

## **The Dynamics of Internal and External Debts: Further Evidence from the Middle East and North Africa<sup>\*</sup>**

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### **Abstract**

This article explores the dynamic relationship between budget and trade deficits (twin deficits) observed in several middle-eastern and North African economics in recent decades. From a policy viewpoint, it matters greatly to ascertain whether the twin deficits hypothesis holds in general or it has limited validity for a handful of countries over selected time periods. The objective of our research is to test the hypothesis for several countries including Bahrain, Egypt, Iran, Jordan, Kuwait, Morocco, Oman, Nigeria, Syria, Tunisia, Turkey and Yemen in the Middle East subcontinent. Compared to Europe and North America, this important area of the world remains largely under-researched. The structural vector autoregression (VAR) is used to test the hypothesis that innovations in government budget deficit are positively transmitted to trade deficit. Our empirical findings suggest that the incidence of twin deficits appears to be country specific. The observed cross-country variations with regard to the effects of fiscal deficits on current account deficits tend to confirm that the dynamic relationship between the two deficits is subject to change depending on the underlying tax system, trade patterns and barriers, monetary regimes, the exchange rate and a complex host of internal and international forces that shape a country's economic status in the global economy. Our findings confirm that the presence and the direction of causality between the two deficits is generally country specific and ambiguous in certain cases.

Key words: current account, budget deficits, and twin deficits

## The Theoretical Perspectives

The implied link between an economy's current account deficit and its budget deficit (the twin-deficits—the hypothesis) has energized extensive academic debate and empirical testing for several decades. Most recently, Leonardo Bartolini and Amartya Labiri (2006, p.6) provide some support for the twin deficit hypothesis. Using panel data from the largest industrial economies, they find that “on the average, each dollar of fiscal deficit is associated with ... a fall in national savings of about 35 cents in the 1972-2003 period...” The authors conclude that much of the savings shortfall observed in their samples for each extra dollar of fiscal deficit requires an increase in foreign borrowing. In a similar study, Jeffrey Frankel (September 2006, p.654) examines the issue in the context of the U.S. economy and reminds us that the fiscal policy of the current decade mirrors the fiscal policy of the 1980s. In his words, “the twin deficits are back”. Frankel further hypothesizes that the U. S. twin deficits are rooted in her *macroeconomics policy* rather than trade policy.

The traditional argument (also referred to as the Keynesian absorption theory) largely suggests that when an economy is operating at or near full employment capacity, a *ceteris paribus* increase in the budget deficit drives the balance of payments into deficit by inflating the aggregate demand for goods and services including demand for imports.<sup>1</sup> The conventional view purports that large and sustained budget deficits profoundly impact saving and capital formation, factor prices, income distribution, the exchange rate and international commerce.

More elaborate explanations in support of the twin deficit hypothesis draw upon the quantitative perspectives provided in the context of the Mundell-Fleming (FM) models of exchange rate regimes (1962), Blanchard overlapping generations model (1984, and 1985 ) and succeeding versions of FM model put forth by Auerbach and Kotlikoff (1987) and other researchers who have attempted to resolve the question through complex mathematical simulations.

The stylized Mundell-Fleming models propose that increases in the fiscal deficit lead to current account imbalance by driving up domestic interest rates, the exchange rate, and the rate of capital inflows. While acknowledging the *crowding out* effects of large budget deficits on the private economy, critics of the FM approach have vigorously disputed the sequence of causation implied by these models. In fact, some researchers have invoked the Ricardian equivalence hypothesis to argue that alterations in the composition of public financing, (i.e. debt versus taxes) have no impact on real interest rates, aggregate demand, private spending, the exchange rate or the external accounts. Proponents of this view point out that while tax cuts have the effect of reducing public saving and enlarging the budget deficit, they increase private saving by an amount equal to the expected increase in the tax burden in the future years. Blanchard (1985) has rejected the Ricardian argument by showing that utility maximizing tax-payers would behave differently under a finite horizon as opposed to an infinite horizon as assumed by Ricardo. Blanchard suggests a positive correlation between sustained budget deficits and a country's external debt.

Despite the fact that the twin-deficits debate has helped to expand our understanding of the macroeconomic consequences of abnormally large budget and trade deficits, it has yet to provide irrefutable proof that the two deficits are causally related under diverse scenarios. The difficulty in explaining any underlying association between the two deficits stems from the fact that no single model can capture the full expanse of the dynamics of the macroeconomic variables and sociopolitical constraints that affect the two deficits. Thus, a plausible alternative is

to rely on more empirical evidence and to test the hypothesis experimentally using samples from as many regions as possible, as it has been done in our study. Nevertheless, the caveat is that simple econometric models of the data tend to oversimplify the complex nature of the association between the twin deficits, especially over short time periods.

The theoretical perspectives on the link between the two deficits have been, in the main, qualitative due to the difficulties involved in incorporating all the short-run and long-run effects of debt in the confines of precise mathematical models. In addressing these challenges, experts in the field have used empirical approaches to uncover any underlying relationships and processes hidden in the raw data. The empirical approach has provided a convenient and meaningful tool for detection of the more dominant themes buried in empirical data without the constraints and assumptions routinely integrated in complex mathematical models and abstract methodologies. An examination of the representative literature on the underlying association of the twin deficits renders four competing scenarios as follows: (1) budget deficits cause trade deficits, (2) the two deficits are not casually related, (3) there is bi-directional causality between the two variables, and (4) trade deficits cause budget deficits.

The overall goal of our investigation is to revisit the twin deficit hypothesis by targeting countries and regions that are outside of the Western hemisphere, thereby broadening the scope of the research. For the most part, we predict that the twin deficits hypothesis will not be corroborated collectively. A careful and critical assessment of the facts from variety of sources should help to deepen our understanding of the different interpretations of the hypothesis. The analysis may help to refocus renewed attention on a widely acknowledged but uncorroborated association which has long been integrated in macroeconomics theory and policy debates. Last but not least, we intend to provide much needed empirical evidence about the dynamics of the twin deficits in countries which do not have a steady tax base or an enforceable tax code similar to the developed economies in the Western hemisphere.<sup>2</sup>

### **Favorable Evidence**

The probable effects of the budget deficit on the trade deficit are still the subject of much debate and controversy. Despite the increased use of more sophisticated time series techniques, economists have yet to arrive at a common empirical methodology on how to investigate the association between the two deficits. As a result, policy implications of research findings dealing with the subject remain basically ambiguous, time and space dependent and hence impracticable.

Based on his assessment of the data from the United States, Normandin (1999, p. 74) infers that a tax increase “would directly decrease the budget deficit and would indirectly decrease the external deficit, due to reduced imports induced by the decline of private after-tax incomes.” Kenneth Kasa (1994) reports a significant relationship between trade deficits and budget deficits for the post war era for the United States, Japan and Germany after controlling for the effects of fiscal expenditures on Gross National Product (GNP). Likewise, Zietz and Pemberton (1990) and Vamvoukas (1999) report a positive association between the two deficits in the context of their samples from the United States and Greece. Using data from Brazil, Islam (1990) reports a positive long-run relation between budget deficits and trade deficits. Miller and Russek (1989) report contradictory results depending on specification of the econometric model used in testing the hypothesis. The authors report that both deterministic and stochastic models suggest a positive secular relationship between the two deficits during the period of flexible

exchange rates. Nevertheless, when they subject the same data to cointegration analysis, they find no evidence to support a long-run equilibrium relationship between the two deficits.

### **Conflicting Evidence**

Other investigations of the connection between the two deficits include studies undertaken by Kearney and Monadjemi (1990), Godley and Cripps (1983), Enders and Lee (1990) and Evans (1993). These authors do not detect a stable long-run association between the two deficits using variety of samples. Similarly, in a study of the G7 countries, Godley and Cripps (1983) find no short-run statistical association between the two deficits. In a subsequent investigation that focuses on the secular relationship between the twin deficits in the United States, Bartlett (1999) concludes that the relationship between the two deficits is not consistent overtime. The evidence presented by Bartlett suggests that during the 1980s, the budget deficit and the current account deficit moved together. However, he discovers that during the 1990s, the relationship between the two deficits changed direction. Laney (1986) finds no “statistically significant linkages for the postwar period between the actual U. S. budget balance and the current account balance.” He reaches the same conclusion for “most of the larger industrial countries”. Evans (1988, and 1993), Miller and Russek (1989), Dewald and Ulan (1990), Enders and Lee (1990), Kasa (1994), Kim (1995) and Barlett (1999) are unable to discern a plausible causal relationship between the two deficits in their enquiries. Boucher (1991) rejects the hypothesis of a positive and significant long run relationship between the deficits in the case of the United States. Similarly, using a vector auto-regression (VAR) framework, Bhattacharya (1977) finds that in the United States, innovations in the federal budget deficit do not appear to have any statistically significant impact on the trade deficit. Papaioannou and Kei-Mu Yi (2001) rule out a statistical causation from the budget deficit to the external trade deficit in the United States in the 1990s. They report that the burgeoning U.S. trade deficit between 1966 and 1999 mainly resulted from a booming economy supported by an environment of low interest rates, a strong dollar and high productivity growth.

Using quarterly data from eight countries during the period of flexible exchange rates – 1972-I -1987-IV, C. Kearney and M. Monadjemi (1990, pp. 197-219) report that a temporary relationship between the two deficits may be indicated. Nonetheless, they also discover substantial evidence of reverse causation between the stance of fiscal policy and the current account balance. The conclusion reached by these authors emphasizes that the relationship between the two deficits is a complex one and that fiscal policy should not be used in isolation to manage current account performance.

### **Bi-Directional Causality**

Darrat (1988) has reported evidence supportive of bi-directional causality between the twin deficits. Using quarterly data for the period 1960: I – 1984: IV, he concludes that in the case of the United States, there is evidence of “budget-to-trade deficit causality, but also...stronger evidence of trade-to-budget deficit causality.” Darrat argues that studies that have assumed the budget deficit to be the exogenous variable “could be biased and inconsistent. Moreover, as Cuddington and Vinals (1986) have demonstrated, the linkages between the two deficits are influenced by the extent of unemployment and the stage of the business cycles. These authors have shown that when the economy faces classical unemployment in the short run,

“an expected future increase in government spending will improve the current account today.” (ibid, p. 115).

### The Sample and the Model

The diverse results reported from different time and spatial settings strongly suggest that the presumed relationship between the two deficits is materially different across countries and time series. In yet another attempt to further investigate this matter, this paper examines the pattern of current account deficits and budget deficits for a sample of twelve economies that include Bahrain, Egypt, Iran, Jordan, Kuwait, Morocco, Nigeria, Oman, Syria, Tunisia, Turkey and Yemen. Unfortunately, we were not successful in locating timely and consistent data for other countries in the region including Iraq, Saudi Arabia, and the United Arab-Emirates. Some, but not all of these economies, are heavily dependent on revenues from oil exports. As expected, the amount of the budget deficits in countries with large oil assets is tied to world oil prices, the world demand for petroleum products and the quotas set by the Organization of Petroleum Exporting Countries (OPEC). For these countries, revenues from oil exports have been the mainstay of foreign exchange earnings in the recent past. Notwithstanding their revenues from oil exports, fluctuations in the world price of oil and other fossil fuels have forced some of these economies such as Iran to look for revenues from non-oil exports. In a recent article, M. A. Alkswani (2002) has argued that neither the Keynesian nor the Ricardian views about the correspondence of the two deficits seem to hold in Saudi Arabia. He correctly points out the major source of income in an oil based economy are revenues from oil exports and oil by-products. In turn, the export revenues impact government revenues, spending and the exports of goods and services. Alkswani concludes that in Saudi Arabia the direction of causality runs from trade deficits to budget deficits.

Using a familiar framework used by other researchers, we define gross national product (GNP) as the sum of income derived from producing goods and services for private consumption (C), private investment ( $I_p$ ), government purchases of goods and services (G), and exports (X). Consistent with the usual GNP identity, imports (M) are treated as a negative item to avoid double counting of consumption or investment goods purchased at home but produced abroad. Thus, GNP is given by

$$(1) \quad \text{GNP} = C + I_p + G + X - M,$$

Where  $X - M$  represents net exports plus net factor income. A second basic equation in the national income accounts is founded on the principle that income received by individuals has four possible uses: it can be consumed (C), saved ( $S_p$ , for private saving), paid in taxes (T), or transferred abroad (Tr). Because GNP is simply the sum of the income received by all individuals in the economy, we have:

$$(2) \quad \text{GNP} = C + S_p + T + \text{Tr},$$

By equating the two expressions for GNP developed above, canceling out C, and rearranging terms, we derive the following equation:

$$(3) \quad X - M - \text{Tr} = (S_p - I_p) + (T - G),$$

Where,  $[X - M - Tr]$  is equal to the current account balance. In other words, the current account balance is equal to the surplus of private saving over investment and the gap between government tax receipts and government expenditures on goods and services, that is, the government budget surplus. Given that both current account and government budget data are reported with the same frequency, we believe that equation (3) does offer a satisfactory basis for empirical research and trade policy debate. In particular, if there is a strong and an unambiguous relationship between the two deficits, it should be readily detected in the context of equation three, which incorporates the most relevant macroeconomic aggregates. However, it should be emphasized that while equation (3) shows that current account balance is associated with the gap between domestic savings and investment, it does not provide a theory of how the current account balance is determined. Given the empirical nature of our investigation, we made no attempt to incorporate all the variables that influence the magnitude of saving, investment, export and import flows in the sample countries

## Methodology

In exploring the generalizability of the twin deficit hypothesis, we first tested for Granger Causality using both level and first differences of the annual observations. Subsequently, using the vector auto regression (VAR) technique, we explored the extent to which innovations in one variable would impact the behavior of the other variable over time. If significant, the findings would have useful and important policy implications by further substantiating the extent to which “theory” has been aligned with reality in recent times. <sup>3</sup>

The raw data is obtained from the International Financial Statistics (IFS) database compiled by the International Monetary Fund (IMF). However, it should be noted that the data is self reported although it goes through an approval process before its release by the IMF. For several Middle Eastern nations, budget deficit and current account data have not been published in recent years. For consistency, all variables are measured in deflated U.S. dollars rather than in units of home currency. The data extends from the early 1980s through the early to mid 2000s. Most time graphs (not shown here) of the raw data seem to suggest some association between the data series for all the countries over the sample period.

Equation (3) is estimated using the following VAR specifications using two lags for each of the endogenous variable, a constant  $c$  to capture the effects of exogenous variables including the spread between domestic savings and gross private domestic investment. The choice of the lag length in the VAR models was guided by the Akaike Information Criteria (AIC) and sample size.

$$(4) \quad \text{Var}_1: \Delta \text{CAB}_t = \beta_{11}(\Delta \text{CAB}_{t-1}) + \beta_{12}(\Delta \text{GBB}_{t-1}) + \alpha_{11}(\Delta \text{CAB}_{t-2}) + \alpha_{12}(\Delta \text{GBB}_{t-2}) + c_1 + \varepsilon_{1t}$$

$$(5) \quad \text{Var}_2: \Delta \text{GBB}_t = \beta_{21}(\Delta \text{CAB}_{t-1}) + \beta_{22}(\Delta \text{GBB}_{t-1}) + \alpha_{21}(\Delta \text{CAB}_{t-2}) + \alpha_{22}(\Delta \text{GBB}_{t-2}) + c_2 + \varepsilon_{2t}$$

where  $\Delta \text{CAB}$  represents first difference in current account balance,  $\Delta \text{GBB}$  is the change in government budget balance,  $c_1$  and  $c_2$  are the constants and  $\varepsilon_{1t}$  and  $\varepsilon_{2t}$  are innovations for the  $\Delta \text{CAB}$  and  $\Delta \text{GBB}$  respectively. The innovations were purged of any shared component before estimation by first differencing of the data.

## Granger Causality Tests

Prior to the estimation of the VAR models, the endogenous variables were subjected to Granger Causality tests. Under the null hypothesis that there exists no Granger causality, (i.e.  $\beta_{12} = \alpha_{12} = 0$ , and  $\beta_{21} = \alpha_{21} = 0$ ), the standard F- test should be insignificant. With the exception of Kuwait and Turkey, and marginally Bahrain, Egypt and Oman, there is no compelling evidence that changes in the current account balance causes changes in the government budget balance, or vice versa.

## The Results

The parameter estimates of the structural vector autoregressive models specified above are presented in Tables 1a and 1b, where the values in brackets represent t-statistics. The augmented Dickey-Fuller procedure was used to test the first difference of each endogenous variable for the presence of a unit root. The null hypothesis of a unit root was rejected in every instance, except for Turkey where the test detected a unit root but only marginally. In the context of the VAR models, the dependent variable is dynamically stable, if the coefficients of the lagged dependent variable on the right-hand-side of the VAR equation are significantly negative. Likewise, the twin deficit hypothesis proposition is empirically validated if the estimated coefficients of the lagged endogenous variables are positive and statistically significant.



Table 1a  
 Summary of Coefficient Estimates and t-values from the Var. Models

| Dependent Variable: $\Delta$ Trade Balance |                      |  |  |  |  |                         |
|--|----------------------|--|--|--|--|-------------------------|
| Country                                    | Constant and t-Value | $\Delta$ Balanced Budget(-1) and t-Value | $\Delta$ Balanced Budget(-2) and t-Value | $\Delta$ Trade Balance(-1) and t-Value | $\Delta$ Trade Balance(-2) and t-Value | Adjusted R <sup>2</sup> |
| Egypt                                      | 0.178                | -0.067                                   | 0.109                                    | 0.167                                  | -0.222                                 | -0.10                   |
|  | [ 0.478]             | [-0.526]                                 | [ 0.859]                                 | [ 0.670]                               | [-0.906]                               |                         |
| Iran                                       | -0.071               | -0.001                                   | -0.001                                   | -0.137                                 | -0.176                                 | -0.15                   |
|  | [-0.067]             | [-0.381]                                 | [-0.256]                                 | [-0.612]                               | [-0.782]                               |                         |
| Jordan                                     | 0.018                | -1.56*                                   | -0.274                                   | -0.377                                 | -0.201                                 | 0.15                    |
|  | [ 0.295]             | [-2.25]                                  | [-0.367]                                 | [-1.56]                                | [-0.906]                               |                         |
| Kuwait                                     | 0.766                | 3.16*                                    | -0.241                                   | -0.432*                                | -0.671*                                | 0.15                    |
|  | [ 0.405]             | [ 1.74]                                  | [-0.173]                                 | [-1.87]                                | [-2.24]                                |                         |
| Morocco                                    | 0.062                | -0.043                                   | -0.018                                   | -0.334                                 | -0.036                                 | 0.11                    |
|  | [ 0.439]             | [-1.49]                                  | [-0.575]                                 | [-1.40]                                | [-0.154]                               |                         |
| Oman                                       | -0.049               | -3.58*                                   | 1.63                                     | 0.263                                  | -0.722*                                | 0.37                    |
|  | [-0.175]             | [-2.39]                                  | [ 0.828]                                 | [ 0.982]                               | [-2.22]                                |                         |
| Syria                                      | -0.009               | -0.043                                   | 0.013                                    | 0.241                                  | 0.251                                  | -0.36                   |
|  | [-0.032]             | [-1.009]                                 | [ 0.328]                                 | [ 0.602]                               | [ 0.569]                               |                         |
| Turkey                                     | 0.449                | 2.353*                                   | -2.34*                                   | -0.905*                                | -0.685*                                | 0.77                    |
|  | [ 0.602]             | [ 3.42]                                  | [-2.56]                                  | [-4.27]                                | [-2.99]                                |                         |
| Nigeria                                    | 477.82               | 9.57                                     | -9.68                                    | -0.189                                 | -0.269                                 | -0.090                  |
|  | [ 0.552]             | [ 0.397]                                 | [-0.290]                                 | [-0.552]                               | [-1.19]                                |                         |
| Tunisia                                    | 45.90                | 194.67                                   | 819.83                                   | -0.120                                 | -0.214                                 | -0.11                   |
|  | [ 0.487]             | [ 0.461]                                 | [ 1.36]                                  | [-0.444]                               | [-0.774]                               |                         |
| Bahrain                                    | -3.15                | -945.82                                  | 1486.48                                  | -0.006                                 | -0.547                                 | 0.11                    |
|  | [-0.031]             | [-0.697]                                 | [ 1.00]                                  | [-0.023]                               | [-1.88]                                |                         |
| Yemen                                      | 0.366                | 0.051                                    | -0.070*                                  | -0.344                                 | -1.48*                                 | 0.53                    |
|  | [ 1.82]              | [ 1.47]                                  | [-2.95]                                  | [-1.08]                                | [-2.28]                                |                         |

\* Parameter estimate is significant at the five percent level.



Table 1b  
Summary of Coefficient Estimates and t-values from the Var. Models

| Dependent Variable: $\Delta$ Balanced Budget |                      |  |  |  |  |                         |
|--|----------------------|--|--|--|--|-------------------------|
| Country                                      | Constant and t-Value | $\Delta$ Balanced Budget(-1) and t-Value | $\Delta$ Balanced Budget(-2) and t-Value | $\Delta$ Trade Balance(-1) and t-Value | $\Delta$ Trade Balance(-2) and t-Value | Adjusted R <sup>2</sup> |
| Egypt  | -0.42                | -0.23                                    | 0.113                                    | -0.35                                  | 0.977*                                 | 0.21                    |
|  | [-0.645]             | [-1.027]                                 | [ 0.512]                                 | [-0.809]                               | [ 2.30]                                |                         |
| Iran   | -2.935               | -0.665*                                  | -0.332                                   | -0.469                                 | -0.001                                 | 0.18                    |
|  | [-0.036]             | [-2.82]                                  | [-1.42]                                  | [-0.027]                               | [-.000007]                             |                         |
| Jordan                                       | -0.002               | 0.023                                    | -0.217                                   | -0.132                                 | -0.100                                 | -0.04                   |
|  | [-0.080]             | [ 0.110]                                 | [-0.795]                                 | [-1.50]                                | [-1.24]                                |                         |
| Kuwait                                       | 0.343                | -0.45                                    | -0.260                                   | 0.124*                                 | 0.012                                  | 0.36                    |
|  | [ 1.16]              | [-1.59]                                  | [-1.12]                                  | [ 3.43]                                | [ 0.257]                               |                         |
| Morocco                                      | 0.184                | -1.010*                                  | -0.223                                   | -0.129                                 | -2.409                                 | 0.48                    |
|  | [ 0.143]             | [-3.81]                                  | [-0.779]                                 | [-0.058]                               | [-1.14]                                |                         |
| Oman   | -0.02                | -0.521                                   | -0.088                                   | 0.055                                  | -0.013                                 | 0.00                    |
|  | [-0.465]             | [-1.80]                                  | [-0.232]                                 | [ 1.07]                                | [-0.212]                               |                         |
| Syria  | -0.09                | -0.464                                   | -0.63*                                   | 2.78                                   | 7.403*                                 | 0.40                    |
|  | [-0.043]             | [-1.52]                                  | [-2.24]                                  | [ 0.976]                               | [ 2.36]                                |                         |
| Turkey                                       | -0.150               | -0.63*                                   | 4.15*                                    | -0.030                                 | -0.044                                 | 0.97                    |
|  | [-0.681]             | [-3.12]                                  | [ 15.40]                                 | [-0.479]                               | [-0.658]                               |                         |
| Nigeria                                      | -8.28                | 1.04*                                    | -0.747                                   | -0.001                                 | 0.001                                  | 0.39                    |
|  | [-0.763]             | [ 3.45]                                  | [-1.79]                                  | [-0.347]                               | [ 0.307]                               |                         |
| Tunisia                                      | -0.031               | -0.617*                                  | -0.110                                   | 0.000                                  | -0.00003                               | 0.08                    |
|  | [-0.493]             | [-2.17]                                  | [-0.271]                                 | [-0.388]                               | [-0.160]                               |                         |
| Bahrain                                      | -0.01                | -0.645*                                  | -0.250                                   | 0.0001                                 | -0.0001*                               | 0.46                    |
|  | [-0.591]             | [-2.88]                                  | [-1.02]                                  | [ 1.25]                                | [-2.25]                                |                         |
| Yemen  | -4.05                | 0.244                                    | 0.258                                    | 17.72*                                 | 7.58                                   | 0.29                    |
|  | [-0.828]             | [ 0.289]                                 | [ 0.447]                                 | [ 2.28]                                | [ 0.479]                               |                         |

As shown in Tables 1a and 1b, results from VAR analysis of the data are mixed. For Kuwait and Turkey,  $\Delta CAB_t$  is positively impacted by  $\Delta GBB_t$ . Turkey appears to be a notable case as increases in budget deficits generated larger trade deficits during and shortly after the financial crisis of 2000 - 2001, when both deficits dropped very sharply (Ozatay and Sak, 2002). For Egypt, Iran, Morocco, Syria, Nigeria, Tunisia, and Bahrain, no significant relationship is detected between changes in budget deficits and changes in the current account.

By contrast, for Egypt, Jordan, Oman, Syria and Yemen, inverse causality is observed between  $\Delta CAB_t$  and  $\Delta GBB_t$ . In the case of Yemen, changes in budget deficits in response to changes in the current account are delayed for at least one period since  $\Delta GBB_{t-2}$  is statistically significant while  $\Delta GBB_{t-1}$  is not. In Egypt and Syria, changes in budget deficits in response to changes in trade deficits are delayed for at least one period because  $\Delta CAB_{t-2}$  is statistically

significant while  $\Delta CAB_{t-1}$  is not. In Bahrain, significant inverse causality between  $\Delta GBB_t$  and  $\Delta CAB_t$  is detected although the numerical magnitude of the coefficient on  $\Delta CAB_{t-1}$  is quite small. For Iran, Morocco, Nigeria, and Tunisia, the statistical evidence does not give a significant relationship between  $\Delta GBB_t$  and  $\Delta CAB_t$  or  $\Delta CAB_t$  and  $\Delta GBB_t$ .

From the VAR parameter estimates, impulse–response functions (IRFS) are estimated to predict the effects of an innovation in a given variable on the performance of endogenous variables that appear in the model. The impulse response functions (Fischer, 1981) are equivalent to dynamic multipliers providing an estimate of the current and future response of a variable in the left-hand-side of the equation to an innovation in one of the variables in the right-hand-side of the system. After estimating each system, (IRFs) and variance decomposition estimates are used to trace out the effects of innovations in deficit spending (current account balance) on the current account balance (budget balance).

For each country, we show the graph of the IRF for each variable that arise from innovations in “the exogenous variable”. These charts are designed to provide a visual presentation of the dynamic effects of the shock to the system. As shown in Figure 1 (upper right panel), the IRFs for Bahrain, Egypt, Jordan, Kuwait and Syria suggest that innovations in the budget deficit tend to impact the trade balance for utmost two to three time lags. On the other hand, in Jordan and Kuwait, innovations in the trade balance tend to impact the budget deficit for at most three time lags.

### Variance Decomposition

Besides the IRFs, variance decomposition estimates are computed to trace out the effects of innovations in deficit spending (current account balance) on the current account balance (budget balance). The decomposed variance estimates are indicative of the magnitude and the longevity of the variance in the system variables that can be attributed to an external shock. Here, our goal is to discover the extent to which prediction errors in the budget deficit (trade deficit) can explain the forecast errors in the trade deficit (budget deficit). If, for example, shocks to budget deficit (trade deficit) do not explain any of the forecasted error variance of the trade deficit (budget deficit) at all forecast horizons, we can conclude that the budget deficit (trade deficit) is exogenous. The results reported in Table 2 below are computed using the Choleski decomposition algorithm, which insures that the decomposed residuals are orthogonal.

Table 2  
Summary of Variance Decomposition Analysis

| Country | Sample Period | Variance Decomposition of: | Percent of Variance Explained by Shocking the Budget Deficit Equation* | Percent of Variance Explained by Shocking the Current Account Equation* |
|---------|---------------|----------------------------|--|---|
| Egypt   | 1981 - 2003   | Budget Deficit             | 75.1   | 24.9  |
|         |               | Current Account            | 4.4  | 95.6  |
| Iran    | 1980 - 2004   | Budget Deficit             | 100.0  | 0.0   |
|         |               | Current Account            | 7.5  | 92.5  |
| Jordan  | 1980 - 2001   | Budget Deficit             | 86.1   | 13.9  |
|         |               | Current Account            | 20.2   | 79.8  |
| Kuwait  | 1980 - 2005   | Budget Deficit             | 61.2   | 38.8  |
|         |               | Current Account            | 42.2   | 57.8  |
| Morocco | 1980 - 2005   | Budget Deficit             | 94.7   | 5.3   |
|         |               | Current Account            | 23.9   | 76.1  |
| Oman    | 1980 - 2001   | Budget Deficit             | 91.2   | 8.8   |
|         |               | Current Account            | 32.8   | 67.2  |
| Syria   | 1980 - 1999   | Budget Deficit             | 53.1   | 46.9  |
|         |               | Current Account            | 14.2   | 85.8  |
| Turkey  | 1980 - 2001   | Budget Deficit             | 99.8   | 0.2   |
|         |               | Current Account            | 92.2   | 7.8   |
| Nigeria | 1980 - 1999   | Budget Deficit             | 99.2   | 0.8   |
|         |               | Current Account            | 3.7  | 96.3  |
| Tunisia | 1980 - 1999   | Budget Deficit             | 99.2   | 0.8   |
|         |               | Current Account            | 25.9   | 74.1  |
| Bahrain | 1980 - 2001   | Budget Deficit             | 64.8   | 35.2  |
|         |               | Current Account            | 13.8   | 86.2  |
| Yemen   | 1989 - 1999   | Budget Deficit             | 85.8   | 14.2  |
|         |               | Current Account            | 84.3   | 15.7  |

\* Percent of predicted Variance After 4-Lags

**Figure 1: Graphics of Impulse Response Function  
Cholesky One S.D. Innovations  $\pm 2$  S.E.**

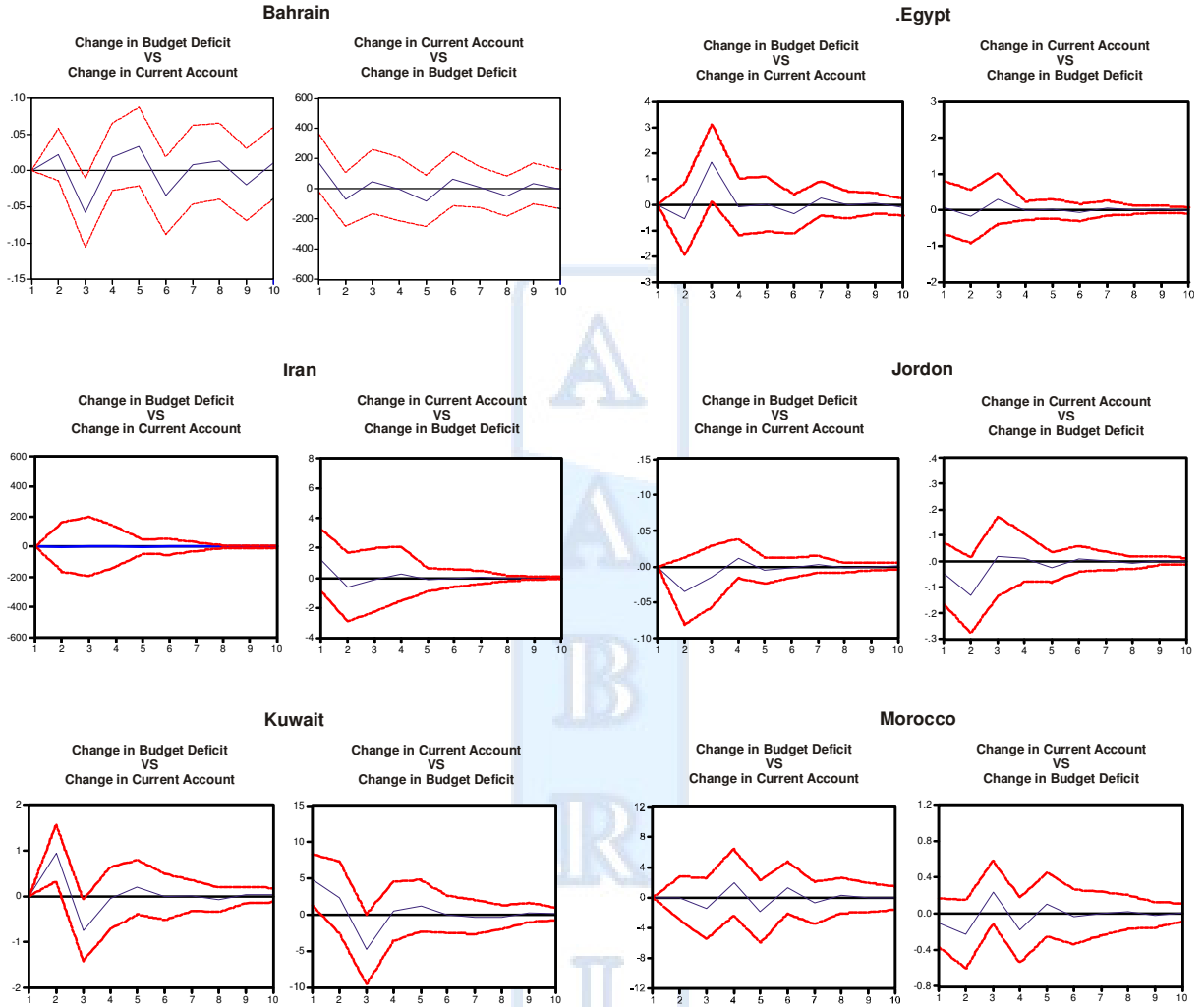
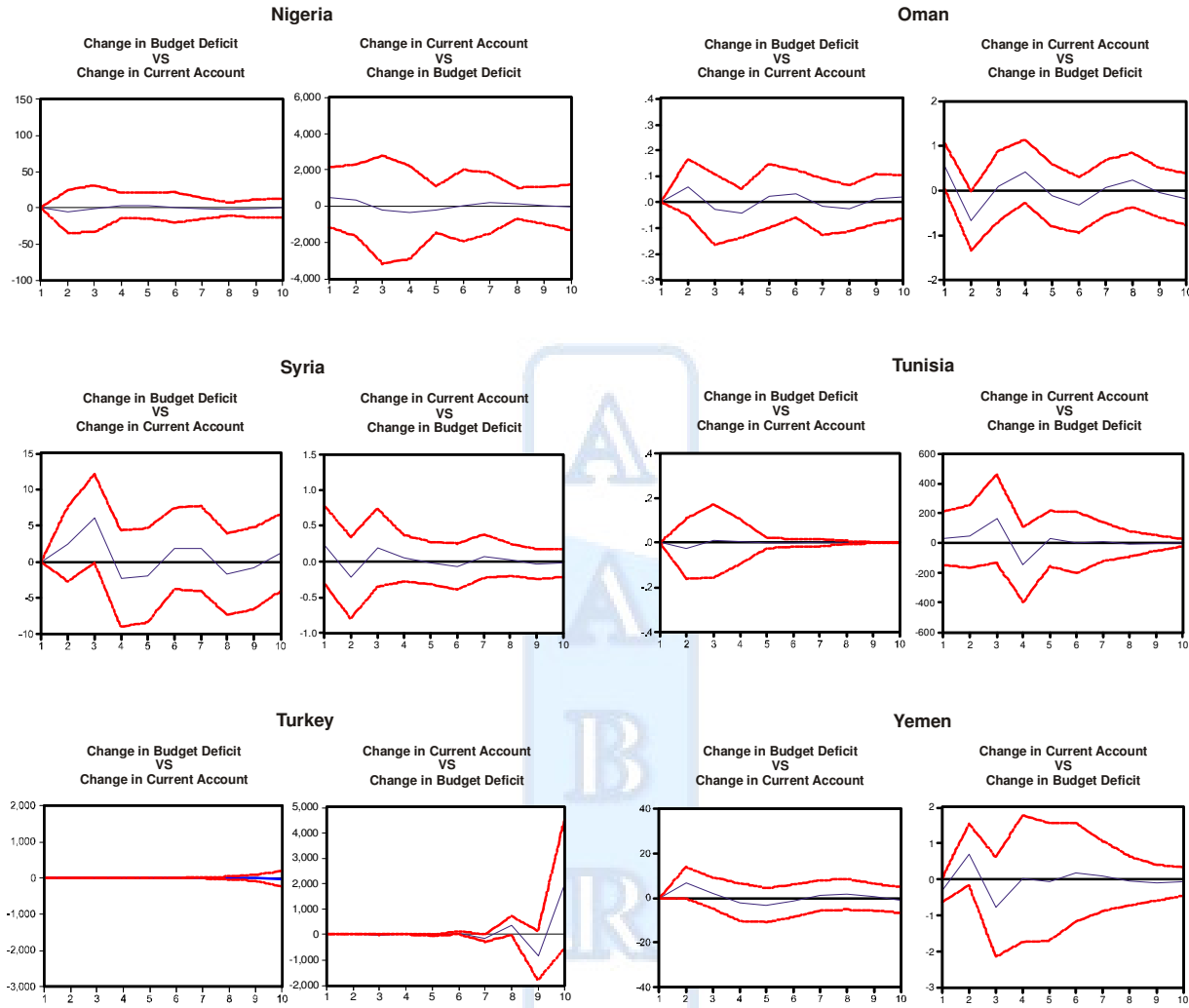


Figure 1 Continued:



**Conclusion**

The twin deficit hypothesis has often been invoked by influential economists in the West as a theoretical basis to argue against government deficit spending and its adverse consequences on the external trade balance. Although deficit financing tend to stimulate the flow of imports in an expanding economy, it does not necessarily pose a serious dilemma when the economy is in recession. As Higgins and Klitgaard (December 1998) have correctly noted, while a high a current account deficit may harm employment and production in some sectors of the economy, the resulting inflow of foreign capital creates offsetting employment and spending opportunities in other sectors of the economy.

We submit that with all the complexities that are inherent in a mixed economy, it may not be possible to verify a tight and stable relationship between the two deficits. The empirical evidence regarding the association between the two deficits is ambiguous and often contradictory. In this paper, we have attempted to demonstrate that the twin deficit proposition is

not universally supported. If anything, the incidence of twin deficits appears to be country specific. For example, in some countries such as Japan, we observe a natural structure of trade surplus, budget deficit, and high investment and saving while in other countries such as the United States, we observe that high budget deficit, high trade deficit and low level of savings tend to be the norm. From a practical stance, the twin deficit hypothesis may not serve as reliable guideline for macroeconomic policy decisions.

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<sup>1</sup> In his articulation of the “equivalence theory”, classical economist, David Ricardo (1817) suggests that government budget deficits should not alter capital formation and economic growth or the level of aggregate demand including demand for imports due to the fact that far-sighted individuals fully capitalize the implied future taxes associated with budget deficits. Stated differently, the theory implies that there is no apparent correlation between the two deficits. Though controversial, Ricardo’s neutrality hypothesis suggests that the private sector views budget deficits as public investment and treats public and private investment as perfect substitutes. Thus, fiscal measures designed to influence aggregate demand will prove fruitless as individuals reduce consumption in anticipation of future tax liabilities.

<sup>2</sup> The current study is a substantial revision of an earlier study by Hashemzadeh and Wilson (2006) and uses more current data from an expanded sample of countries and applies a more appropriate methodology to infer presence and direction of causality between the two deficits.

<sup>3</sup> VAR modeling has proven successful for forecasting systems of interrelated time series variables over short-term horizons (Watson 1994). Succinctly stated, in a VAR model, every equation has the same right hand variables, and those variables include lagged values of all the endogenous variables. The inclusion of lagged values of the endogenous variables is intended to eliminate estimation bias associated with simultaneity and serial correlation. As further insurance against spurious regression estimates, all variables are expressed in first differences.

