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The Relationship between Budget Deficit and Current Account Deficit in Egypt

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Abstract

The Egyptian economy is marked for its budgetary imbalances. The present paper addresses the important question of whether these noticeable budget deficits have come to bear on the current account component of the Egyptian balance of payments, thus creating imbalances therein as well. We thus examine the familiar so called twin deficit hypothesis. Our findings elucidate the existence of a short and long run relationship linking budgetary deficits to their current account counterparts. Thus a Granger causality test reveals that while budget deficits lead to one lag current account deficits, the latter in turn have arguably been the source of two lags deficits in the government budget, which gives a plausible testimony confirming the reverse hypothesis. Indeed, notwithstanding the strong causal effect whereby budget deficits resulted in four to nine year lagged current account deficits; a remarkably significant counter-effect exists, thus signifying a bi-directional causal relationship between the two types of deficits.

The ECM analysis of our results indicates that a 10 percent increase in the government budget deficit will accentuate itself by a further 7 percent increase in the first lag but will also cause a one lag increase of 8.7 percent in the current account deficit. These findings lend strong support to the twin deficit hypothesis in the Egyptian case. Barring the presence of strong shocks, it can plausibly be claimed that there is a reasonably strong link between government budget deficits in Egypt and the current account deficits in which the labor market situation as well as the business cycles appear to play important roles.

Keywords: twin deficits, granger causality, co-integration tests, hodrick and Prescott filter, Egypt

1. Introduction

The theoretical basis for the twin-deficit hypothesis is largely grounded in the pioneering works of Mundell-Fleming. The basic tenet of the twin-deficit hypothesis is that in the event of a rise in the government budget deficit, interest rates will most likely follow suit thus inducing inward capital movements and causing the exchange rate of domestic currency to appreciate. The upshot of this is that the current account deficit will escalate, too. If the government increases its debt to finance the deficit, private saving won't be affected because people will sense an increase in their wealth owing to the increase in public debt. By and large, what happens to private investment and current account deficit turns heavily on whether capital is mobile or not. If capital movements are highly unrestricted, interest rates will most likely not be affected by the rise in budget deficit and domestic private investment won't be crowded out by the fiscal shock since inwards capital movements will make up for any shortfall in domestic investment.

On the other hand inward capital movements will invariably cause domestic currency exchange rate to appreciate. This will most probably take place through a hike in nominal exchange rate in case the country follows a fixed exchange rate regime or alternatively through rising rates if the prevalent regime is a floating one. Consequently in the Mundell-Fleming world, the government budgetary deficit and the current account deficit are closely wound up with a direct relation that links the two. (Fleming, 1962; Mundell, 1963; Volcker, 1987; Kerney & Monadjemi, 1960; Haug, 1996).

The Mundell-Fleming model aside, there are also other important constructs of the budgetary and current account deficits, namely the Keynesian absorption theory and the so called Feldstein chain construct. In the Keynesian absorption setup, a rise in the budget deficit is seen as raising imports by means of an increase in

domestic absorption. Naturally, the rise in imports will culminate in current account deterioration. In the Feldstein chain model on the other hand, more emphasis is laid on the linkages between short-run capital movements, the exchange rate and interest. This approach has it that if a floating exchange regime is firmly in place and capital movements are unrestricted, then a fiscal shock that culminates in a budget deficit will cause national savings to fall. In order to redress this situation and recoup national savings, the interest rate will be raised thus attracting capital from abroad. Given the inwards flow of foreign capital, the value of domestic assets will rise causing the country's exports to decline. Put differently, budget deficits would trigger an upward movement in the domestic interest rate, thus causing substantial inwards capital movements. Naturally, an appreciation in the national currency would follow raising in turn the current account deficit of the country (Feldstein, 1992).

Turning to the Ricardian Equivalence hypothesis propounded by Barro (1974) and Barro (1989), the basic theme here is that following a budget deficit, people will presumably expect a large hike in taxes in the future which will adversely affect their disposable income. Consequently, taxpayers will respond to the fiscal shock by reducing their consumption and boosting their savings to face the impending income shortfalls. This suggests that such variables as national savings, investments and current account deficit won't be affected by the budget deficit following a fiscal shock.

Nevertheless, in the absence of a Ricardian equivalence, a causal link between the government budget deficit and the current account deficit can still be expected. Indeed, in addition to the twin deficit theory alluded to above, which postulates a two-way causal link ensuing from the government budget deficit to the current account deficit (Laney, 1984); there are a couple other hypotheses. As it turns out, the possibility of a unidirectional causal link emanating from the current account deficit to the government budget cannot be ruled out. Such counter-effects have been analyzed and summarily termed “current account targeting”a’laSummers (1988). This will most likely take place if the current account deficit hampers the economic growth of the country and eventually exacerbates the government budget deficit. (Khalid & Teo, 1999), Alkshwani (2000), Kouassi et al. (2004) and Saleh (2006). Further, it is possible to have a bi-directional causal link between the two variables (Darrat, 1988; Islam, 1998; Mansouri, 1998). Under such circumstances, eliminating the budget deficit in order to get rid of current account deficit won't work. This is due to the fact that other factors such as the labor market conditions and the vagaries of trade cycles also come to bear strongly on the relationship between the two types of deficit. Indeed there are also other less influential factors bearing on the relation between the two types of deficits such as interest rates, the export policies and the type of exchange rate regime. The rest of the paper will be organized as follows: section 2 gives the literature review; section 3 presents the methodology while section 4 provides the results.

2. Literature Review

Khalid and Guan (1999) took a sample of five developed and five developing countries and used the method of cointegration to test for the existence of a long run relationship between government budget deficit and current account deficit and the line of causation. Using annual time series for the period 1950–1994, they found a strong relation in the long run between the two variables was more likely to exist in the developing countries in comparison to the developed ones. As far as the former are concerned, Granger causality tests produced mixed results for the direction of the causal link between the two types of deficit. For example it was found that current account deficits result in budget deficits for countries such as. Indonesia and Pakistan. This was attributed to the fact that the current account deficit was by and large financed by loans obtained from domestic sources and from abroad, thus adding substantially to the staggering public debt figures. Debt amortizations and interest redemption have in effect depleted the finances of these countries causing them to incur relatively large budget deficits (Eldemerdash et al., 2008). But Egypt and Mexico are a different story; they did not experience similar relationships. Again no causal relationships between the two types of deficit have been detected for the UK and Australia, while only some meager evidence is reported for the Canadian and Indian cases.

The Egyptian case was further investigated by Marinheiro (2008). Looking into the relationship between government budget deficit and the current account deficit for the period 1974–2002 and using a vector autoregressive (VAR) model, the data revealed only a relatively weak long-run attachment between the budget deficit and the current account deficit. While the twin-deficit hypothesis was thus rejected, a reverse Granger causality in contrast was verified ensuing from the current account deficit and in the direction of government budget deficit. The evidence also supported the existence of unrestricted capital movements.

The study conducted by HashemZadeh and Wade (2009) also sought to examine the dynamic relationship between the government budget deficit and the current account deficit. The study included a number of middle eastern and North African countries. With time series data covering the period approximately from early 1980s to

the mid-2000s, his methodology based on the (VAR) analysis uncovered some interesting results. One such result is that the occurrence of the twin deficits seems to be country specific. The findings suggest that there is a myriad of factors which appear to be responsible for the marked cross-country differences as to how budget deficits impact the external deficits. Such factors include the monetary systems, international trade policies, the taxation system and the exchange rate regime and other factors which determine a country's position in the world economy. For the Egyptian case, the findings indicated an inverse causality between the current account deficit and the budget deficit. Additionally, it was found that budget deficit movements follow movements in the current account deficits only with a lag of at least one period and that budget deficit moves would impact the external deficit with a lag of two to three time periods at the most.

3. Methodology

The bulk of the literature on the twin deficit hypothesis has paid great attention to the nature of the causal relation linking government budget deficit to the external deficit. This can be seen in the words of Kouswanietal. (2004) and Fidrmuc (2003) to take somewhat recent examples. Many of the empirical studies have sought generally to investigate the mode of finance of the external deficit and whether it was obtained from domestic or external sources in addition to the usual theme about the causal relation between the internal and external deficits. If a causal relation was found to exist between the two variables, attention is then directed to the issue of the extent to which the budget deficit influences the current account deficit. In particular, the question is posed: is the budget deficit accountable for Granger causing the external deficit? Or is the reverse probably true?. It would seem appropriate to start tackling these issues by examining the time series data of each of the two variables, namely the budget deficit and the current deficit. If the variables are found to be non-stationary, then one can proceed to see if there is a long run cointegration relationship between them. If it turns out that there is indeed a long run equilibrium relationship between the variables, then an error correction model must be used to do the tests. In the absence of cointegration, however, then there is no need to apply cointegration techniques since the model boils down to a first difference one.

Engle and Granger (1987) have suggested that co integrated variables can be represented in terms of an ECM model. Such a representation has the merit of taking into account the short run dynamics of equilibrium as well as the deviations of the variables away from their long run equilibrium values. Thus given a cointegration relationship between the budget deficit and the external deficit, the following ECM equation can presumably be estimated:

$$BUDB\ t = a + B_1 CAB\ t + B_2\ EX\ t + B_3\ GOV\ t + B_4\ INF\ t + B_5\ In\ TDS\ t + u\ t \qquad (1)$$

Where the notations can be explained as follows:

$BUDB_t$ = (budget Deficit or surplus / GDP) %;

CAB_t= Current account balance (% of GDP);

Ex_t = Official exchange rate (LCU per US$, period average);

GOV_t= General government final consumption expenditure (% of GDP);

INF_t = Inflation, consumer prices (annual %);

TDS_t = Total debt service (% of exports of goods, services and primary income);

U t (Note 1) = White-noise error term.

The time series data used in this study start from as early as 1980 up to the year 2011, and the main source of the data is the World Bank Indicators (WDI) dated 2012 and the IMF. The long run values for the most important budget balance determinants were computed according to the Hedrick and Prescott filter (HP),to separate the cyclical component of a time series from raw data and obtain a smooth-curve representation of a time series, one that is more sensitive to long-term than to short-term fluctuations. (Hodrick & Prescott, 1997) (Note 2).

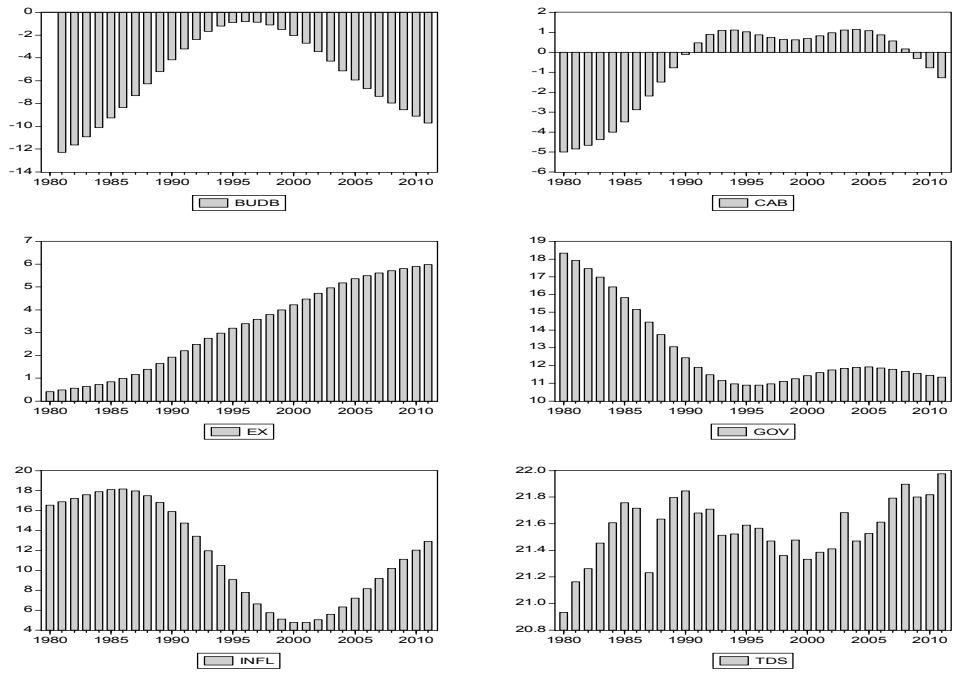

Figure 1. Budget balance, current account balance, official exchange rate general government final consumption expenditure, inflation and total debt service in Egypt: 1980–2011

3.1 Unit Root and Counteracted Tests

The unit root test is in essence a stationary test. When running time series regressions, an implicit assumption here is that the variables of the time series are stationary. Time series are said to be stationary if their mean, variances and auto covariance's remain unchanged over the relevant period under study. Thus to find out whether the time series are stationary, we use the Augmented Dickey Fuller procedure to test for the unit roots. The test results are reported in Table 1.

Table1. Summary of ADF unit root test result

	Test Augmented Dickey Fuller (ADF)					
	constant			Trend		
Variable	Level	First-Difference	Conclusion	Level	First-Difference	Conclusion
BUDB	-3.06**	-2.36	I(0)	-2.71	-5.36*	I(1)
CAB	-0.67	-1.75		-1.75	-4.72***	I(1)
EX	-3.62**	1.17	I(0)	1.17	-4.21***	I(1)
GOV	-3.73*	-2.64***,	I(0)	-3.6**	-1.74	I(0)
INF	-2.12	3.26**	I(1)	3.02	-7.54*	I(1)
TDS	-2.99**	-6.14*	I(0)	-3.07	-6.009*	I(1)

Notes: 1) For ADF and PP tests, ***, ** and * denote rejection of a unit root hypothesis based on Mackinnon (1991) critical values at 10%, 5% and1% respectively.

The test results reported in Table 1 indicate that while most of the variables, namely the exchange rate, TDS, budget balance, current account balance and inflation are stationary at first level, one of the variables appears to be stationary at level namely general government final consumption expenditure. Clearly the variables are integrated of order one, I (1). Having ascertained stationary of the variables, we move on to test for the existence of a long run cointegrating relationship between the time series variables included in the model. Modern time

series analysis has it that if there is some variable which is individually not stationary at level, it would turn stationary if combined by means of linear combinations with other variables. Accordingly, this shows that it is possible to set up a time-variant model of the and as a BUDB that encompasses all the relevant arguments as independent variables. To reiterate this paper utilizes cointegration techniques to test for the existence of a long run cointegration relationship between BUDB and a set of other explanatory variables that may impinge strongly on the dependent BUDB variable. Once the long run cointegration relationship is verified, the next step will be to get some estimates of the vector error correction model. However, and as a matter of statistical prudence, if the vector estimators are to be as highly efficient as possible, it might be most appropriate to use one of the breeds of the full information maximum likelihood models, namely the VECM. Use of the VECM approach is advantageous in several ways. In the first place, it would be possible with VECM to reduce the estimation process to one step only that does not involve any normalization procedures for the variables used. Furthermore, there will be no need for the usual endogeniety or exogeneity assumptions about the variables. Indeed under the VECM approach, the endogenous variables of the model are driven home to their long run equilibrium values while at the same time short term derailments from these long run values are corrected invariably.Table 2 below reports the results of Johansen Co-integratedtest for five equations at the 5% and 1% levels for Trace Max-eigenvalue tests.

Table 2. Summary of Johansen Co-integrated test

Unrestricted Co-integrated Rank Test				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5per cent Critical Value	1per cent Critical Value
None **	0.99	389.35	94.15	103.18
At most 1 **	0.95	209.10	68.52	76.07
At most 2 **	0.85	121.72	47.21	54.46
At most 3 **	0.77	66.61	29.68	35.65
At most 4**	0.55	23.31	15.41	20.04
At most 5	.0016	0.04	3.67	6.65
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5per cent Critical Value	1per cent Critical Value
None **	0.99	180.24	39.37	45.10
At most 1 **	0.95	87.38	33.46	38.77
At most 2 **	0.85	55.11	27.07	32.24
At most 3 **	0.77	43.29	20.97	25.52
At most 4**	0.55	23.26	14.07	18.63
At most 5	.0016	0.04	3.76	6.65

Note: *(**)denotesrejectionofthehypothesisatthe5 %(1%)level;

Tracetestindicates5co-integratedequation(s)atboth5%and1%levels;

Max-Eigenvalue test indicates 5 co-integrated equation(s) at both 5% and 1% levels.

3.2 Granger Causality Tests

A close look at the Granger causality tests in the literature on the twin deficit theory reveals that there are four basic competing scenarios of interest: (i) budget deficits cause trade deficits (ii) the two deficits are not causally related. (iii) There is a bi-directional causality between the two deficits, and (iv) trade deficits cause budget deficits.

To check the causal relationship between BUDB and CAB, we have applied Granger causality test using lag lengths of up to nine periods. The test results are to be found in table (3) below. These results indicate clearly that the hypothesis that BUDB does not Granger cause CAB is rejected in one lag. This finding ties in with the conventional hypothesis of Fleming (1962), Mundell (1963), Voleker (1987), Keaney and Mondjemi (1990) and Haug (1996). Furthermore, the null hypothesis that CAB does not Granger cause BUDB is also rejected in two lags, thus validating the reverse hypothesis in support of Summers (1988), Khalid and Guan (1999), Marinheiro (2008),Ashem,Zadeh and Wade (2009). With three lags, BUDB and CAB appeared to be independent, but the budget deficit did Granger cause current account deficits from four to nine lags. However, a strong and significant feedback does exist which in effect makes causality between the two variables rather bi-directional.

These points to a high association between the budget deficit and the current account deficit which is in agreement with the findings of Darrat (1988), Islam (1998), Mansouri (1998). This also seems to confirm the findings that emphasize the role of the labor market situation and the trade cycle position. (Caddington & Vinals, 1986).

Table 3. Results of granger causality tests

Null Hypothesis	Observations	lags	F-statistics	Probability	Conclusion
CAB does not Granger Cause BUDB	30	1	30.03	8.400	BUDB → CAB
BUDB does not Granger Cause CAB			13.02***	0.001	
CABdoes not Granger Cause BUDB	29	2	12.45***	0.000	CAB → BUDB
BUDB does not Granger Cause CAB			33.55	1.107	
CABdoes not Granger Cause BUDB	28	3	12.66	6.105	
BUDB does not Granger Cause CAB			27.19	2.007	
CABdoes not Granger Cause BUDB	27	4	3.15**	0.039	CAB ↔ BUDB
BUDB does not Granger Cause CAB			6.35***	0.002	
CABdoes not Granger Cause BUDB	26	5	4.288**	0.012	CAB ↔ BUDB
BUDB does not Granger Cause CAB			5.95***	0.003	
CABdoes not Granger Cause BUDB	25	6	3.07**	0.046	CAB ↔ BUDB
BUDB does not Granger Cause CAB			10.36***	0.000	
CABdoes not Granger Cause BUDB	24	7	9.62***	0.001	CAB ↔ BUDB
BUDB does not Granger Cause CAB			14.36***	0.000	
CABdoes not Granger Cause BUDB	23	8	16.20***	0.001	CAB ↔ BUDB
BUDB does not Granger Cause CAB			18.19***	0.001	
CABdoes not Granger Cause BUDB	22	9	9.67**	0.043	CAB ↔ BUDB
BUDB does not Granger Cause CAB			13.78**	0.026	

Note:*, **, *** indicates statistical significance at the 10%, 5% and 1% level respectively.

Table 4. Summary of over parameterized ECM result

variable	coefficient	Std. Error	t-Statistic
CAB (-1)	-0.69	0.019	-34.77
EX (-1)	2.28	0.024	91.22
GOV (-1)	1.67	0.025	64.99
INF (-1)	0.26	0.007	33.87
In TDS(-1)	-0.064	0.007	-9.09
C	-25.04		
Error Correction	-0.20	0.284	-0.705
D (BUDB (-1))	0.70	0.262	2.64
D (CAB (-1))	0.87	0.206	4.21
D (EX (-1))	-4.20	1.232	-3.42
R-squared	0.99	Akaike Information	-6.78
Adj. R-quared	0.99	Criteria	
Log likelihood	109.01	SchwarzCriteria	-6.120
		F-statistic	23554

4. Results

Equation (2) below present's estimates of the long run relationship between the BUDB and its determinants.

$$BUDB\ t\text{-}_1 = -25.04 - 0.69\ CAB\ t\text{-}_1 + 2.28\ EX\ t\text{-}_1 + 1.67\ GOV\ t\text{-}_1 + 0\ .26\ INF\ t\text{-}_1 - 0.064\ In\ TDS\ t\text{-}_1 \quad (2)$$

The same estimates have also been presented in Table 4. The long run dynamics of the VECM are expected to work to smooth out any upward or downward stray by any of the variables from their long run predicted values. The significant error-correction term testifies to the existence of this correction mechanism. (see Table 4).

The results clearly indicate the existence of a long run relationship between the budget balance and the explanatory variables included in the theoretical formulation of the model. Each one of the variables included as arguments in the BUDB function has a statistically significant coefficient carrying the "right" sings stipulated apriority by economic theory. For instance since the coefficients of the exchange rate, general government final consumption expenditure and inflation carry a positive sign, this is an indication that increases in these variables will invariably raise the government budget deficit. On the other hand since current account balance and total debt service carry a minus sign, then an increase in either of these variables leads to a decrease in the budget deficit in the long run. For more details, it may be pointed out that a rise of 10 percent in current account balance and a similar rise in total debt service will most likely reduce budget deficit by about 6.9 percent and 0.6 percent respectively. Similarly, increases in the exchange rate, government final consumption expenditure and inflation will end up raising the government budget deficit by nearly 22.8, 16.7 and 2.6 percent respectively. It can be seen in Table 4 that the error correction statistic is negative (-0.20) although it is not significant. The interpretation of this statistic is that should the budget deficit wander away from its long run equilibrium value, there will be no mechanism to put it back on track, or its long run equilibrium value. In other words, deviations of the budget deficit from the long run equilibrium will not be corrected so as to bring it back to its long run value.

Additionally our findings do not indicate rampant short run adjustments in the model estimates. Indeed such adjustments are found to be relevant only for the budget balance, current account balance and exchange rate variables which appear to be the factors which loom large in adjusting the budget deficit in the direction of its predicted value in the short run. Looking at Table 4, it can be seen that a 10 percent hike in the budget deficit will like accentuate itself (i.e., result in further budget deficit increase) by 7 percent in the first lag. That same budgetary deficit increase will also cause current account balance to deteriorate by an additional 8.7 percent in the first lag. This seems to lend support to the applicability of the twin deficit hypothesis to the Egyptian case with the government budget deficit and the current account deficits posing as surrogates to the vindication of the hypothesis. These results are also in line with those of the Granger causality. As for the exchange rate connection, a 10 percent increase in the budget deficit will likely cause the exchange rate to plummet by nearly 42 percent in the first lag in the absence of shocks.

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Notes

Note 1. Where $u_t \sim (0, \sigma^2)$.

Note 2. From the (HP) perspective, time series are seen as made up of transitory and permanent components. Consequently the permanent components are distilled by minimizing the sum of squares of the second difference.