



In or Out: Is Government Borrowing Crowding Out Private Sector Credit in the Bahamas?

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Abstract

The aim of this paper is to determine whether increased Government borrowing from commercial banks negatively impacts credit to the private sector, using the Johansen Co-integration test and the Vector Error Correction Model (VECM), which suggests the short and long-run dynamics of government credit relative to private sector credit. The model utilized annual data from the Central Bank of the Bahamas spanning the period 1985-2017 and the results of the model show evidence of crowding out in the short-run, however in the long-run the impact is muted.

Keywords: Crowding Out, Government, Credit, Cointegration, VECM

JEL Classification: E62 & H62

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I. Introduction

Keynesian theory suggests that governments employ countercyclical fiscal policy to return their economies to equilibrium; as such, they may borrow and spend more during a recession, or raise taxes and spend less during a boom. In the case of the former, increases in government borrowing from the domestic market has the potential to cause a reduction in private sector credit. This was true for many countries in the aftermath of the 2007/08 global financial crisis, as their governments increased spending, and by extension borrowing, not only to facilitate social payments such as unemployment and welfare, but also as a way of creating jobs. In the Bahamas, the government undertook a number of infrastructure projects during the economic downturn that followed after the crisis, in a bid to create and stimulate growth. This also occasioned an increase in Government borrowing in order to meet the mismatch between the increase in spending and the falloff in revenue.

In the Bahamas, Government borrowing has mostly been from the domestic sector, and in Bahamian dollar (B\$) currency, with the ratio of internal B\$ debt to the total averaging 90% in the 10 years prior to the recession (1998-2008), and 70% in the years that follow, (ending in 2017). On average, growth in Government's \$B borrowing from domestic banks had waned slightly from 10.8% in 2007 (pre-recession), to 8.4% in 2017. Over the same span of time, private sector credit has trended downward—from a 10.1% expansion in 2007 to a decline of 3.0% 2017. Although it is widely accepted that this trend is due to economic factors, specifically the economic downturn and its negative impact on employment, it is also understood that private investment is a precursor for economic growth. Moreover, given that the decline in private sector lending has been congruent with an expansion in fiscal borrowing, it is worthwhile to determine the factors that most strongly influence private sector credit, and explore the relationship between government's claims on domestic banks, and the supply of credit to the private sector.

To this end, this paper seeks to answer the question of whether or not government borrowing is crowding out private sector lending. Specifically, the paper begins with a review of the literature on the subject matter, followed by an overview of trends in both

private and public sector borrowing. In the fourth section of the paper the data and methodology for the study are introduced, while part five discusses the empirical findings and precedes the conclusion and policy implications.

II. Literature review

In instances where the majority of governments' financing is from domestic sources, there is greater potential for pressure to be placed on lending rates, which can possibly 'crowd out' private investment. The extent to which this 'crowding out' occurs has been empirically tested in a number of studies over a range of jurisdictions. This literature review will outline the methodology and findings of a few studies, on which we based our study.

Given the excessive public borrowing from domestic sources in Egypt at the time, Fayed (2012) used a co-integration approach to investigate the relationship between public borrowing and private sector credit. The author uses a co-integration test to investigate the relationship among the variables, which were private sector credit, government borrowing, industrial production (which was used as a proxy for Gross Domestic Product (GDP) due to data unavailability), the level of financial intermediation, institutional quality, and the lending interest rate. The study uses data spanning the second quarter of 1998 to the third quarter of 2010, with first a unit root test to verify the stationarity of the variables, followed by a Johansen Co-integration test to see if there is a long-run relationship between the variables. The results of the unit root test showed that all of the variables were non-stationary at levels and stationary at order 1. Once the long-run relationship was verified, an error correction model (ECM) was ran to test the short-term dynamics of the model. Finally, a number of robustness checks were done to verify the results of the model. The findings reveal that government borrowing from domestic banks results in a more than a one to one crowding out of private credit in Egypt, implying then that government borrowing from banks is not the sole reason for crowding out private sector credit but that banks' preference to invest excess liquidity in a low risk/high return investment by holding securities and treasury bills also add to this crowding out.

en and Kaya (2013) used a modified version of David A. Aschauer's (1989) model to test the effects of government spending on private investment in Turkey, and whether or not there was a crowding out effect. Unlike the previous study, en and Kaya (2013) looked specifically at the components of government spending to determine their impact on private investment, whereas other studies looked at total government spending. Using data from 1975–2011, the authors employed a Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests—similar to Fayed (2012)—to test the stationarity properties of the variables at level and at first difference, followed by the co-integration test. Their variables included private investment (dependent variable), government current spending, government transfer spending (excluding interest), government capital spending, government interest spending, GDP, and an error term. The results revealed that government current transfer spending, government current spending, and government interest spending crowded out private investment, while government capital spending crowds in private investment in Turkey.

Similarly, Majumder (2007) investigated the crowding out effect of government borrowing on private investment in Bangladesh, using an investment function with government borrowing, GDP and the interest rate as the three independent variables. To get the estimates, the author analyzed the unit root test, a co-integration test and the error correction model. The results showed that instead of there being a crowding out effect in Bangladesh, there was in fact a crowding in effect associated with the impact of government borrowing on private investment. This means that as government borrowing/spending increases, private investment increases as well, in that the two share a positive relationship, rather than the negative relationship described in the crowding out effect. Majumder (2007) concludes that the presence of the crowding in effect is due to excess liquidity in the banking system, imperceptible government competition with the private sector, a relatively sustainable government debt scenario, a government expenditure for transfer payment program, significant development expenditure for producing those goods and services which have the potential to discharge positive externalities, the presence of government microcredit programs, and ADP-black money linkages.

In a different attempt to examine the relationship between government spending and private sector credit and the presence of a corresponding crowding out effect, Emran and Farazi (2009)

used a linear regression, as opposed to a unit roots test and a co-integration test, like the previous studies. Looking specifically at 60 developing countries, the authors ran estimates for the causal effect of government borrowing on private credit from 1975 to 2006, with private sector credit (dependent variable) and government borrowing from the banking system as their focus variables—both as a percentage of GDP. GDP, GDP per capita growth, and inflation were used as control variables, while financial intermediation, institutional quality and the lending interest rate were used for the remainder of the explanatory variables. The results showed that when the government borrows \$1 from the domestic banking sector, private sector credit decreases by approximately \$1.40. This then implies that to some extent, government borrowing crowds out private sector credit. However, it is important to note here that other factors may have played a role in this outcome.

Though all of the studies thus far have employed econometric analyses to determine the presence of crowding out due to government borrowing, Amiokor et al (2014) did not use a statistical test, but instead analyzed credit trends of the Ghanaian government and private sector separately over the period 2004-2013, and then against each other, to make inferences on whether or not one had an impact on the other. Their findings showed that there was a negative relationship between government borrowing and private sector credit, in that during the years that government borrowing declined, credit to the private sector increased. Further, they conducted an analysis of interest rates against credit trends of the private and public sector. This analysis revealed that in the years that government borrowing increased, interest rates increased as well, and in the years when government borrowing decreased, the interest rates declined, thus insinuating that interest rates and government borrowing share a positive relationship. Given these results, the authors conclude that public sector borrowing is indeed crowding out private sector credit in Ghana, and the government finances budget deficits mostly through internal borrowing, which tends to beat out private sector borrowers as they compete for available domestic funds. It should be noted that there may have been other factors affecting the trends in these indicators during the period studied. For example, perhaps the demand for private sector credit may have been low in the years government borrowing was high for other reasons outside of the interest rate; factors such as borrowers' credit profile and debt-service ratio could have

played a role, as well as the unemployment level. If individuals are not employed, they will not be able to qualify for a loan, and thus the amount of credit extended will be lower.

It is quite evident then, from the body of studies looked at in this review that government borrowing does indeed lead to the crowding out of private sector credit in most cases, although the opposite was observed in one particular case. In addition, it appears that the method used to examine the relationship between public spending and private investment can vary, though most studies employed unit root tests, followed by co-integration tests. Nevertheless, trend analyses and regressions can also render plausible results. In terms of the breakdown of variables used in these tests, it is apparent that different factors—including the source of government borrowing—can determine the extent to which crowding out can occur due to government spending. In fact, in some studies it was proven that some factors can lead to either crowding in or crowding out in any one economy. In all cases, it is pertinent to consider the factors that may impact the results of the tests, outside of the variables tested.

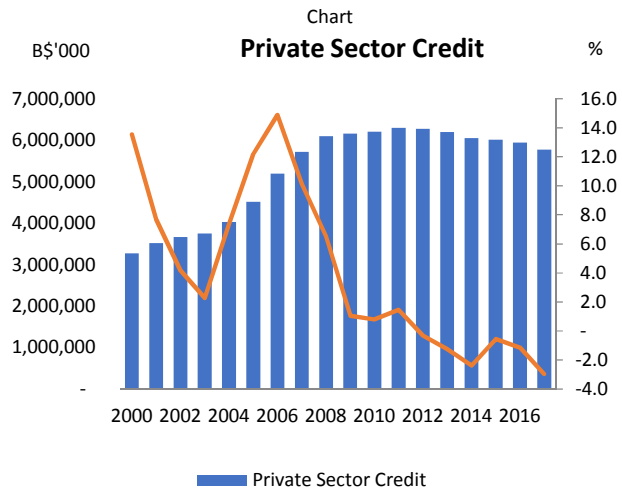
III. Stylized facts

This section will review trends in credit over the period 2000–2017. Specifically, we will review trends in both private sector credit, and government borrowing from internal sources to see whether there was any particular correlation between the two variables throughout this period. For the purposes of this study, we only assessed credit extended in Bahamian dollars to the government and private sector from the banking sector. This is because for the majority of the review period, Bahamian residents were not allowed to borrow in foreign currency from domestic banks. Only recently, as a part of the Central Bank of The Bahamas' move toward a more liberalized exchange control regime, have residents been given more breadth concerning foreign currency investment.

Trends in Private Sector Credit

Over the period 2000– 2017, trends in private sector credit varied against the backdrop of several macroeconomic events, in conjunction with changes in the Central Bank of The Bahamas’ monetary policy.

The value of private sector credit from the banking sector averaged approximately \$5,261.1 million over the seventeen years, peaking at \$6,297.5 million in 2011. Beginning in 2001, the rate of growth in private sector credit slowed from 13.5% in 2000, to 7.7% and 4.2% in 2001 and 2002, respectively. This was due to the credit freeze that the Central Bank



SOURCE: The Central Bank of The

implemented in September of 2001, in the wake of the September 11 terrorist attacks on the United States which lead to a significant falloff in tourism activity in The Bahamas. At this time, commercial banks were instructed to ‘provide new credit only to the extent of resources provided from ongoing repayments; though they were at liberty to determine how much resources would be allocated within their portfolios’ (The Central Bank of The Bahamas). As a result, the level of private sector credit from the banking sector fell. However, when the credit freeze was removed in August of 2004, a corresponding spike in private sector credit was registered, with growth accelerating to 12.2% in 2005 from only 7.4% the year before. It should be noted also that in the aftermath of Hurricane Francis in September of 2004, the Central Bank increased the debt-service ratio by 10 percentage points from 40-45% to 55%, and relaxed the 15% equity contribution requirement for credit, which also helped to drive the increase in credit.

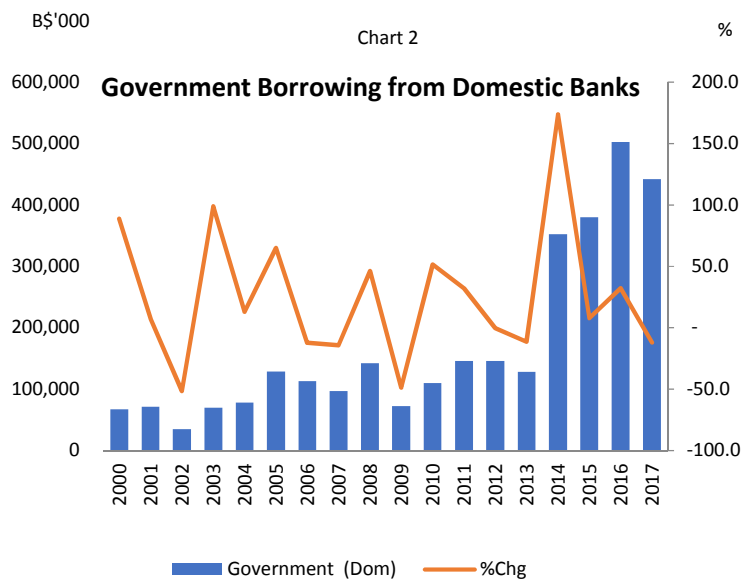
Private sector credit trends maintained its upward trajectory for the following two years, but fell again in 2007 at the onset of the global financial crisis. Amid the high unemployment levels and financial pressure that prevailed during the crisis, banks were not lending as much during this period, which resulted in a subsequent decline in private sector credit growth from 10.1% in 2007 to 0.8% by the end of 2010. In 2011, growth trends made a slight turnaround

when it increased to 1.5%, but retreated again in 2012 with a 0.3% contraction. This trend persisted during the last five years of the review period, with 2017 showing the deepest decline of 3.0%, reflecting a number of factors including weak credit demand, and banks’ conservative lending stance, due to the high level of non-performing loans in the banking system—though these levels have lowered significantly in the last two years of the period, due to banks’ loan restructuring initiatives and strengthened credit collection efforts.

Trends in Government Borrowing

Credit extended to the government from the banking sector averaged approximately \$171.3 million over the seventeen year period. The highest value was recorded in 2016, of \$502.7 million, while the lowest value—\$34.8 million—was registered in 2002. It is evident that in the earlier part of the review period, government credit from banks was relatively low, but increased significantly in 2014 and throughout the remaining years to 2017. With regard to growth trends,

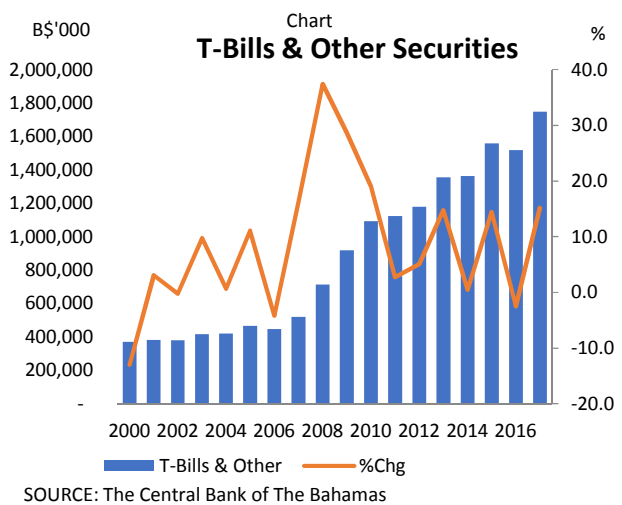
the spikes registered in 2000 and 2003 were due mostly to advances made to the government by commercial banks for various purposes, which were nonetheless small in number when compared to other types of significant borrowing usually undertaken by governments. The largest increase over the period however, occurred in 2014 when the government obtained a \$100 million short-term syndicated loan for budgetary financing. This resulted in



SOURCE: The Central Bank of The Bahamas

the value of domestic credit to the government increasing nearly three-fold to \$352.1 million. After this, government borrowing from domestic sources returned to trend.

As commercial banks' holdings of government securities is pertinent to the discussion of government credit, it is important to study the evolution of this type of borrowing over the review period, so as to determine whether it has any particular correlation to the other factors. Over the review period, trends in government borrowing via securities seem to vary, as its changes swing up and down for the first five years of the series, and again for the last six



years. However, it is evident that there was a spike in banks' holdings of securities—inclusive of treasury bills and other government securities, such as Bahamas Government Registered Stock (BGRS) and Bahamas Government Stock (BGS)—from 2007 to 2009 (see chart 3), which was mainly attributed to an exchange of treasury bills from the central bank to the commercial banks, and does not necessarily indicate new credit extended to the government for the period. In terms of the overall volume however, the amount of credit extended by banks to the government over the seventeen year period is much higher in securities than in loans and advances.

As compared to trends in private sector credit, trends in government borrowing from the banking sector appear to be more volatile, fluctuating throughout the review period. In addition, the overall level of credit extended to the government by banks is lower than that which is lent to the private sector, which can be attributed to the fact that the government has multiple sources from which they can acquire credit, including the Central Bank, other local financial institutions², public corporations, as well as external sources such as bilateral institutions³, international financial institutions or private capital markets—though this credit would be extended in foreign currency. Thus, their reliance on commercial banks for credit may not be as robust as it is for the private sector, where their options are more limited. Based on charts 1

² This includes 'banks and trusts which opt to deal mainly with non-residents and savings and loans institutions which deal only in Bahamian dollars' (The Central Bank of The Bahamas' Quarterly Statistical Digest).

³ These are financial institutions set up by a country to finance development projects in a developing country and its emerging market

through 3, there does not appear to be a direct correlation between credit to the private sector and government borrowing from domestic banks, in that there are some years that they seem to move in tandem, such as 2001, and between 2010 and 2013; however, in other years they move in opposite directions, for example in 2005 when private sector credit increased and government credit decreased. Due to this ambiguity, it is necessary to run a statistical model to test the impact of government borrowing on private sector credit, to determine whether there is in fact a crowding out effect.

IV. Data and Methodology

Based on the research of Sen & Kaya (2014) and Fayed (2012), among others, we employed a VECM to determine the long-run relationship between government borrowing and credit to the private sector. Accordingly, we began by testing the data for stationarity using the Augmented Dickey Fuller test (ADF). The Johanson Co-integration test was then conducted to assess for co-integration among the variables, after the number of lags was estimated using VAR. Based on the results; we proceeded to conduct the VECM. The general specification of the VECM is shown below:

$$\Delta y_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta y_{t-i} + \sum_{i=0}^n \delta_1 \Delta x_{t-i} + \varphi z_{t-1} + \mu_t$$

Co-integrating equation:

$$z_{t-1} = E_{t-1} (y_t - \beta_0 - \beta_1 x_{t-1})$$

The models used annual data for the period 1985-2017. Data from the Central Bank of the Bahamas was used for most of the variables; namely, the fiscal deficit, private sector credit, and interest rates, while Gross Domestic Product data was sourced from the Bahamas Department of Statistics. Further, the variables were presented in log format. The expectation is that changes in private sector credit are positively related to changes in GDP and negatively related to lending rates, such that an increase in the lending rate should result in reduced demand for credit. It is further hypothesized that increases in commercial banks' holding of government stock will reduce the liquidity available for lending thereby reducing private sector credit. The impact on changes in government borrowing from commercial banks on private sector credit depend on the

existence of a crowding out relationship—where increased borrowing by the public sector reduces the availability of credit to the private sector—or crowding in—where a rise in credit to the government occasions growth in private sector credit activity. Similar to other studies, the decision was made to use the government deficit as a proxy for private sector credit to the Government. This was deemed appropriate given that the deficit is financed through credit, and historically the majority of government financing has been served by the domestic banking sector. Accordingly, increases in the deficit are expected to occasion an expansion in banks' credit to the Government.

Prior to completing the VECM, an Ordinary Least Squares (OLS) regression was ran to confirm the factors that contribute most significantly to private sector credit in the Bahamas. The results showed that 95% of changes in private sector credit could be explained by real GDP, interest rates and the fiscal gap. (Equation1). Further, all variables are statistically significant at the 5% level, and both GDP and the government deficit were found to be positively related to private sector credit (PSC). In contrast, as expected, the interest rate was negatively related to private sector credit extension.

Equation 1:

$$l_t = 8.352 + 0.212l_{t-1} + 2.050l_{t-1} - 0.185I_{t-1}$$

(0.000) (0.011) (0.000) (0.000)

V. Empirical results

As a pre-requisite for the Johansen Co-integration testing, the variables (*LNPSC*, *LNRGDP*, *LNDEF* and *IR*) were tested for stationarity at level and first difference. Based on the p—value, as well as the critical values versus the t-statistic, the variables were non-stationary when tested at levels and became stationary at 1st difference⁴. The results of the Augmented-Dickey Fuller unit root tests are shown in the Appendix. Given that all of the variables were found to be stationary, the condition was satisfied to conduct the Johansen Co-integration test. Prior to performing this test, the appropriate number of lags for the analysis was determined by running an unrestricted VAR. Accordingly, 1 period lag length was dictated by the lag length criteria.

⁴ The log of private sector credit was not found stationary at level or 1st difference (trend and intercept), but was found stationary at level when the PP unit root test at level and the ADF at 1st difference (intercept) was employed.

The lag selection results are shown in Table 2 of the Appendix, while the results of the Johansen Co-integration test are displayed in Table 3.

Specifically, the results of the co-integration test confirm that the variables are co-integrated, with at least 2 co-integrating equations. Further, based on the normalizing equation, the long-run dynamics of the variables are such that increases in the interest rate result in a reduction in private sector credit. Conversely, the results suggest that in the long-run both Government borrowing and GDP are positively correlated with private sector credit; suggesting that there is no crowding-out relationship in the long-run.

In terms of the short-run dynamics, the results of the VECM indicate that 26.6% of deviations from long-run equilibrium, which occurred in the previous period, are corrected within the current period. Moreover, the model indicated that a 1.0% increase in the budgetary gap results in a 0.069% decrease in private sector credit, which suggests crowding out in the short-run. Further, a 1 % rise in the interest rate will result in a 0.023% decrease in private sector credit.

As a robustness check, impulse response functions were also utilized to show how changes in private sector credit are impacted by shocks to the remaining variables (see diagram 1). The diagrams show that a shock to the deficit initially causes a decrease in private sector credit, the impact of which levels out over time. Likewise, an innovation to the interest rate has a similar result, however the impact on PSC is sharper and more immediate. Conversely, a 1 standard deviation shock to real GDP, causes an initial increase in GDP, before smoothing out.

VI. Conclusion and Policy Recommendations

Recent trends in domestic credit show that the bulk of commercial bank lending has been to the Government, while private sector credit has largely been lethargic. The deceleration in private sector growth which, commenced in 2007, was initially associated with the increase in unemployment and reduced household income due to the recession. At the same time, Government's expansionary spending led to a surge in credit to the government in order to finance the deficit. This paper set out to determine if the sustained increase in banking sector financing to the Government has impacted commercial banks' capacity to lend to the private sector.

The results of the analysis showed that there is a negative relationship between private sector credit and banks' lending rates in both the short and long-run. Further, GDP growth is positively correlated with private sector credit in the short-run, but the long-run impact of GDP growth on credit is minimal. Finally, most of the models suggest that in the short to medium run increases in government borrowing negatively impacts private sector credit, while the long-run impact is positive or neutral. The positive correlation between government borrowing and private sector credit can stem from the fact that in many instances the government financing is to meet recurrent obligations (inclusive of wages and salaries). Furthermore, a significant proportion of the public workforce is highly indebted. Therefore, it can be expected that increases in their income will translate to a rise in borrowing.

Nevertheless, the overarching results suggest that given the inverse relationship between interest rates and private sector credit, there is opportunity for policy makers to more actively impact monetary aggregates via interest rate adjustments. Further, the impact of GDP on credit affirms the assertion that poor economic conditions and overleveraged consumers are driving weak private sector credit. However, the results related to the co-integration between government borrowing and private sector credit suggest that the possible incidence of crowding-out should not be dismissed. Therefore, Government should be mindful of how fiscal irresponsibility or overreliance on the domestic banking system impacts its growth objective, particularly via the channel of private sector investment.

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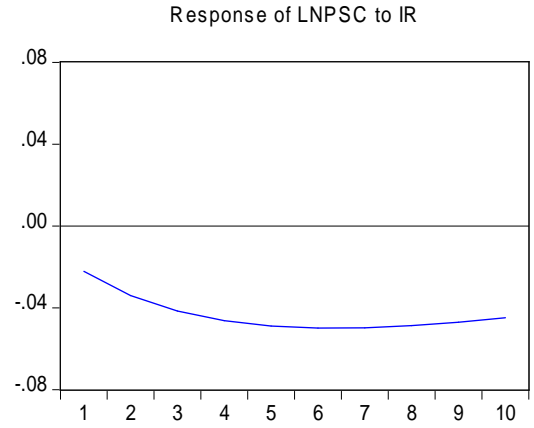
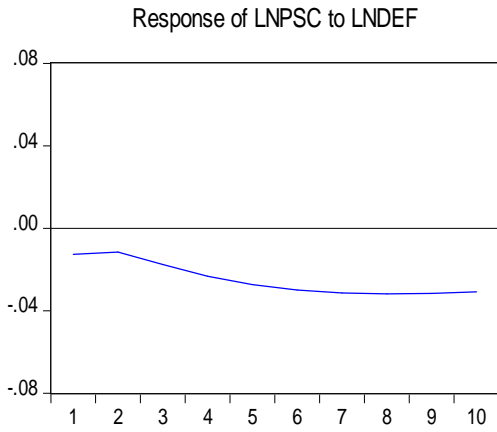
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APPENDIX

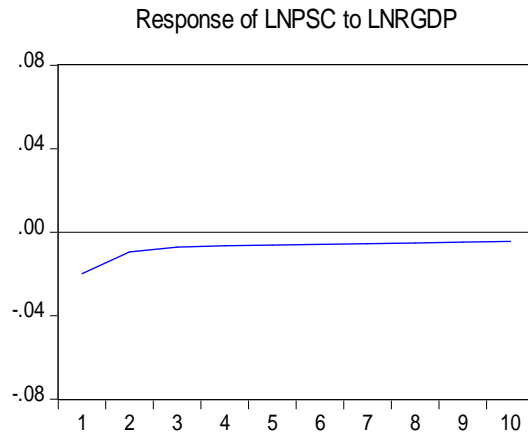
DIAGRAM 1

Response to Generalized One S.D. Innovations

Response to Generalized One S.D. Innovations



Response to Generalized One S.D. Innovations



Variable	LEVEL (intercept)		1 st Difference Intercept & Trend	
	t-statistic	Critical Value	t-statistic	Critical Value
LNPSC	0.4274 (0.9985)	-3.5578	-3.8396 (0.0064)	-3.5683***
LNRGDP	-2.1131 (0.5193)	-3.5578	-5.7168 (0.0003)	-3.5629***
LNDEF	-2.6861 (0.2485)	-3.5578	-5.2714 (0.0009)	-3.5683***
IR	-0.8598 (0.9486)	-3.5578	-4.1147 (0.0152)	3.5684***

Table 2: Lag Length Selection

Lag	Log likelihood (LogL)	Sequential modified LR t-statistic	Final prediction error (FPE)	Akaike information criteria (AIC)	Schwarz information criteria (SC)	Hannan-Quinn Information Criteria (HQ)
0	-53.92435	NA	0.000493	3.737055	3.922085	3.797370
1	65.36638	200.1006*	6.37e-07*	-2.926863*	-2.001710*	-2.625287*
2	74.35252	12.75452	1.06e-06	-2.474356	-0.809081	-1.931518

Nb: the (*) reflects the lag order specified by the criteria- computed by Eviews 9.

Table 3: Johansen Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.614125	56.03253	47.85613	0.0071
At most 1 *	0.426170	30.32198	29.79707	0.0435
At most 2	0.312097	15.32559	15.49471	0.0530
At most 3 *	0.175936	5.224691	3.841466	0.0223

Trace test indicates 2 cointegrating eqn(s) at the 5% level

$$D(LNPSC) = C(1)*(LNPSC(-1) - 0.409040788538*LNDEF(-1) - 0.606263159291*LNREGDP(-1) + 0.207555358667*IR(-1) - 13.12598985) + C(2)*D(LNPSC(-1)) + C(3)*D(LNDEF(-1)) + C(4)*D(LNREGDP(-1)) + C(5)*D(IR(-1)) + C(6)$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.261875	0.078714	-3.326914	0.0032
C(2)	0.010611	0.181144	0.058577	0.9538
C(3)	-0.068731	0.039653	-1.733322	0.0977
C(4)	-0.481601	0.316470	-1.521791	0.1430
C(5)	-0.023400	0.027691	-0.845038	0.4076
C(6)	0.071748	0.019756	3.631638	0.0016
R-squared	0.474775	Mean dependent var		0.064083
Adjusted R-squared	0.349722	S.D. dependent var		0.077495