the budget deficit as a percentage of GDP. The average yield on treasury bills lagged two periods appears to have a significant and direct effect on the budget deficit at the 5% significance level, while yields lagged one period are not significant. This suggests that the increase/decrease in the yields on treasury bills does lead to an increase/decrease in the budget deficit as a percentage of GDP. Gross domestic debt as a percentage of GDP is also significant at the 1% significance level which is an intuitive result given the high percentage of domestic debt to total debt and thus the domestic debt service burden is expected to significantly influence changes in the budget deficit. In the equation for domestic debt, yields on treasury bills lagged twice appear to have a significant and direct effect on domestic debt as a percentage of GDP.

The responses of different endogenous variables to the "shock" variable of interest, the average yield on treasury bills, are shown in graph (2) in the appendix. It is obvious that as the average yield on sovereign

bills increases at one point in time, the domestic debt as a percentage of GDP continues to increase over time. The response of inflation is the exact opposite which is expected given the monetary policy dynamics. The increase in the rate of sovereign yields usually follows a rise in the interest rate on loans and deposits, thereby discouraging investment and consumption and pulling inflation downward. As for the budget deficit, the response to a shock in the treasury bill yields appears to be ambiguous.

Results from the VEC model were somewhat different from the unrestricted VAR model results. For the budget deficit equation, it is the most significant equation of all and the lagged endogenous variable for one period was found to be significant attesting that the dynamic specification for this variable is the right one. Other than that, the only variables that were found to be significant are the first lags of the average yield on treasury bills and the percentage of domestic debt to GDP. The most striking observation in this equation is that the movement in both variables seems to impact the budget deficit in an inverse manner. For the treasury bill yield equation, the only significant variable at the 10% significance level is the inflation rate lagged one period, which is intuitive as it is usually the case that as inflation goes up, the central bank may take some corrective action by raising lending rates and sovereign yields, lowering investment and consumption and pulling down inflation rates. For the inflation rate equation, only the budget deficit percentage of GDP, lagged one and two periods, has a significant and inverse impact on the inflation rate. This may be explained by the expectation that as the budget deficit goes up, the government may actually increase interest rates and government lending rates to raise more debt to finance the deficit in what is known as the "debt-deficit spiral", which may be expected to lower inflation. In the equation for domestic debt, the budget deficit lagged one period was found to be significantly and directly affecting domestic debt. This may be explained by the same argument that as the budget deficit increases, the government would sometimes choose to raise more domestic debt in order to finance the deficit which in turn leads to a higher domestic debt as a proportion of GDP. As for treasury bill yields, they appear to impact domestic debt significantly and inversely, with a one-period lag, which is consistent with the finding from the budget deficit equation.

V. Conclusion and Policy Recommendations

The topic of debt burden relief and narrowing down the budget deficit has received substantial attention worldwide, particularly in developing and emerging economies. One policy that governments usually implement to face their surging debt and widening fiscal deficit is lowering the rates on government securities. Following the 25th of January revolution, Egypt has relied heavily on the local banking sector to finance its growing budget deficit, accumulating a substantial stock of domestic public debt over many years. Although literature on the impact of interest rate and sovereign yield movements on the budget deficit is limited and even non-existent for the case of Egypt, some studies drew conclusions that trigger the investigation of this relationship for the Egyptian economy. Using quarterly data from Q4 2004 to Q3 2015, this paper estimates Vector Autoregressive and Vector Error Correction models to test the significance of movements in sovereign yields on the budget deficit. Results obtained from the VAR model are somewhat different from those obtained from the VEC model. However, the VEC model is expected to give more reliable results given the non-stationary nature of the variables. The equation for the budget deficit as a percentage of GDP was the most significant of all. The most striking observation in this equation is that the movement in the average yield on treasury bills seems to impact the budget deficit significantly but surprisingly enough in an inverse manner. This may be attributed to a number of reasons. First, banks rely heavily on sovereign investments and tend to balance any amount of private credit that they give out by a proportional amount of risk-free investment in government securities. In addition, banks may not be very encouraged to replace their risk-free investments with riskier private investments in fear of a reduction in their profits, given the fact that rates on sovereign securities currently stand at very close levels to interest rates on private sector riskier lending. This means that as the government cuts rates on sovereign securities, it may not achieve the awaited increase in private investment due to the cut, thus collecting lower-than-expected tax revenues which would at best leave the budget deficit unchanged. Second, lowering interest rates on private lending and on government securities has an inflationary effect based on economic theory. Thus, real tax revenues would actually be lower exerting an upward pressure on the budget deficit. These results suggest that, in order to achieve a shrinkage in the budget deficit, lowering sovereign yields does not seem to be the correct policy decision but rather creating an environment that is conducive to investment, but not through the channel of interest rates.

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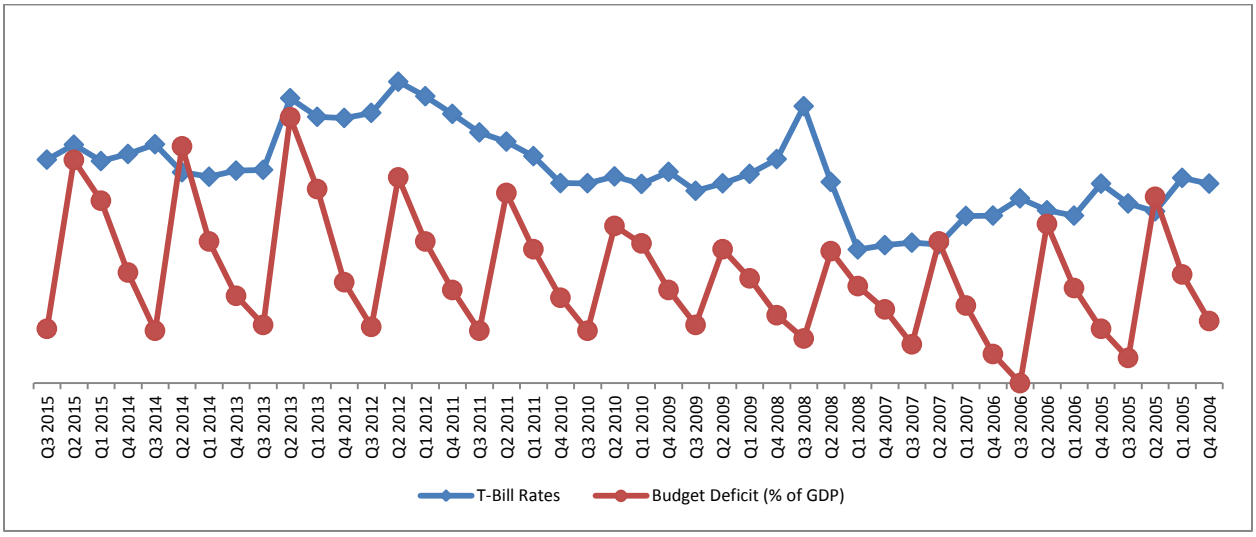
APPENDIX

Graph 1: Evolution of budget deficit as % of GDP and average yield on treasury bills



Graph 2: Response of different variables to a shock in the average yield on treasury bills

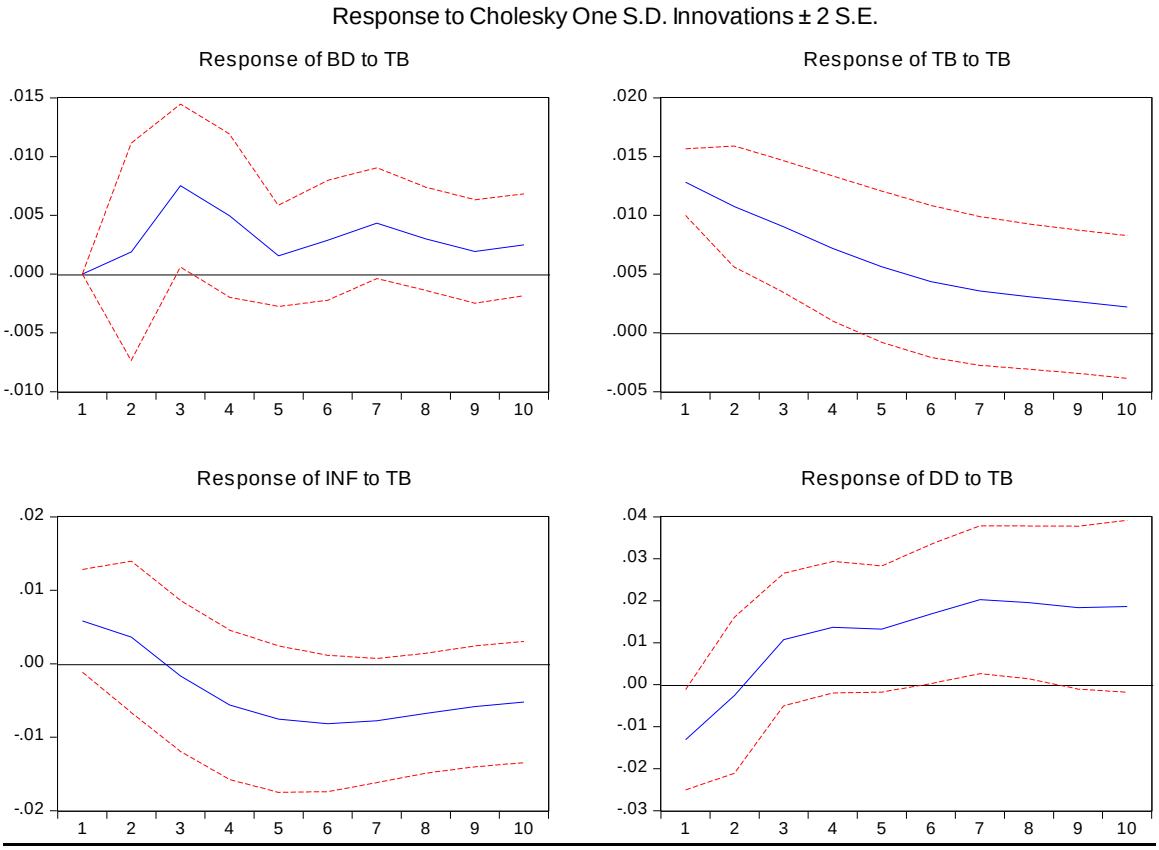


Table 1: VAR Lag Order Selection Criteria

Lag	Akaike Information Criterion
0	-15.5
1	-18.05
2	-18.23*
3	-18.13

**Indicates lag order selected by criterion*

Table 2: Unit Root Stationarity Test*

Variable	Level		First Difference	
	P-value	**Decision**	**P-value**	**Decision**
BD	0.8743	Do not reject H0: Non-Stationary	0.0019	Reject H0: Stationary
DD	0.6522	Do not reject H0: Non-Stationary	0.0045	Reject H0: Stationary
INF	0.1306	Do not reject H0: Non-Stationary	0.0148	Reject H0: Stationary
TB	0.2924	Do not reject H0: Non-Stationary	0.0000	Reject H0: Stationary

** Decisions are made at the 5% significance level*

Table 3: Vector Autoregression Estimation Results

Variable	Equation 1 (BD)	Equation 2 (TB)	Equation 3 (INF)	Equation 4 (DD)
C	-0.0534 (0.06133)	0.0292 (0.02971)	0.1017 (0.05120)**	0.0153 (0.12468)
BD (-1)	0.1153 (0.22816)	0.0807 (0.11053)	0.0750 (0.19048)	0.1709 (0.46387)
BD (-2)	-0.8088 (0.18722)***	0.0097 (0.09069)	0.0806 (0.15630)	-1.5558 (0.38063)***
TB (-1)	-0.0728 (0.40702)	0.7355 (0.19717)***	-0.1774 (0.33981)	-0.2514 (0.82751)
TB (-2)	0.8631 (0.43764)**	0.0994 (0.21201)	-0.1754 (0.36537)	1.9392 (0.88976)***
INF (-1)	0.2221 (0.20191)	0.1856 (0.09781)*	1.0085 (0.16856)***	0.2795 (0.41049)
INF (-2)	-0.2256 (0.20191)	-0.1883 (0.09781)*	-0.3480 (0.16857)***	-0.4232 (0.41050)
DD (-1)	-0.1168 (0.10973)	-0.0169 (0.05315)	-0.0023 (0.09161)	0.0715 (0.22308)
DD (-2)	0.2112 (0.08653)***	-0.0064 (0.04192)	-0.0526 (0.07224)	0.7732 (0.17593)***
R-Squared	0.4281	0.7121	0.7225	0.6481
Adjusted R-Squared	0.2852	0.6401	0.6531	0.5601
F-Statistic	2.9947	9.8938	10.4150	7.3670

** Significant at 10% level ** Significant at 5% level *** Significant at 1% level*

Table 4: Unrestricted Trace Cointegration Test Results

Hypothesized number of cointegrations	Trace Statistic	P-Value
None*	79.4093	0.000
Almost 1*	30.6924	0.0393
Almost 2	13.3389	0.1030
Almost 3	3.1913	0.0740

**Denotes rejection of the hypothesis at the 5% significance level.*

Trace Test indicates 2 cointegrating equations at the 5% significance level

Table 5: Vector Error Correction Model Results

Variable	Equation 1 (D(BD))	Equation 2 (D(TB))	Equation 3 (D(INF))	Equation 4 (D(DD))
C	0.0004 (0.0045)	0.0006 (0.0022)	0.0018 (0.0037)	0.0014 (0.0091)
D(BD (-1))	1.2045 (0.3226)***	0.0097 (0.1546)	-0.6043 (0.2686)***	1.3890 (0.6527)***
D(BD (-2))	0.3680 (0.2486)	-0.0998 (0.1191)	-0.5376 (0.2070)***	0.2521 (0.5030)
D(TB (-1))	-0.9856 (0.5109)*	0.0463 (0.2448)	0.5044 (0.4254)	-2.1974 (1.0337)***
D(TB (-2))	-0.3614 (0.4905)	0.1034 (0.2350)	0.3730 (0.4084)	-0.6371 (0.9924)
D(INF (-1))	0.1661 (0.2066)	0.1596 (0.0990)	0.1839 (0.1720)	0.4121 (0.4180)
D(INF (-2))	-0.2450 (0.2079)	-0.0949 (0.0996)	-0.0415 (0.1731)	-0.0223 (0.4206)
D(DD (-1))	-0.3535 (0.1267)***	0.0209 (0.0607)	0.1110 (0.1055)	-0.6986 (0.2563)***
D(DD (-2))	-0.1035 (0.1171)	0.0802 (0.0561)	0.1426 (0.0975)	-0.1068 (0.2369)
R-Squared	0.6909	0.2420	0.3971	0.5120
Adjusted R-Squared	0.5843	-0.0193	0.1891	0.3437
F-Statistic	6.4823	0.9261	1.9097	3.0424