

Foreign Direct Investments and Economic Growth in Saudi Arabia: A Cointegration Analysis

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Abstract

This study used the Johansen cointegration framework to evaluate the causal relationship between foreign direct investment (FDI) and economic growth in Saudi Arabia during 1970-2012. By referring to endogenous growth theory and integrating an analysis of two additional variables of domestic capital investment and trade openness, the results show that there is at minimum a long-run relationship between FDI inflows, economic growth, domestic capital investment and trade openness. Moreover, Granger causality tests showed that FDI inflows promote both short- and long-term economic growth. As such, FDI has factored into improvements in the Saudi Arabia economic situation mainly since 2000. This result supports the FDI-led growth hypothesis of endogenous growth theory.

Keywords: FDI inflows, economic growth, domestic capital investment, trade openness, Johansen cointegration approach, Saudi Arabia.

1. Introduction

During the last three decades, globalization has generated strong growth in international activity and foreign direct investment (FDI). This growth has progressed with a noticeable rhythm since the beginning of the 1990s. Besides offering more advantages than other types of financial flows, FDI has become an important source of outside financing and it represents an essential means for countries to enter the global market. Beyond the increase that FDI provides in terms of national capital stock, they have a positive impact on productivity due to technological transfers and improved management skills.

FDI inflows can provide host countries with advanced technologies and improved strategies for management, finance and market access for the production of goods and services. Therefore, FDI contributes significantly to raising the total factor productivity that can be essential for economic growth. Also, FDI inflows have positive impacts on domestic capital investments, particularly if these flows affect industries with domestic forward and backward linkages. Finally, FDI can lead to improvements in the quality of domestic production, increased domestic and international competitiveness, and creation of new jobs in the host country (Wang and Blomstrom, 1992; De Mello, 1997, 1999).

Following the example of other developing economies, the Kingdom of Saudi Arabia recently designed an economic policy to promote the development of its economy by using FDI. Before 1999, FDI inflows were not important or necessary in the oil sector. In many of the following years, the investment outflow from Saudi Arabia exceeded its inflow as evidenced by the huge earnings from oil exports and the small capacity of the Saudi economy to absorb all its financial resources. Saudi Arabia should thus take action to attract FDI inflows in non-oil sectors and reduce investment outflows. Since the creation in 2000 of the General Investment Authority by the Saudi government, many measures (e.g. Tax concession provisions, revised trade-related and corporate laws as well as infrastructure investments) have been taken to attract FDI. In addition, to attract more FDI inflow and pursue its policy of economic diversification, in 2005 Saudi Arabia joined the World Trade Organization (WTO).

Since joining the WTO, foreign companies can now access tax holidays and concessional finance in many sectors making full foreign ownership in the Kingdom of Saudi Arabia possible (Alkhathlan, 2009). These efforts have enabled Saudi Arabia to be among the top 10 most attractive for FDI inflows worldwide and the first country in the Arab world to rank so highly. The amount of FDI inflow into Saudi Arabia has increased from \$804 million US dollars (USD) in 1990 to \$91,564 million USD in 2008 (Alkhathlan, 2013). Moreover, Saudi Arabia has captured about 38.2 percent of the total Arab FDI inflows in 2011 (Alobaid, 2014). The principal countries investing in the Kingdom are the USA, Kuwait, the UAE, France and Japan. In 2012, FDI inflows reached \$12.2 billion USD (WDI, 2013).

Concurrent with the rapid growth in FDI, many theoretical and empirical studies that attempted to determine the theoretical advantages of these flows on the economy of every country have appeared, particularly since the 1990s (Grossman and Helpman 1991; Blomstrom et al., 1994; Borensztein et al., 1998; Tiwari et Mutascu 2010; Adeniyi et al., 2012; Soltani and Ochi, 2012). These studies produced mixed results. Some authors concluded that there were no positive links (and/or recognized the existence of mixed results) between FDI and economic growth. In contrast, other studies found that FDI positively and significantly affects long-term

economic growth. In fact, these studies identified conditions that can help developing countries make full use of the potential advantages provided by FDIs.

In this context, this study used the Johansen cointegration framework (1991, 1995) to evaluate the causal relationship between FDI inflows, domestic capital investment, trade openness and economic growth in the Kingdom of Saudi Arabia. The Granger causality tests were used to analyze annual economic data from 1970 to 2012. The second section of this study provides an overview of the literature concerning the link between FDI inflows and economic growth while the third section describes the study data and methodology. Section 4 presents and discusses the empirical results and Section 5 outlines the study conclusions and policy implications.

2. Literature Review

The relationship between FDI and economic growth has been the subject of many studies in international economics over the last three decades. In the economic literature, numerous publications have highlighted the influence of FDI on economic growth by describing the various channels through which FDI can exercise direct and indirect positive effects on economic growth. These works confirmed these links by exploring various aspects of FDI effects such as: i) technological transfer; (ii) introduction of new processes; iii) productivity gains; and iv) opening of new market opportunities. FDI is generally considered as a conduit through which technology can propagate development in developing countries.

According to Chen (1992), the development of FDI generally plays a positive role in stimulating economic growth in host countries. Furthermore, Blamestorm and Kokko (1997) assert that favors economic development by improving growth in productivity and exports. De Mello (1997) found that FDI affects economic growth in the host country when domestic firms are efficient. The existence of long-term relationships between FDI and economic growth depends on the productivity of national firms and the degree of complementation between domestic and foreign investment. In studying China, Dess (1998) noted that FDI positively and significantly affects economic growth in the long-term by influencing technological changes. Meanwhile, Borensztein et al. (1998) presented a model wherein the degree of technological progress is the main driver of long-term economic growth. Their results suggest that FDI, which is an important tool for technology transfer, stimulates economic growth to a greater degree than domestic investment. Although certain empirical studies recognized the existence of a positive correlation between FDI and growth, several other works found opposite effects. Following the examples of these studies, conclusions by Aitken and Harrison (1999) concerning the profits of FDI for domestic firms showed that the net effect of FDI on productivity is not a factor.

Sadik and Bolbol (2001) studied the impact of FDI on total factor productivity in six Middle East and North Africa (MENA) countries including Saudi Arabia over the period 1978-1998. They found a negative and significant impact in the case of Saudi Arabia. As noted by Agénor (2001), FDI inflows can facilitate the transfer or distribution of management and technological expertise to improve the skills of the workforce through the application of the principle "*learning by doing*". Besides, the increase in the degree of world market capital integration accompanied a significant increase in capital flows dedicated to developing countries. Direct investment flows and investments in the portfolios of developing countries increased significantly during the 1980s and 1990s. This upward trend engendered an increased incidence of financial volatility and exchange crises during the second half of the 1990s. Nevertheless, Ogutucu (2002) supported FDI as an important catalyst for the development and integration of developing countries into the global economy. Liu et al. (2002) investigated causal relationships between FDI, trade openness and economic growth in China using quarterly data for imports, exports, FDI and economic growth during 1981-1997. By using a cointegration approach, they found a bidirectional causal relationship between FDI, exports and economic growth.

Athukorala (2003) studied the causal relationship between FDI and economic growth in Sri Lanka by employing using the vector error correction model. He found that there is a unidirectional causality running from the economic growth to FDI in Sri Lanka. Using similar methods, Kohpaiboon (2003) studied Thailand during 1970-1999. By introducing exports as a variable into the equation "growth-FDI", he showed that the impact of FDI on growth tends to factor more significantly into the commercial regime of export promotion compared with an import substitution regime. Balamurali and Bogahawatte (2004) also confirmed these results in a study of Sri Lanka during 1977-2003. These authors found that improved reforms of commercial policies and restoration of international competitiveness allowed the widening and diversification of this country's exports, which in turn accelerated long-term economic growth.

Feridun (2004) studied the relationship between FDI and economic growth for Cyprus and found that FDI Granger causes economic growth, but the reverse situation does not. A study by Alfaro et al. (2006) revealed that increased FDI generates three times more additional growth in countries that are financially very developed compared to countries with less financial development. Meschi (2006) investigated the impact of FDI on economic growth in MENA countries over the period 1980-2003 using econometric panel data models. The author found that FDI affects negatively economic growth.

Bhandari et al. (2007) concluded that increased stock in domestic capital and FDI inflows are the main

factors that positively influence economic growth in Eastern Europe. Meanwhile, Won et al. (2008) concentrated their analysis on recently industrialized Asian countries and used the VAR model to show that enhanced economic openness as measured mainly by exports and FDIs is the most significant factor that contributed to the rapid growth of these Asian economies. Anwar and Nguyen (2010) also examined the link between economic growth and FDI in Vietnam during 1996-2005. Their results suggested that the impact of IDE on economic growth in Vietnam would be more important so that additional resources can be invested in education, development of financial markets and reducing the technological gap between foreign and domestic companies. Tiwari and Mutascu (2010) made an empirical analysis of 23 Asian countries during 1986-2008 and showed that FDI and exports allowed countries to improve their economic growth. Furthermore, Adeniyi et al. (2012) examined the link causality between FDI, economic growth and financial development in several small economies during 1970-2005 using a vector error correction model and Granger causality tests. Their results showed that the degree of the financial sophistication is important to benefit from advantages conferred by FDI on the economic growth of the countries included in the study. Soltani and Ochi (2012) investigated the long-term relationship between FDI and economic growth in Tunisia during 1975-2009 using a cointegration approach and found that FDI causes economic growth. Indeed, we can notice that several studies analyzed this relationship, in particular for developing countries. The majority of these studies produced results showing that, relative to other factors, FDI has a significantly positive effect on the economic growth of host countries.

3. Data and Methodology

3.1 Data Sources and Variable Descriptions

This study is based on an annual series of GDP per capita (Y), net inflows of FDI (F), gross fixed capital formation (G) and international trade (T) in Saudi Arabia during 1970-2012. As with many other investigators (Soto, 2000; Alfaro et al., 2004; Li and Liu, 2005), we used FDI as percentage of GDP. The attraction of FDI is also dependent on the degree of integration in the global economy. The opening of an economy is measured by the ratio of imports to exports with regard to the GDP and takes into account the fact that the more open economies tend to be more vulnerable to the loss of access to outside financing (Agénor 2001, p 35). As such, decreases in limitations on commercial transactions with outside sources tend to increase the horizontal FDI in host countries. However, since vertical FDI is considered an investment that does not seek a market, many multinationals prefer to focus on economies that are more open. These data were obtained from the World Development Indicators (2013) of the World Bank. The descriptive statistics for the different variables are shown in Table 1.

Table 1. Descriptive Statistics for the Variables

Variables	F	G	T	Y
Description	Net inflow of foreign direct investment (% of GDP)	Gross fixed capital formation (% of GDP)	Trade (% of GDP)	GDP per capita (constant 2005 US\$)
Mean	1.159	20.291	78.484	14902.47
Median	0.365	20.428	76.852	13078.96
Maximum	8.4963	30.057	124.843	22109.70
Minimum	-8.295	8.917	56.474	10423.19
Std. Dev.	3.149	4.160	13.365	3450.92
Observations	43	43	43	43

3.2 Methodology

This study investigates the dynamic causal relationships between economic growth, FDI, domestic capital investment and international trade in Saudi Arabia using the Johansen cointegration (1991, 1995) framework. This work is based on endogenous growth theory stating that FDI can affect economic growth over the long-term. However, in neoclassical growth theory FDI can affect economic growth only in the short-term through technical progress, which is exogenous.

Johansen's cointegration methodology is used to test for the presence of a long-term equilibrium relationship between FDI, domestic capital investment, international trade and economic growth and it is based on the estimation of the following model given by equation (1):

$$Dy_t = \alpha + \phi c_t + \sum_{i=1}^{K-1} \Gamma_i Dy_{t-i} + \Pi y_{t-K} + \varepsilon_t \quad (1)$$

In this equation D is the first difference, y_t and y_{t-i} include the natural logarithm of per capita GDP, the natural logarithm of gross fixed capital formation, FDI, and trade openness; K is the order, α is the intercept, C_t represents the trend term and ε is the error term. The rank of the matrix Π determines the number of cointegrating vectors that exist among the variables. In this context, Johansen (1991, 1995) propose two cointegration tests: the trace test and maximum eigenvalue test.

If cointegration is detected between the variables, a Vector Error Correction (VEC) model may be used to estimate the cointegrating equation. Before testing for the existence of a cointegration relationship, augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests of stationarity are employed (Dickey and Fuller, 1981; Phillips and Perron, 1988). In the case where these unit root tests reveal that the variables contain one unit root, the appropriate method is to transform the data by differencing the variables prior to investigation. When the variables are integrated and have the same order of integration, we say that they can be cointegrated (Engle and Granger, 1987). The presence of a cointegrating relationship forms the basis of VEC specification presented as follows:

$$Dy_t = \alpha + \lambda ECT_{t-1} + \beta Dy_{t-1} + \varepsilon_t \quad (2)$$

Where ECT is the lagged error-correction term(s) derived from the long-term cointegrating relationship. The λ coefficients of the ECTs represent the deviation of the dependent variables from the long-run equilibrium. In cointegration test, the ECT_{t-1} measures the speed of adjustment of the short run to the long run. Hence, the coefficient of the speed of adjustment has to have a negative sign and its magnitude should not be greater than unity. The short run estimation is carried using the first difference of the variables and the ECT_{t-1} .

Finally, Granger causality tests are used to check for the directions of causality between the different variables in the long and short terms (Granger, 1988). The Granger causality testing procedure involves testing the significance of the lagged independent variable coefficient β , which can be implemented using a standard χ^2 Wald test. Using ECT, an error correction model offers an alternative test of causality (or weak exogeneity of the dependent variable). The significance of λ indicates that the long-run equilibrium relationship is directly driving the dependent variable.

4. Empirical Results

We analyzed the dynamic causal relationships between economic growth, FDI, domestic capital investment and internal trade in Saudi Arabia using the Johansen cointegration framework described above. The results of this analysis are presented in this section.

4.1 Results of Unit Root Tests

The unit root tests were performed at both levels and first differences in the four variables by estimating the three models (model with constant and trend, model without trend and model without constant and trend). The results of the Augmented Dickey-Fuller and Phillips-Perron unit root tests for the levels of the variables are shown in Table 2. They reveal that the natural logarithms of per capita GDP and domestic capital investment, as well as the net inflows of FDI and international trade openness are not stationary. However, Table 3 shows that all of the variable first differences are stationary. From these results, we can conclude that the four series are integrated with an order of one.

Table 2. Results of Unit Root Tests on Log Levels of Variables

Variables	ADF Test			PP Test	
	SIC lag	t-Stat	Critical Value at 5%	t-Stat	Critical Value at 5%
Ln(Y)	1	-2.124**	-2.935	0.593213*	-1.948
Ln(G)	0	-2.755**	-2.933	-2.695**	-2.933
F	0	-3.880***	-4.192a	-3.895***	-4.192a
T	0	-0.345	-1.948	-2.962**	-2.933

*model without constant and trend, **model without trend, ***model with constant and trend, a: Critical value at 1%.

Table 3. Results of Unit Root Tests on First Differences of Variables¹

Variables	ADF Test			PP Test	
	SIC lag	t-Stat	Critical Value at 5%	t-Stat	Critical Value at 5%
Ln(Y)	0	-3.323*	-1.949	-3.173*	-1.949
Ln(G)	0	-7.643*	-1.949	-7.670*	-1.949
F	0	-8.265*	-1.949	-10.264*	-1.949
T	0	-10.367*	-1.949	-10.932*	-1.949

*model without constant and trend, **model without trend, ***model with constant and trend

¹ The testing procedure for the different unit root tests is applied to an equation without constant and trend, an equation without trend and an equation with constant and trend. We begin by estimating the last equation and if we find that, the trend is not significant we estimate the equation without trend. If the constant is not significant, we estimate the equation without constant and trend to test for the existence of a unit root.

4.2 Results of Johansen Cointegration Tests

As all variables integrated with an order one, the next step is to use Johansen's tests (trace and maximum eigenvalue tests) to test for the existence of long-run relationships between the studied variables. Both tests are performed for a lag length equal to one (see Table 4). The Akaike information criterion (AIC) gives lag 5 as optimal while the Schwarz information criterion (SIC) gives lag 1 as optimal. When performing the trace and maximum eigenvalue tests, we chose the case 2 assumption where the level data do not have deterministic trends and the long-run equations have constants. Results of these two tests are reported in Tables 5 and 6, respectively. Both tests indicate the existence of at least 3 cointegrating equations at the 5% level, meaning that there is likely a long-term relationship between FDI, economic growth, domestic capital investment and international trade in Saudi Arabia. All tests were performed using Eviews 8 software.

Table 4. Choice of Lag Length for VAR Estimation

Lag length (K)	AIC	SIC
1	7.279	8.115*
2	7.415	8.935
3	6.949	9.167
4	6.261	9.192
5	5.066*	8.723

* Indicates the smallest value of the criterion.

Table 5. Results of Trace Test for Multiple Cointegrating Relationships

Null hypothesis: No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value at 5%	Prob.**
None *	0.618	91.495	54.079	0.000
At most 1 *	0.496	52.985	35.192	0.000
At most 2 *	0.353	25.565	20.261	0.008
At most 3	0.183	8.092	9.164	0.079

Note: Trace test indicates three cointegrating equations at the 5% level.

* denotes rejection of the null hypothesis at the 5% level.

** MacKinnon-Haug-Michelis (1999) p-values.

Table 6. Results of Maximum Eigenvalue Test for Multiple Cointegrating Relationships

Null hypothesis: No. of CE(s)	Eigenvalue	Eigenvalue Statistic	Critical Value at 5%	Prob.**
None *	0.618	38.510	28.588	0.002
At most 1 *	0.496	27.420	22.299	0.008
At most 2 *	0.353	17.472	15.892	0.028
At most 3	0.183	8.092	9.164	0.079

Note: Max-eigenvalue test indicates three cointegrating equations at the 5% level.

* denotes rejection of the null hypothesis at the 5% level.

** MacKinnon-Haug-Michelis (1999) p-values.

4.3 Granger Causality Test Results

The presence of related cointegrations implies the existence of a causal relationship between the variables in at least one direction, although the direction of causality between the different variables was not detected. The directions of causality can be determined through estimation with the VEC model using Granger tests of causality. The main advantage of the VEC model is that it can distinguish between long and short run relationships among variables (Granger, 1988). Long-run causality is determined by the *t*-statistics of ECT coefficients whereas the short-run causality is determined by the joint χ^2 Wald statistics for the lagging explanatory variables in the VEC model.

Table 7 shows the different results for Granger causality tests, which imply that in the short run there is unidirectional causality running from FDI and capital domestic investment to economic growth, unidirectional causality running from trade to FDI and capital domestic investment, bidirectional causality between FDI and capital domestic investment, and bi-directional causality between trade and economic growth. For long run relationships, the ECT coefficient is negative and statistically significant in only the equations where D(LNY) and D(LNG) are dependent variables. These results indicate that, in the long run, there is unidirectional causality running from FDI and trade to economic growth, unidirectional causality running from trade and FDI to domestic capital investment, and bi-directional causality between domestic capital investment and economic growth. In conclusion, FDI, capital domestic investment and international trade promoted economic growth in Saudi Arabia in both the short and long runs, which verifies the FDI-led growth hypothesis for both the long-

and short-term. Finally, we can assert that Saudi Arabian authorities should adopt economic and financial conditions (e.g. reformed and improved commercial policies, restoration of international competitiveness and diversification of exports) to generate marked improvements in the country's economic situation.

Table 7. Granger Causality Results

Dependent variable	Short-run causality				Long-run causality
	D(LNY)	D(LNG)	D(F)	D(T)	ECT
	χ^2 Wald statistics				t-Ratio
D(LNY)	-	4.583**	8.612***	3.283*	-1.966**
D(LNG)	0.592	-	11.483***	40.775***	-2.396**
D(F)	0.015	5.841**	-	4.034**	-1.31
D(T)	2.763*	0.253	1.789	-	0.796

Significance at the 1% level is indicated by ***, the ** 5% level and the * 10% level.

ECT: error correction term in the VEC model. D represents the corresponding variable in first differences.

LNY: natural logarithm of real per capita gross domestic product; LNG: natural logarithm of gross fixed capital formation; F: foreign direct investment; T: international trade.

5. Conclusion

Having reviewed the theoretical and empirical literature on the link between FDI and economic growth, this study used the Johansen cointegration framework to examine empirically this relationship for Saudi Arabia during 1970-2012. FDI inflows can bring important advantages for the country in terms of capital inflows, technology acquisition, training and formation of human resources, job creation and improved development of local companies. In parallel, government policies are necessary to maximize the benefits and minimize the negative effects of FDI, such that FDI inflows positively affect local companies.

The empirical results suggest: (i) the existence of both short- and long-run unidirectional causal relationships running from FDI to economic growth; (ii) a bidirectional causal relationship between domestic capital investment and economic growth in the long term; and (iii) unidirectional causality running from FDI to domestic capital investment. Therefore, an increase in foreign and domestic investments promotes economic growth. In addition, FDI promotes the growth of the domestic investments. Finally, the degree of openness represented by international trade promotes FDI and economic growth in Saudi Arabia, which can be explained by the free movement of capital flows that are a main attraction for FDI.

The results confirm previous findings for the Kingdom Saudi Arabia. This study shows that FDI plays a positive role in stimulating economic growth in Saudi Arabia. The stimulation of growth and economic development in Saudi Arabia requires that certain conditions be satisfied in advance of investment: i) the climate for all types of investment from both foreign and domestic capital be improved; ii) the country attracts foreign investments in sectors beyond hydrocarbons; iii) the level of human resources through training and formation be improved; and iv) administrative procedures are simplified.

The results of this paper can be very interesting for many developing and emerging countries to learn the lesson that the attraction of FDI is important to promote economic growth. However, the majority of previous studies on the causal relationship between FDI and economic growth in MENA countries found no causality between the two variables because the causality depends on many other conditions such as the level of FDI, its nature, the sectors of investments, infrastructure development, financial system development, human capital, etc.

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