



منتدى الاستراتيجيات الأردني  
JORDAN STRATEGY FORUM

# Real Economic Growth in Jordan: The Role of Investment at the Macro & Micro Levels

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## منتدى الاستراتيجيات الأردني JORDAN STRATEGY FORUM

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## EXECUTIVE SUMMARY

The Jordanian economy faces a number of socio-economic challenges. To remind all stakeholders, these challenges include fluctuating real Gross Domestic Product (GDP) growth rate, consistently high unemployment rates, rapidly expanding labor force, existing poverty levels, and vulnerability to downward income mobility by a significant proportion of the total population. Also, it is disappointing to note that successive governments have been experiencing consistent budget deficits and the capital component of total public spending has been falling at alarming rates.

Within the context of the Jordanian socio-economic dynamics, it is important to note that there is no magical formula that can, for example, result in strong and sustainable real economic growth with positive implications to unemployment and poverty. Indeed, for more than two decades, economists, as well as others, have been trying to understand the growth experience of nations.

Notwithstanding the fact that there is no single and unifying theory, one can find a number of economic theories that discuss the role various factors in real economic growth. This effort has led to the publication of numerous applied research papers and policy-oriented papers that examine what really impacts growth. As one might expect, gross fixed capital formation and bank credit to the private sector (macro) have been instrumental in this line of research. In addition, firm-level investment (micro) has been examined because this activity can exert significant impact of the performance of firms, and hence, on the national economy.

This paper examines the role of investment in the Jordanian economy at the macro and micro levels. At the macro level, the paper scrutinizes the impact of gross-fixed capital formation (and other factors) on economic growth during the period 1993-2016. At the micro level, and as a possible representative sample of the private sector, the paper probes the relationship between listed Jordanian industrial firms' investment behavior and their performance.

Based on the statistical analysis, the results are encouraging. The findings indicate that gross fixed capital formation and bank credit to the private sector promote real economic growth in Jordan. Similarly, the micro-level analysis indicates that the investment behavior of listed Jordanian industrial firms is significant in impacting their performance (profitability). In other words, the results imply that firms which invest more in fixed assets tend to earn greater profitability levels.

## 1. INTRODUCTION

For more than two decades, economists, as well as others, have been trying to understand the growth experience of nations. Indeed, whilst this cumulative effort has resulted in the publication of theoretical, empirical, and policy-oriented papers, the process that underlies economic performance is still not properly understood. We still do not really understand why some countries enjoy strong and stable real economic growth, while others experience unstable or even poor performance.

Notwithstanding the fact that there is no unifying theory, one can find in the literature a number of theories that discuss the role of various factors in economic growth. Some of the most prominent works include Solow (1956), Romer (1986), Lucas (1988), Myrdal (1957), Kaldor (1970), Krugman (1991), North (1990), and Brunetti (1997). As expected, the theoretical effort that dealt with economic growth has led to the publication of many academic and policy-oriented papers. Based on this literature, we can state that investment, human capital, economic policies and macroeconomic conditions, openness to trade, institutional framework, innovation and research and development activities, foreign direct investment, openness to trade, political stability, socio-cultural factors, financial development, and others have been considered as possible determinants of growth.

Relative to the above-mentioned brief account of the economics of growth at the macro-level, it is also useful to note that firm-level investment has caught the attention of researchers as well as policy-makers. Indeed, corporate investment in real assets directly impacts firms' production process and efficiency, as well as their future profits. More importantly, corporate investment is fundamental to the growth of firms themselves and to the performance of the national economy.

Within the context of the "*determinants of economic growth*" at the macro level, and the "*impact of firms' investment on their performance*", the objectives of this paper are two-fold:

- (1)** To examine the impact of gross fixed capital formation<sup>1</sup> on real economic growth in Jordan during the period 1993-2016.
- (2)** To examine the impact of listed Jordanian industrial firms' investments in real assets on their performance (2001-2016).

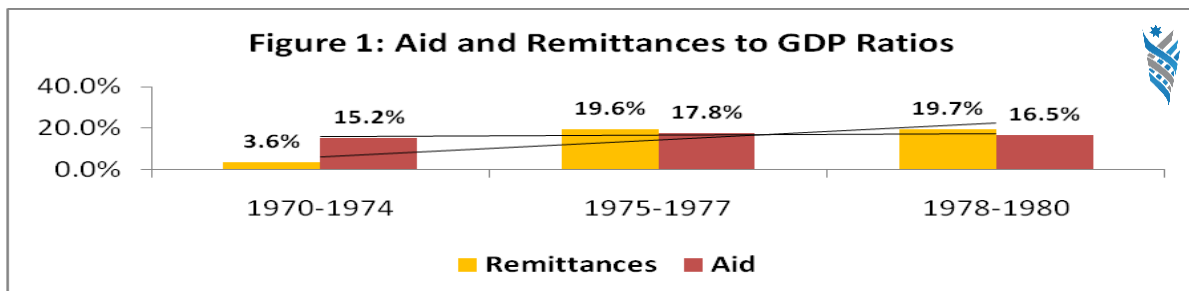
The rest of the paper is organized as follows. In section 2, we put the Jordanian economy in its proper perspective relative to its need for investments at both the macro and micro levels. In section 3, the data, methodologies, and empirical results are presented and discussed. Finally, the last section summarizes and concludes.

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<sup>1</sup> Gross fixed capital formation includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and the commercial and industrial buildings" (world Bank).

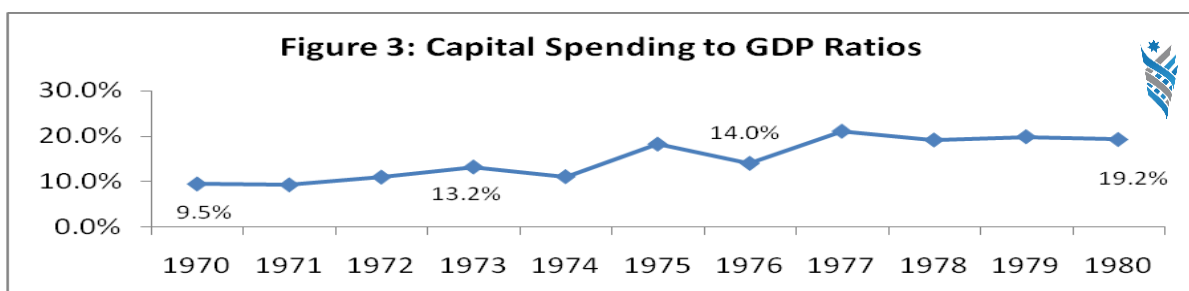
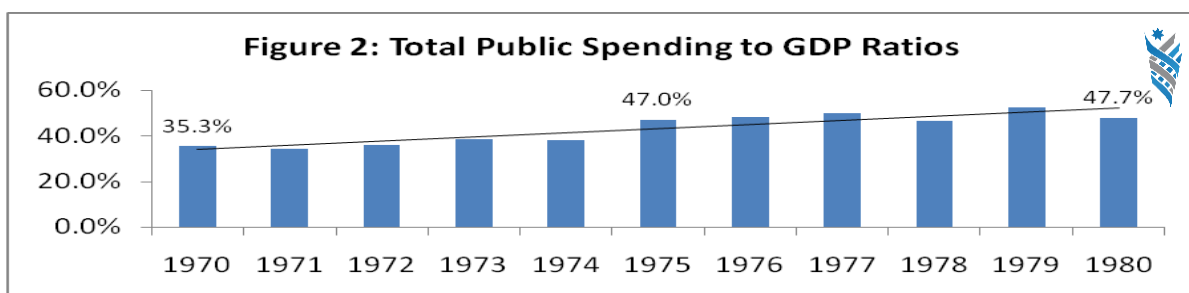
## 2. THE JORDANIAN ECONOMY: THE CONTEXT

To understand the underlying economic challenges facing Jordan, one should probably start from the period immediately after the 1967 Arab-Israeli War because of its' lasting implications to the economy. **First**, the fact that Jordan is a small country with limited resources, many of the Palestinians refugees looked for employment opportunities abroad; mainly in the Arab Gulf countries. As a result, the inflow of remittances increased significantly during the period 1970-1980. **Second**, being on the confrontation line with Israel at the time, Jordan received huge financial support from the regional and international community (Figure 1).



Given the political-economy circumstances of the 1960s and 1970s, one can argue that Jordan **“had no choice”** but to rely on aid and remittances in managing its' economic affairs and meeting growth and development plans.

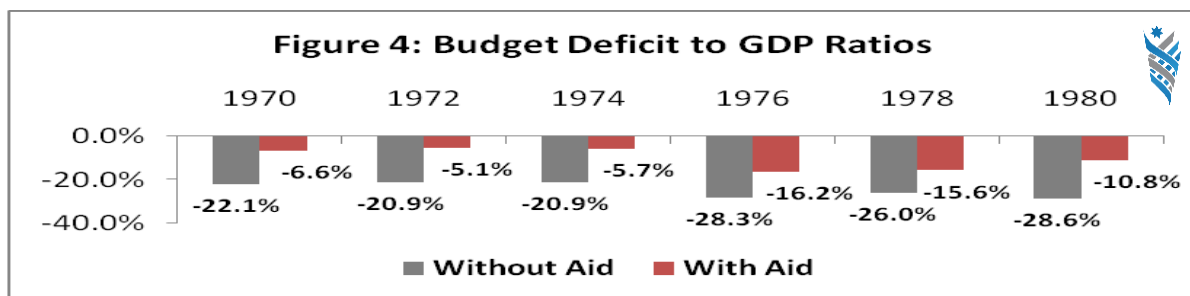
As expected, the foreign capital inflows (aid and remittances) that Jordan received generated strong economic activities. Aid enabled the government to invest in human and physical infrastructure. Indeed, total public spending increased from 35.3% of GDP in 1970 to more than 47% by the end of 1980 (Figure 2), and this increase was largely due to its' capital spending component (Figure 3). In addition, and fuelled by the increasing inflow of remittances, the mean annual increase in real private consumption was equal to 8.8% (1970-1980).



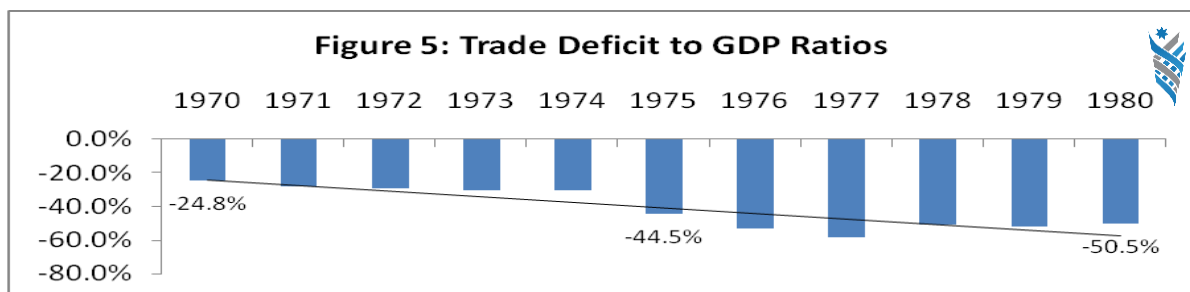
The 1970s economic activities resulted in strong economic performance. For example, the country enjoyed 11.6% real annual increase in its GDP (1973-1982). The overall unemployment rate in 1982 was equal to only 4.8%. Also, the country witnessed some additional gains in, for example, new and improved physical infrastructure, reductions in infant mortality rate, increases in life expectancy, increased access to education, and improvements in literacy levels.

The strong growth witnessed during the 1970s and early 1980s notwithstanding, it is interesting to note that certain features characterized the Jordanian economy. Two of these features are worth raising.

**First**, in spite of the huge aid inflows, the government suffered from large and consistent budget deficits. Without aid, the budget deficit to GDP ratio in 1980 was equal to 28.6%. With aid, this deficit was reduced to 10.8% of GDP (Figure 4).



**Second**, the national economy suffered from consistent and growing trade deficit. Indeed, by the end of 1980, this reached passed the 50% of GDP mark (Figure 5).



The Jordanian economy's ***“dependence”*** on aid and remittances, and consistent budget and trade deficits are ***clearly not positive observations***. Together, they have made the economy ***“reliant”*** on external factors over which policy-makers had little control. Indeed, economic weaknesses started to appear soon after 1980.

The 1980s collapse in the crude oil prices and the resultant slowdown in regional economies had some serious repercussions on the Jordanian economy. Some of these repercussions are listed below.

**A)** The annual flow of Jordanians looking for work in the Gulf countries declined causing a rise in local unemployment from 4.8% in 1982 to 10.3% by the end of 1989.

**B)** Remittance inflows to GDP ratio decreased from 23.5% in 1981 to 20.4 percent in 1985, 14.8% in 1989, and to 12.0% by the end of 1990.

C) Aid to GDP ratio decreased from 16.3% (1970-1980) to 12.5% (1981-1983), 7.2% (1984-1986), and to 7.2% (1987-1990).

D) The mean annual growth rate in real GDP collapsed to 1.4% (1983-1987).

The sudden decrease in aid, the country's "**commitment**" to some large infrastructure projects, as well as the increase in the demand for public goods, forced successive governments to rely on borrowing to fund public spending. Total external debt passed the 190% of GDP mark. As a result, the government devalued the Dinar (October 1989) and embarked on an austerity and restructuring program supervised by both the International Monetary Fund (IMF) and the World Bank (WB).

Since the help of the IMF was sought, the Jordanian economy has passed through various phases of reforms (Alissa, 2007). Whilst not the objective here to review these reforms in any detail, we can outline two observations:

**First**, the aim of the first and second phases (1989-1991 and 1992-1999) was to stabilize the economy, reduce budget and current account deficits, control inflation, and to rebuild foreign exchange reserves.

**Second**, the current phase (1999 – present) marked a more serious commitment to economic liberalization. Since the signing of the Association Agreement with the European Union in 1997, Jordan has become the 136<sup>th</sup> member of the World Trade Organization (WTO) in April 2000. In addition, President Bush signed (September 28, 2001) into Law the United States – Jordan Free Trade Area Implementation Act, and together with Tunisia, Egypt, and Morocco, Jordan signed the Agadir Agreement in Rabat on 25 February 2004. It is useful to note that the "**ongoing**" reform phase has witnessed a major shift in the tax base. While customs used to be the major source of revenue for the government, the equation has changed and customs' revenue has been replaced by the sales tax<sup>2</sup>. More recently, the Jordanian government has also enacted the 2014 Public-Private Partnership (PPP) Law as the exclusive legal framework for public-private partnership projects. Indeed, PPPs are recognized as a catalyst for economic growth and employment generation in the launched blueprint "**Jordan 2025: A National Vision and Strategy**".

**More than three decades later**, Jordan remains in more or less similar circumstances. While the main characteristics of the economy have not really changed, a number of socio-economic realities have emerged. These are outlined below.

### Prevailing Characteristics:

1. The economy is reliant, albeit less than before, on aid and remittances. The mean annual aid and remittances to GDP ratios (2008-2016) were equal to 3.4% and 11.0% respectively.
2. Despite aid, governments suffer from consistent budget deficits. During the period 2008-2016, the mean deficit to GDP ratio was equal to 9.0%.

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<sup>2</sup> For a good analysis of the political economy of introducing sales tax in Jordan, see Saif (2009).

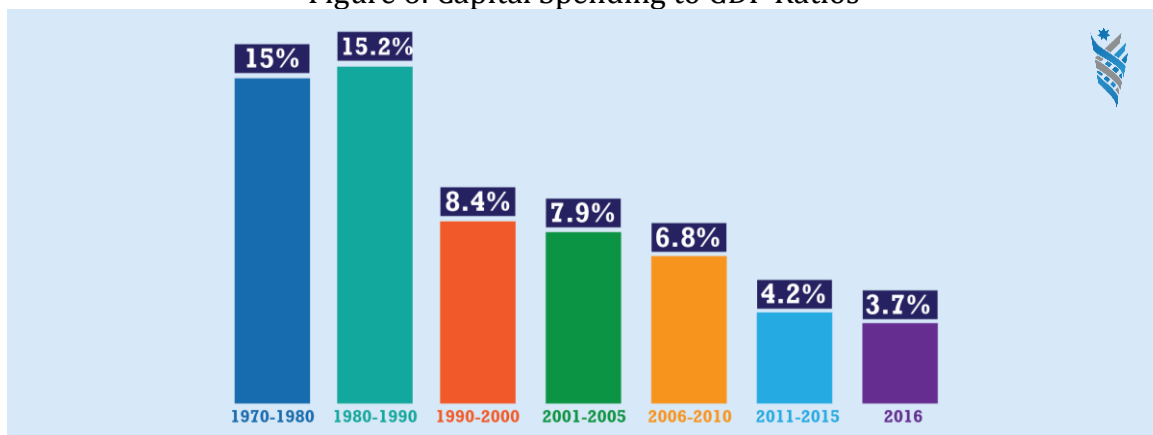


### Current Realities and Challenges:

1. Unemployment rates have been consistently high. During the years, 2006, 2010, 2015, and 2016 these rates were equal to 13.0%, 11.8%, 13.6%, and 15.8% respectively.
2. Amongst the educated (undergraduate degree and higher), the 2016 male and female unemployment rates are equal to 26.6% and 76.9% respectively.
3. The 2016 official figures indicate that the unemployment rates amongst the 15-19 years old and the 20-24 years old are equal to 36.3% and 36.0%.
4. Within the context of unemployment, the age structure of the population poses a real challenge. Those who are between 0-14 and 15-24 years old account for about 36% and 21% of the population.
5. It is encouraging to note that the female participation rate in the labor force has been increasing. However, this fact implies that unless the economy generates sufficient employment opportunities, females are expected to “**compete**” with males over job opportunities.
6. The government’s involvement in the national economy is relatively limited. During the period 2011-2016, total public spending to GDP ratio was equal to 33.5%. This is much lower than that in, for example, Denmark (56.7%), Germany (44.4%), Kuwait (43.3%), Turkey (37.1%), United Kingdom (42.0%), and others.
7. The capital spending component of total government spending has fallen from 15% of GDP per annum (1970-1980), to 8.4% (1990-2000), 6.8% (2005-2010), 4.2% (2011-2015), and to 3.7% in 2016 (Figure 6).

### Impact of Capital Spending on Economic Growth:

Figure 6: Capital Spending to GDP Ratios



The falling ratios of capital spending must have had negative implications to the infrastructure deficit facing the economy. To realize this, one only needs to look at the modest and perhaps poor rank of Jordan in terms of the ***World Bank's Global Macroeconomic Stability Index, and Logistic Performance Index, Worldwide Governance indicators (government effectiveness and regulatory quality), and the World Economic Forums's Global Energy Architecture Performance Index, Networked Readiness Index, and Human Capital Index.***

Within the context of the socio-economic challenges facing Jordan, it must be stated, from the outset, that ***the economics literature or profession has no explicitly stated theoretical model or framework that can guide researchers and other stakeholders including think tanks in their analysis and policy formulation.*** This is why different researchers from academia, strategic centers, and think tanks rely on different variables in explaining the growth experiences of countries.

Notwithstanding the absence of explicit models, and relative to the above-mentioned socio-economic challenges facing Jordan and the falling capital spending, however, it is useful to note that economic growth models agree on the importance of capital investment. ***Capital investment promotes growth by increasing the capital stock of a nation and its marginal productivity of capital.*** This is especially relevant in economies that have capital shortage.

Relative to the importance of capital investment, greater levels of openness to trade also allows economies to reorganize their factors of production and distribute them to where they have comparative advantages. As a result, through specialization and lower costs of production, economies are expected to realize some benefits from being more open to international trade (Romer, 1986). However, while openness can be beneficial, others argue that it can lead to macroeconomic instability by increasing inflation, depreciation in the local currency and by resulting in severe balance of payment deficits (Rodrik, 1992).

In the literature, it is also argued that banks (and stock markets) provide economies with a number of financial services which are conducive to economic growth. These include the pooling of savings, allocation of scarce capital resources, monitoring of investments, risk diversification and risk management, and the exchange of goods and services (Levine, 2004). Given these financial functions, it is stated that ***"a large body of economic literature supports the premise that, in addition to many other important factors, the performance and long-term economic growth and welfare of a country are related to its degree of financial development"*** (World Economic Forum).

In common with the economics of growth literature, the issues of firm growth and its performance have been a centre of many theoretical and applied research papers. Again, this is expected for several reasons.

**First**, the growth of firms reflects one of the positive outcomes of entrepreneurial efforts, and this effort is known to positively contribute towards growth and development (Delmar & Wiklund, 2008). Indeed, it is profitable firms that employ peoples, innovate, and even taxes.

**Second**, firms that achieve higher growth rates create more jobs (Moreno & Casillas, 2008).

**Third**, newly established firms that grow, compete with older firms, and possibly replace them, is a dynamic process that leads to greater productive efficiency (Moreno & Casillas, 2008). Given these reasons, the applied literature contains many papers that attempt to examine what impacts the performance of listed firms.

### BOX 1

Based on the above brief account of the economics of growth, most of the empirical literature starts with the following Cob-Douglas production function:

$$Y_t = f(K^\alpha L^{1-\alpha})$$

where, Y is economic output produced in a given economy and in a given period (t), and K and L are the capital and labor factors of production during the same period.

Based on the above model, one can argue that economic growth might be affected by a number of factors like capital formation, openness to trade, credit to the private sector, and others. In other words, when augmented, the model looks as follows:

$$Y_t = A_t K_t^\alpha O_t^\beta C_t^\varphi$$

where, Y is economic output produced in a given economy, and A is total factor productivity. As far as the other variables are concerned, K, O, and C represent the stock of capital (K), trade openness (O), and bank credit (C).

If one takes the logarithmic transformation of the above expression and differentiates both sides with respect to time, this expression can be re-written as follows:

$$Y_t = \alpha_t + \alpha K_t + \beta O_t + \varphi C_t$$

This expression decomposes economic growth into total factor productivity growth, capital, openness, and bank credit. Furthermore,  $\alpha$ ,  $\beta$ , and  $\varphi$ , represent the output elasticity of capital, openness, and credit. Finally, t denotes time (year).

To operationalize the last expression, one can re-state it as follows:

$$GROWTH_t = \lambda + \beta GFCF_t + \psi OPENNESS_t + \varphi CREDIT_t + \varepsilon_t$$

where, GROWTH is equal to real GDP growth rate, GFCF is equal to gross fixed capital formation to GDP ratio, OPENNESS is exports plus imports to GDP ratio, and CREDIT stands for total credit to the private sector to GDP ratio.

The expected signs of the parameters are:  $\lambda > 0$ ,  $\beta > 0$ ,  $\psi > 0$ ,  $\varphi > 0$ . The error term ( $\varepsilon$ ) is assumed to be independently and identically distributed. Finally, the subscript (t) denotes time.

### 3. THE DATA, METHODOLOGY, AND RESULTS

As mentioned in the introduction, this paper examines two related issues and these are the impact of gross fixed capital formation on real economic growth at the macro-level, and the impact of listed Jordanian firms' investments on their performance.

To examine the impact of gross fixed capital formation on economic growth in Jordan, we specify the following model:

$$\text{GROWTH}_t = \lambda + \beta \text{GFCF}_t + \psi \text{OPENNESS}_t + \varphi \text{CREDIT}_t + \varepsilon_t \quad (1)$$

where, GROWTH is equal to real GDP growth rate, GFCF is equal to gross fixed capital formation to GDP ratio, OPENNESS is exports plus imports to GDP ratio, and CREDIT stands for total credit to the private sector to GDP ratio.

The expected signs of the parameters are:  $\lambda > 0$ ,  $\beta > 0$ ,  $\psi > 0$ ,  $\varphi > 0$ ,  $\zeta > 0$ . The error term ( $\varepsilon$ ) is assumed to be independently and identically distributed. Finally, the subscript (t) denotes time (1993-2016). ***For the technical reader, Box 2 outlines the methodology in greater details.***

## BOX 2

As commonly known in such exercises, before we estimate the above expression (1), we proceed as follows.

First, the nature of the data distribution is examined using standard descriptive statistics including mean, median, and standard deviation. Second, the time series properties of all the used variables are tested for their stationarity using both the Dickey-Fuller and Phillips-Peron tests. Third, the co-integrating relationship among the variables is examined using the Johansen-Masulius procedures. In other words, the co-integrating rank ( $r$ ) is formally tested using the maximum Eigenvalue ( $\lambda_{\max}$ ) and the trace test ( $\lambda_{\text{trace}}$ ). These values are computed as follows:

$\lambda_{\max} = -T \log(1 - \lambda_{r+1})$ , where, the suitable null is  $r = g$  co-integrating vectors with ( $g = 0, 1, 2, 3, \dots$ ) against the alternative which is  $r \leq g - 1$ .

$$\lambda_{\text{trace}} = -T \sum_{i=r+1}^k \log(1 - \lambda_i)$$

where, the null is  $r = g$  against the general specification  $r \leq 1$ .

Fourth, based on the co-integration results, a vector error-correction (VEC) model is estimated to examine the long-run and short-run causality dynamics. The objective of this exercise (VEC model) is to specify the speed of adjustment from the short-run equilibrium to the long-run equilibrium condition.

Based on the main expression (1), the VEC model is expressed as follows:

$$\Delta \text{GROWTH}_t = \alpha + \lambda e_{t-1} + \sum_{i=1}^n b_i \Delta \text{GROWTH}_{t-i} + \sum_{i=1}^m c_i \Delta \text{GFCF}_{t-i} + \sum_{i=1}^o d_i \Delta \text{OPENNESS}_{t-i} + \sum_{i=1}^p e_i \Delta \text{CREDIT}_{t-i} + \varepsilon_t$$

In the above expression (4), we can state that a long-run convergence does occur between the variables if the parameter ( $\lambda$ ) of the error correction term is negative and statistically significant.

Finally, we estimate Granger causality between our dependent variable and each of the independent variables. Using expression (4), changes in gross fixed capital formation, openness, credit, and capitalization Granger cause real economic growth (GROWTH) if the  $c_i$ 's,  $d_i$ 's,  $e_i$ 's,  $f_i$ 's are statistically significant.

As far as the performance of listed industrial firms is concerned, we estimate the following panel regression model:

$$\text{ROA}_{i,t} = \beta_1 \text{INVESTMENT}_{i,t} + \beta_2 \text{AGE}_{i,t} + \beta_3 \text{LEVERAGE}_{i,t} + \beta_4 \text{SALES}_{i,t} + \beta_5 \text{TOBIN}_{i,t} + \beta_6 \text{LIQUIDITY}_{i,t} + \varepsilon_{i,t}$$

where, the subscripts  $i$  and  $t$  denote firms ( $i = 1, \dots, 57$ ) and time ( $t = 1, \dots, T = 2001-2016$ ) respectively.

The dependent variable is ROA = Return on assets and this is equal to net income divided by total assets. The independent variables include the annual change in net fixed assets (INVESTMENT), the natural logarithm of the age of the firm (AGE), total

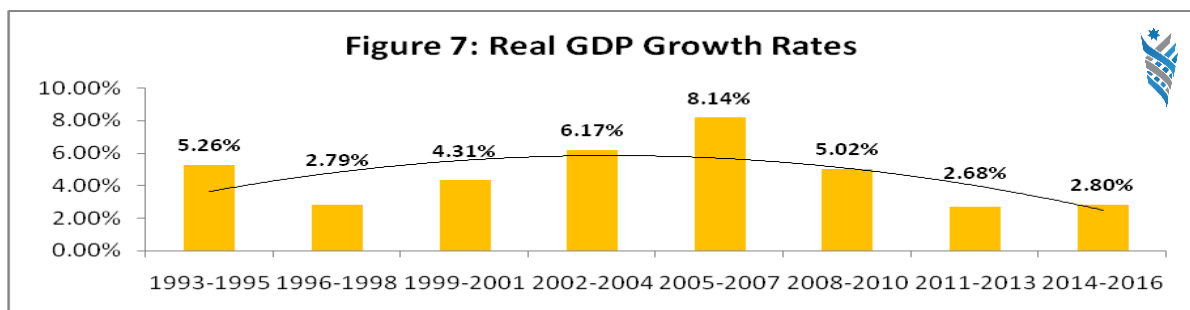
liabilities to total assets (LEVERAGE), the ratio of sales to fixed assets (SALES), market capitalization to book value (TOBIN), and current assets to current liabilities (LIQUIDITY).

Relative to the number of the listed firms, it is important to note that this number (57) accounts for more than 70% of all listed industrial firms. Our sample, it is argued, is a good representative sample of all firms. Moreover, it is also important to note that we rely on these firms (listed) only because their financial statements are available. It would have been really useful to examine non-listed firms as well.

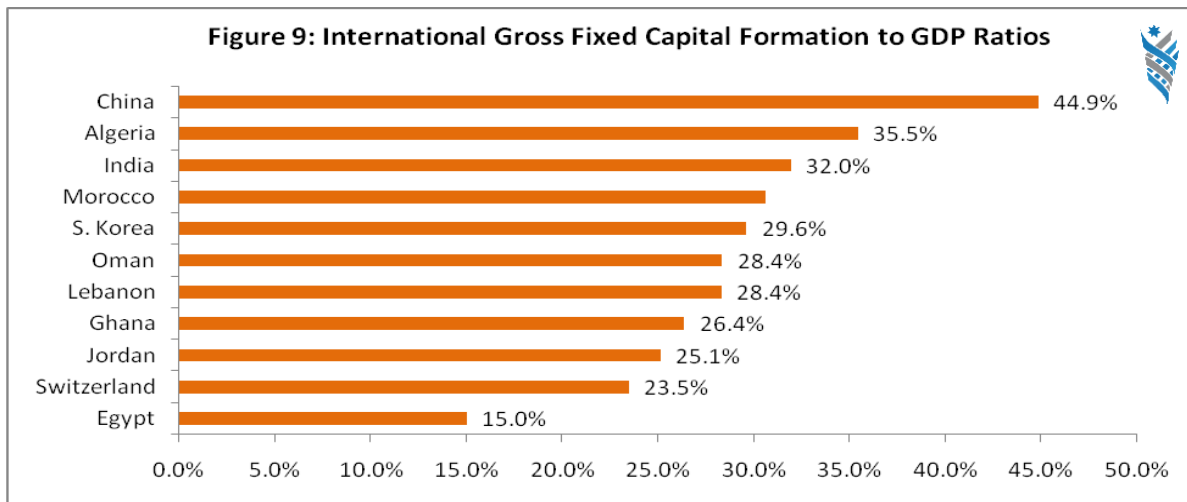
In Table 1, we report the descriptive statistics of the macroeconomic model's variables in terms of their mean, median, maximum, minimum, and standard deviation values. Based on the reported values, we can make the following observations.

**First**, during the period 1993-2016, the national economy realized a maximum and minimum real growth of 8.6% and -2.1% respectively. Overall, the economy has not experienced consistent real economic growth, and this can be seen in Figure 7 below.

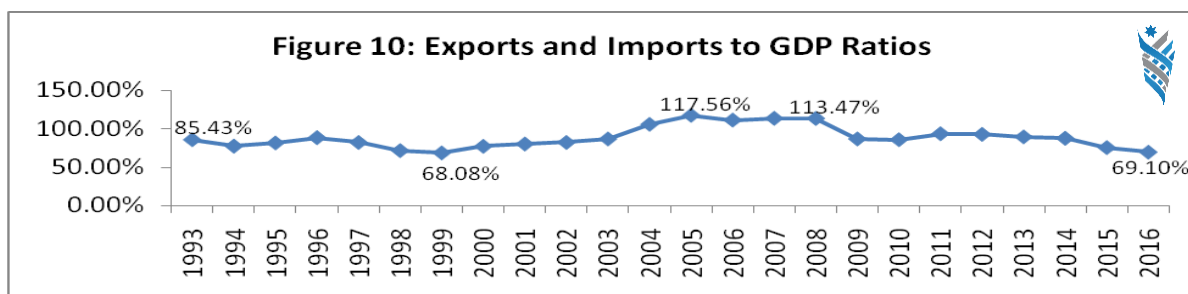
TABLE 1					
Variable	Mean	Median	Maximum	Minimum	Std. Deviation
<b>GROWTH</b>	4.650%	4.200%	8.600%	2.100%	2.137%
<b>GFCF</b>	25.342%	25.350%	33.600%	18.900%	3.964%
<b>CREDIT</b>	69.550%	67.950%	85.700%	59.700%	6.452%
<b>OPENNESS</b>	88.283%	86.000%	117.600%	68.100%	14.353%



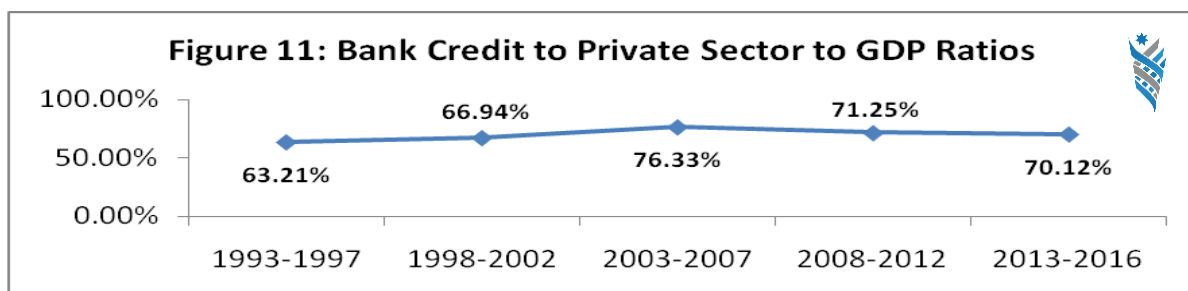
**Second**, relative to the period 1993-1997, gross fixed capital formation has been consistently low (Figure 8). Indeed, the maximum and minimum values of this measure which are equal to 33.6% and 18.9% (Table 1) occurred in the years 1993 and 2002 respectively. *To put this economic activity in its international perspective*, we report (Figure 9) the mean annual values of gross fixed capital formation to GDP ratio for a number of countries. Clearly, China tops the list with a 44.9% proportion.



**Third**, while openness of the Jordanian economy had the largest standard deviation (Table 1), it must be noted that the significant increases in this measure during the period 2004-2008 was due to the relatively high international oil prices (Figure 10). Within this aspect, it must also be pointed out that the degree of openness is due largely to imports and not exports. Indeed, during the period 1993-2016, the mean annual trade deficit was equivalent to about 35.2% of GDP.



**Finally**, the ratio of bank credit to GDP was relatively stable since 2008. In actual fact, this ratio changed between a minimum of 70% and a maximum of 76% of GDP.



The technical results of our analyses are presented in Appendix A (Tables 1-6). Based on the reported results, we can make two main conclusions (as far as the technical observations are concerned, we report them in Box 4).

**First**, the variance decomposition analysis reveals that gross fixed capital formation reflects an increasing power in explaining the variability of real economic growth rates over time. This factor (gross fixed capital formation) must be increased!



**Second**, the variance decomposition analysis also reveals that bank credit to the private sector reflect an increasing power in explaining the variability of real economic growth rates over time. Again, this aspect of the Jordanian banking sector must be examined in greater depth, and if possible, also increased!

**Third**, in relation to the above-mentioned conclusions, the lagged variance of real economic growth rates over time is weakening in their impact on economic growth.

**Fourth**, in the short-term, there is no relationship between economic growth and each of the other variables (gross fixed capital formation, openness and bank credit).

#### BOX 4

In Table 2, we present the results of the unit root test (Dickey-Fuller). These results reveal that all variables are non-stationary at the level form and stationary at their first differences. This stationary finding implies that all variables are integrated in the same order at their first differences. Indeed, this conclusion is also supported by the Phillips-Peron test (not reported). More importantly, this conclusion indicates that we can apply the Johansen co-integration test to test or detect the long-term co-integrating relationship among our group of variables.

In Tables 3 and 4, we report the results of the Johansen co-integration test. Again, based on the reported results of both the trace and maximum eigenvalue statistics, we can conclude that there is at least two co-integrating relationships at the 5 percent significance level. Such results reveal the presence of a long-run relationship among our group of variables. In addition, this result implies that we can estimate a Vector Error Correction Model (VEC).

The regression results under the VEC model with two lags are presented in Table 5 below. These results (Table 5) confirm the existence of a long-run equilibrium relationship among our variables. Indeed, this is confirmed by the negative and significant value of the coefficient ( $\lambda$ ) of the error correction term ( $\lambda\epsilon_{t-1}$ ). Furthermore, this finding also implies that gross fixed capital formation and bank credit to the private sector jointly promote real economic growth.

As far as the short-run relationship is concerned, it must be noted that except for real economic growth, none of the independent variables seem to significantly Granger cause economic growth and this can be seen in Table 7 below.

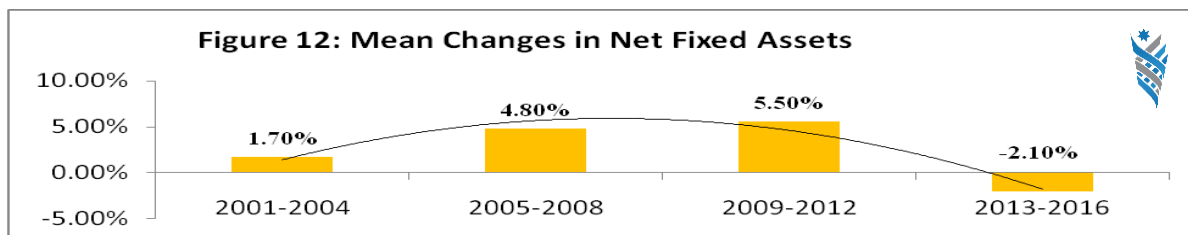
The results of our analysis of firm investment are reported in Figure 12, and Tables 2 and 3. Again, based on the findings, the following observations can be put forward.

**First**, the overall mean annual value of the change in fixed assets is equal to 2.5 per cent. However, what is more important to note is the fact that this measure reflects some significant changes or shifts during the period 2001-2016. Figure 12 shows that during the last few years (2013-2016) the annual change in net fixed assets was equal to -2.1 percent. This implies that listed Jordanian industrial firms have not been investing. This is an unfortunate observation.

**Second**, it is important to note that the mean leverage ratio for our sample of firms is equal to 35%. This is much lower than in the EU countries (55% - 65%). However, what



is more important is that this leverage is not due to long-term debt. In actual fact, long-term debt to total assets is even lower than the 5% level.



**TABLE 2**  
**FIRM-LEVEL DESCRIPTIVE STATISTICS**

	MEAN	MEDIAN	MAXIMUM	MINIMUM	STD.DEV.
<b>AGE</b>	40.692	37.000	80.000	14.000	<b>14.649</b>
<b>TOBIN</b>	1.490	1.121	7.474	0.000	<b>1.089</b>
<b>CASHFLOW</b>	0.300	0.047	15.240	-2.605	<b>0.986</b>
<b>SALES</b>	2.452	1.678	28.249	0.005	<b>2.996</b>
<b>LEVERAGE</b>	0.355	0.315	2.275	0.004	<b>0.253</b>
<b>LIQUIDITY</b>	2.723	1.834	20.138	0.008	<b>2.460</b>
<b>ROA</b>	0.007	0.021	0.840	-0.969	<b>0.116</b>
<b>INVESTMENT</b>	<b>0.025</b>	<b>-0.030</b>	<b>3.282</b>	<b>-0.990</b>	<b>0.314</b>

**Third**, and as expected, the change in net fixed assets (firm investment) impacts firm performance in a positive manner. Indeed, this impact is consistent. When we estimate our regression model using change in net fixed alone, or with each, or all of the other independent variables, its coefficient does not change in either sign or significance.

**TABLE 3**  
**REGRESSION RESULTS**

	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
<b>CHANGEINASSETS</b>	0.019 (2.990*)	0.018 (2.850*)	0.026 (4.222*)	0.031 (5.076*)	0.031 (5.104*)	0.030 (4.929*)
<b>AGE</b>	---	0.005 (2.645*)	0.024 (11.248*)	0.018 (7.416*)	0.015 (5.911*)	0.016 (5.290*)
<b>LEVERAGE</b>	---	---	-0.209 (-13.801*)	-0.202 (-13.524*)	-0.205 (-14.012*)	-0.209 (-12.789*)
<b>SALES</b>	---	---	---	0.007 (5.667*)	0.007 (5.536*)	0.007 (5.471*)
<b>TOBIN</b>	---	---	---	---	0.010 (3.408*)	0.010 (3.456*)
<b>LIQUIDITY</b>	---	---	---	---	---	-0.001 (-0.651)
<b>Adj. R-Squared</b>	0.088	0.148	0.217	0.234	0.249	0.247
<b>F-Statistic</b>	---	14.684*	127.300*	93.623*	76.446	60.677
<b>D-W Statistic</b>	1.959	1.962	1.973	1.976	1.980	1.977

\* implies significance at the 99 percent confidence level.

**Fourth**, as far as the other independent variables are concerned, on average, they have the expected signs. For example, the impact of firm leverage on performance is consistently negative and significant. This result is expected given the fact, as mentioned above, most of the leverage on the books of our sample of firms is short-term. In other words, most firms do not rely on bank loans in the financing of their fixed assets. This observation is reinforced by the positive impact of Tobin's q on firm performance. Firms

with a higher market to book ratios would tend to find it easier to finance their investment by issuing stocks, and hence realize greater levels of profits. Age is also significant in its impact on performance. Again, one can argue that older firms are more known and have stable source of income and hence, greater profitability levels. Finally, sales positively impacts profitability. The fact that this measure is equal to net sales divided by net fixed assets, this finding implies that firms which rely relatively more on fixed assets in generating sales incur lower costs of production (mechanization) and hence, higher profits.

## 4. SUMMARY AND CONCLUSIONS

One cannot, and should not, underestimate the socio-economic challenges facing Jordan. As commonly known, these challenges include consistently high unemployment rates, especially among the young and educated. Within this context alone, one can argue for the economic importance of gross fixed capital formation at the macro-level, and the performance of the private sector firms (micro-level).

This paper has examined the impact of fixed capital formation (and other factors) on the performance of the national economy (annual real economic growth). In addition, the paper looked at the impact of Jordanian industrial firms' investments in real fixed assets on their performance (return on assets).

Based on the used time series analysis techniques, and the time period 1993-2016, the results are encouraging.

**First**, gross fixed capital formation reflects an increasing power in explaining the variability of real economic growth rates over time. This factor (gross fixed capital formation) must be increased!

**Second**, before thinking about increasing public (and private) capital spending, the government must consider the tax revenue to GDP ratio (tax effort) and its consistent budget deficit. The existing tax law enables the government to collect about 15% of GDP in tax revenue. This is lower than that which exists in, for example, Turkey (30%), never mind in Europe (40% to 50%). Here, it is worth remembering that one of the objectives of the on-going Fiscal Reform III is revenue mobilization. ***The government move fast and invest heavily in Public-Private Partnership (PPP) capital projects.***

**Third**, the findings indicate that bank credit to the private sector promotes real economic growth in Jordan. This aspect, especially in its long-term dimension to the private sector, must be increased.

**Fourth**, the relatively huge capital inflows in the form of aid and remittances that Jordan receives must be channeled more effectively in promoting investments at both the macro and micro levels.

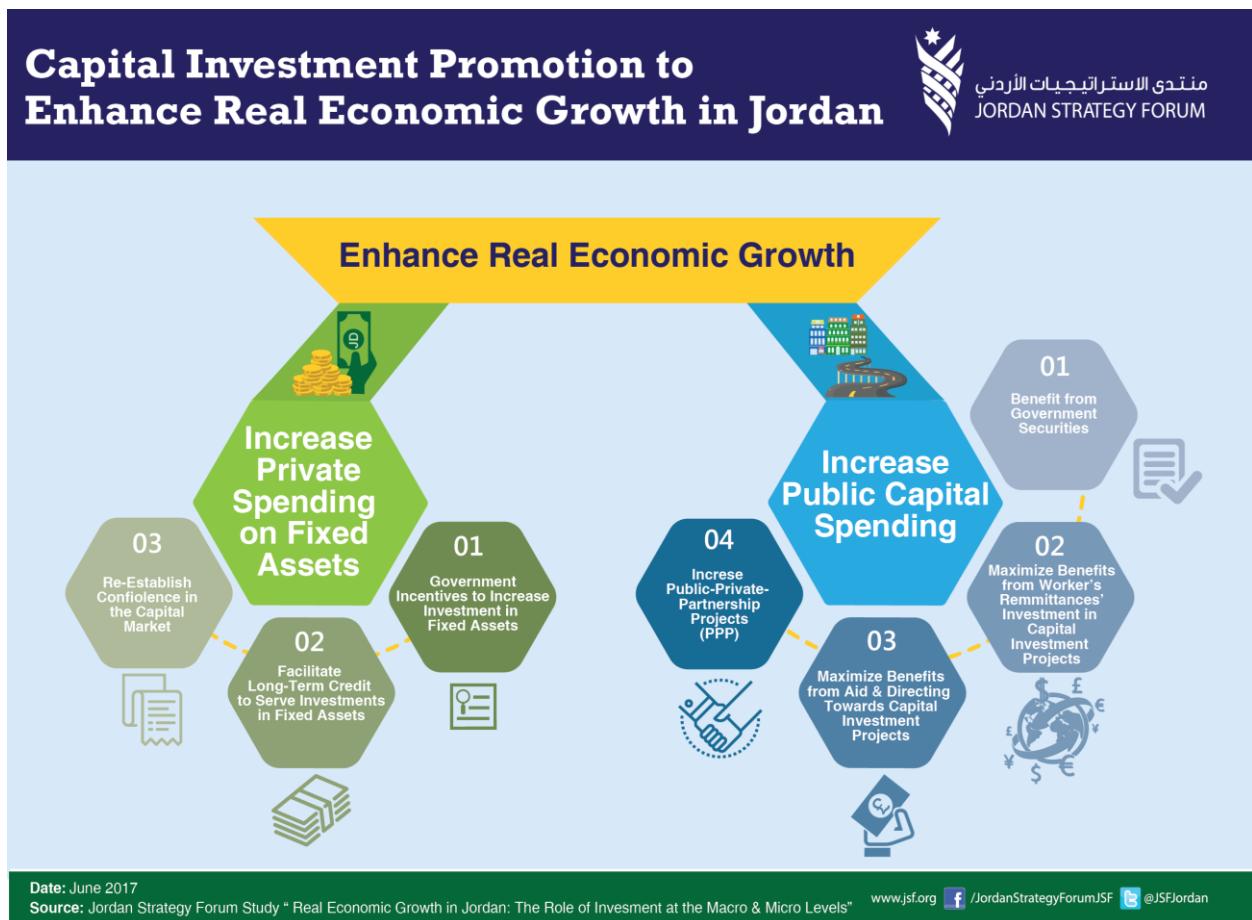
**Fifth**, the micro-level analysis indicates that the investment behavior of listed Jordanian firms is significant in impacting their profitability.

**Sixth**, the private sector must examine the financing of its assets. If most listed firms do not have *“long-term”* debt on their books, how can one expect them to find it easy to finance their capital spending projects? If licensed Jordanian banks have concerns about lending long-term, these concerns, in cooperation with the government, must be dealt with.

**Seventh**, government incentives to private companies who intend to increase their fixed assets.

**Finally**, one must ask why the government and the private sector have not managed to establish an active, efficient, and liquid market for fixed-income securities (bonds)? Such a market would prove to be an instrumental source of finance.

The following info-graph summarizes recommended ways to promote capital investment to enhance real economic growth in Jordan.



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## APPENDIX A

**TABLE ONE**  
**Augmented Dickey-Fuller Unit Root Test**

	Level			First-Difference		
	None	Constant	Constant & Trend	None	Constant	Constant & Trend
Variable						
<b>GROWTH</b>	-0.907	-1.760	-1.804	-5.630*	-5.520*	-5.425*
<b>OOPENNESS</b>	-0.552	-1.902	-1.026	-3.714*	-3.629*	-3.779*
<b>CREDIT</b>	0.595	-2.636	-3.096	-2.864*	-2.860*	-3.716*
<b>GFCF</b>	-1.262	-2.395	-2.265	-4.186*	-4.202*	-4.114*

\* implies significance at the 99 percent level.

**TABLE TWO**  
**Johansen Multivariate Co-Integration Test**

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	5 percent CV	P-Value
None*	0.702	64.191	47.856	0.0007
At most 3*	0.341	8.757	3.841	0.0031

Trace statistic indicates two co-integrating equations at the 5 percent level.

**TABLE THREE**  
**Johansen Multivariate Co-Integration Test**

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	5 percent CV	P-Value
None*	0.702	29.406	27.584	0.0021
At most 3*	0.341	8.757	3.841	0.0031

Max-eigenvalue test indicates two co-integrating equations at the 5 percent level.

**TABLE FOUR**  
**Estimates of VEC Model**

Variable	Coefficient	Std. Error	t-statistic
$\lambda_{t-1}$	-0.863	0.283	-3.046
$\Delta$ GROWTH(-1)	-0.924	0.184	-5.001
$\Delta$ GROWTH(-2)	-0.392	0.178	-2.194
$\Delta$ OOPENNESS(-1)	0.115	0.061	1.885
$\Delta$ OOPENNESS(-2)	0.009	0.039	0.220
$\Delta$ CREDIT(-1)	-0.098	0.128	-0.761
$\Delta$ CREDITSS(-2)	-0.245	0.158	-1.154
$\Delta$ GFCF(-1)	-0.040	0.151	-0.268
$\Delta$ GFCF(-2)	0.130	0.164	0.796
Adjusted R-Squared	0.638		
F-Statistic	4.343		

**TABLE FIVE**  
**VARIANCE DECOMPOSITION OF GROWTH**

Period	GROWTH	OPENNESS	CREDIT	GFCF
1	100.000	0.000	0.000	0.000
2	74.478	2.556	10.124	12.841
3	72.945	2.280	13.351	11.424
4	72.474	1.862	15.701	9.961
5	70.871	2.018	15.896	11.214
6	66.735	1.624	19.742	11.898
7	65.868	1.469	21.061	11.601
8	66.235	1.289	20.769	11.706
9	66.423	1.215	20.634	11.727
10	65.459	1.114	21.791	11.635

**TABLE SIX**  
**Pair-wise Granger Causality Tests**

Null Hypothesis	F-Statistic	Probability
OPENNESS does not Granger cause GROWTH	1.493	0.254
GROWTH does not Granger cause OPENNESS	0.297	0.747
CREDIT does not Granger cause GROWTH	0.157	0.855
GROWTH does not Granger cause CREDIT	0.325	0.727
GFCF does not Granger cause GROWTH	0.355	0.707
GROWTH does not Granger cause GFCF	0.903	0.425



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