



Determinants of Foreign Direct Investment: Empirical Evidence from Saudi Arabia

Heba Gazzaz¹

¹King Abdulaziz University, Kingdom of Saudi Arabia. E-mail: hagazzaz@kau.edu.sa

Abstract

The present study determines the factors affecting foreign direct investment using cross-sectional time-series data over 2000-2017 in the Saudi Arabian region. Moreover, it examines the long-run association of various independent variables with foreign direct investment. The study applies a three-tier process to empirically test the variables under consideration. First, it uses the augmented Dickey-Fuller test to check the stationarity of the trend analysis at the level and at first difference. Second, it uses White heteroscedasticity-consistent standard errors and covariance regression analysis. Finally, it applies Johansen's co-integration analysis. The results indicate that all independent variables significantly affect foreign direct investment except infrastructure and market size at a 5% level of significance, and all the independent variables have a long-run association with foreign direct investment in Saudi Arabia.

Keywords: FDI, Unit-root Test, Co-integration analysis, Saudi Arabia

1. Introduction

Foreign direct investment (FDI) refers to a corporation/company making an investment in a country, which is different from the portfolio investment (i.e., investing money into a country's assets) [1]. In FDI, companies not only induct money, but also inject technology, skills, and knowledge into the economy. FDI benefits the economy as it augments competition in the domestic market, creates new jobs, creates new markets, and aids in increasing tax revenues for the state [1]. Saudi Arabia is one of the largest economies in the Middle East and North Africa (MENA) region. Wright [2] highlighted that Saudi Arabia's economic development had been mainly driven by the increased need for diversification, reformation/creation of new industries, and liberalization to make the market more trustworthy and friendly to the private-investor. Álvarez and Marin [3] highlighted that competition in the global market is one of the factors that drove the Saudi government to enhance FDI. Globalization has underscored for the Saudi Arabian government the significance of integrating capital, technology, managerial skills, and access to foreign markets, driven by FDI, for sustainable economic development [4].

The extant literature highlights various factors that affect FDI; however, the scope of this research pertains to the Kingdom of Saudi Arabia. Previous studies have highlighted various factors that affect the growth of FDI in an economy [5-9]. This research chooses the most commonly cited ones as the independent variables, which include market size, economic freedom/trade openness, infrastructure, inflation rate, research and development and human/intellectual capital. The relationship of each of these factors with FDI in the context of the Saudi Arabian region has been examined in this study.

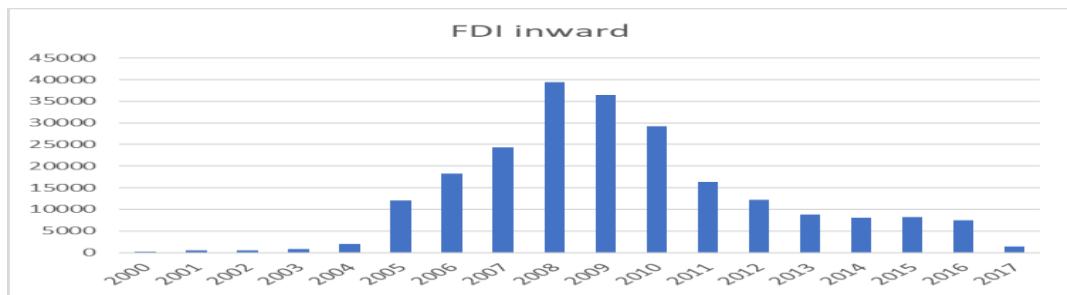


Fig 1: FDI trend in KSA

According to UNCTAD's World Investment Report [10], the FDI inflow trend in Saudi Arabia was downward during 2016 and 2017 (see Figure 1). The economy experienced an 80% decrease in FDI during 2017 (i.e., from \$7.4b in the preceding year to \$1.4b in 2017). The decline can be attributed to negative intra-company loans by MNCs and divestments. Other factors such as social and political tension and a Saudization policy (favoring domestic labor) have also been instrumental in driving negative growth in the country's FDI inflows.

The Saudi government has significantly invested in improving the national infrastructure so it can attract not only FDI but also provide employment opportunities to the national youth. The wide-scale privatization in the wholesale and retail sectors attracted immense FDI in the last decade. To tackle the decline of FDI in 2017, the Saudi government relaxed the entry restrictions on foreign investors in 2018, so that a \$500m investment is now required as opposed to the previous \$1b requirement [11]. The controlled inflation, stable exchange rate, efficient banking sector, and extensive privatization are some of the factors that could drive an increase in FDI inflows [12]. High GDP per capita, low energy costs, and the biggest oil reserves prove Saudi Arabia as a relatively better option for foreign investors in the MENA region [13]. This study aims to explore the various determinants of FDI in the context of the KSA, as have been highlighted by the previous research, to provide a statistically proven and more reliable model for measuring the impact of the primary factors on FDI inflows.

2. Review of Literature

FDI is an integral funding mechanism for capital projects across different countries [14]. This is particularly true for developing countries where the FDI inflow is observed to drive economic growth, meet capital deficits and impose a positive effect on their economies [15-17]. Bekhet and Al-Smadi [18] have also demonstrated that FDI acts as an economic growth stimulator and brings not only capital, but technological skills and the expertise necessary to augment a country's production quality. This is also evident from UNCTAD's statistical reporting, which showed an increase in FDI from 1980 to 2015, when it rose from 54.396m dollars to 1,762.155m dollars, respectively [19]. Empirical studies have used various methods to determine the FDI trends in a country. For example, Anwar and Cooray [20] used ordinary least squares (OLS), generalized method of moments, and panel data to investigate the interaction among gross domestic product (GDP), official development assistance, FDI, and remittances for 103 countries from 1970 to 2011. It showed that remittances and FDI of a country positively impact GDP. It also listed government expenditure, institutional quality, and human capital as FDI incentives. Gui-Diby and Renard [21] applied the generalized least squares method to identify FDI's relationship with industrialization in the African countries from 1980 to 2009. The variables studied include the formation of gross fixed capital, industrialization level, imports, FDI, exports, and the value added to the agricultural sector. The findings of the study showed that the level of industrialization and the market size have no impact on the FDI flow, whereas international trade and the financial sector have a positive impact.

Similarly, Pazienza [22] studied FDI's impact on the environment in 30 countries using OLS, random effects and fixed effects from 1981 to 2005. The studied variables constitute GDP, gross fixed capital formation, literacy ratio, CO2 emissions, trade openness, product, and the surface. The results show that FDI poses no impact on the environment. Likewise, Bekhet and Al-Smadi's [23] study on Jordan analyzed the impact of FDI in the long and short run from 1978 to 2012 using the Granger causality test. It showed that FDI affects the macroeconomic variables in the long run. Lessmann [24] examined FDI's impact on regional inequalities from 1980 to 2009. Lessmann's study included 55 countries and used OLS as well as limited information maximum likelihood to assess the impact. The results show that an increase in FDI is linked to inequalities in low- and middle-income countries.

Tiwari and Mutascu [25] assessed FDI's impact on economic growth. They analyzed 23 Asian countries from 1986 to 2008 using pooled OLS. The determinants of the study included the labor force, FDI, gross capital formation, GDP, and exports. The results revealed that exports and FDI had a positive impact on economic growth. It also suggested that economic development is attained when strategies are export-oriented rather than FDI-oriented.

3. Methodology

The study applies a three-tier process of empirically testing the variables in consideration like Sillah (2015). First, it uses the augmented Dickey-Fuller test [62] to check the stationarity of the trend analysis at level and at first difference (i.e., both the deterministic trend and random walk with drift, or in other words with intercept and deterministic trend).

Second, we use White heteroscedasticity-consistent standard errors and covariance regression analysis and the model variables formed as the following:

$$fdi_gdp = f(exchange_rate, growth_exp, inf, infra, ln_trade_opn, mkt_potential, mkt_size, mm, nat_res)$$

Finally, we apply Johenson's co-integration test to check the long-run association of FDI with the set of independent variables. If a set of variables is co-integrated, then the residuals from a static regression of any one of the variables on all the others will be stationary. If not, then the residuals will be integrated. Thus, Dickey-Fuller tests on the OLS residual set from a static regression provide a way of testing co-integration. Critical values for the augmented Dickey-Fuller test are given in MacKinnon [63]. The unit root Durbin-Watson test can also be used to test co-integration in the residuals from a static regression and is described in Sargan and Bhargava [64].

4. Data Analysis

The present study covers an 18-year period from 2000-2017. The data have been collected from the World Bank and UNCTAD for the Saudi Arabian region.

4.1 Dependent Variable

For the present study, we took the ratio of inward FDI to GDP in percentage as a measure for FDI as the dependent variable.

4.2 Independent Variable

4.2.1. Host country's economy/market size

An economy's GDP growth rate represents its market size. Tintin [26] highlighted that other market size indicators include GDP per capita (representing the purchasing power of residents of home countries), GDP in US dollars, and total population. Asiedu [27] found a statistically insignificant relationship between growth rate/market size and FDI inflows. However, several previous studies [28-30] found that a statistically significant and positive relationship between the size of the economy/market size and FDI inflows. Cuyvers [31] pointed out that investing countries prefer investing in large markets because higher GDP per capita shows higher purchasing power, hence increased propensity to consume. In addition, a bigger market size translates into more development. In the present study, we took the natural logarithm of GDP as a proxy for market size.

4.2.2. Market potential

A country's market potential and population are also recognized as impacting the FDI flow in the country. For example, Petrović-Randelović, Janković-Milić, and Kostadinović [32] showed that market size, growth and population positively and significantly affect the FDI in a country. Bauerle Danzman [33] stated that firms also examine the population statistics of a country, given their preference to invest in countries with a large workforce. In contrast, Mamingi and Martin [34] found that population growth had a negative impact on economic growth in the countries of the Organization of Eastern Caribbean States. Market growth was perceived to have a positive influence on FDI flow. For example, Asongu and Kodila-Tedika [35] demonstrated that real GDP output of a country with an increased initial level of FDI is likely to attract more investment. Accordingly, Ojide, Chigozie and Eke [36] showed a positive influence of economy size and population on FDI in Nigeria from 1970-2011. We took population growth as a measure to determine the market potential.

4.2.3. Trade openness

Trade openness has been considered a key factor that attracts FDI. Previous research [8,26,37,38] has found that trade openness in terms of exports and imports attracts investment opportunities, in turn, increasing FDI inflows. The ratio between the sum of exports and imports and GDP represents trade openness. Closely related to trade openness is economic freedom, which represents the general climate of a foreign country, the quality of institutions, and the host country's economic stability. Gemayel [39], Méon and Sekkat [40], Bengoa and Sanchez-Robles [41] and Quazi [42] have proved that there exists a statistically significant and positive relationship between economic freedom and FDI inflows. Nevertheless, a highly flexible economic environment would significantly encourage FDI inflows. We calculate trade openness as the Ln (ratio of exports and imports to GDP), as another measure that influences FDI in Saudi Arabia. The degree of openness of the economy is also important for FDI (i.e., the more open an economy's trade policy, the more likely it is going to attract FDI). FDI is more directed towards the

tradable sector with potential foreign exchange earnings. In their review of the literature, Moosa and Cardak [43] found either positive or insignificant empirical evidence on the influence of trade openness on FDI. Since Gulf Cooperation Council countries rely heavily on oil exports, trade openness is expected to have a positive influence on FDI. Furthermore, Onyeiwu [44] concluded that trade openness increases FDI flows to the region. Elfakhani and Matar [45] examined FDI inflows in the 19 MENA countries over an 11-year period (1990-2000) and found that the previous year's FDI, country openness, return on investment, membership in the World Trade Organization, and oil-exporting status all have significant and positive effects on FDI inflows to the region.

4.2.4. Growth expectations

Iamsiraroj and Doucouliagos [46] presented a comprehensive review concerning a country's economic growth and FDI, stating a positive correlation between the two. Various other empirical studies have also depicted that the growth of a country acts as an incentive for deriving the FDI [47-49], because investors prefer to be in rapidly growing markets. Factors such as the production cost efficiency, the realization of economies of scale, and production scope are found to be substantially linked to the market size [46]. Thereby, market growth acts as an indicator of market demand attracting increasing FDI. Sultanuzzaman et al. [50] showed that in Sri Lanka market growth improves FDI flows, which leads to improvement in the host country's production. It further helps to improve the product quality, advancing its trade prospects and paving the path for economic development. We took the GDP growth rate as a proxy for growth expectation.

4.2.5. The quality of infrastructure

Infrastructure is another important consideration for foreign investors. Demirhan and Masca [8], Hoang and Goujon [51], Tsen [52] and Kinoshita and Campos [53] identified good infrastructure as one of the priorities for investment consideration in the host countries because effective infrastructure allows foreign investors/multinational corporations to perform their operations efficiently. To measure the quality of infrastructure, various indicators have been employed by previous researchers; for instance, (a) Kinoshita and Campos [53] employed availability of telephone lines and (b) Sahoo and Dash [54] employed indicators like paved roads as a percentage of total roads in the host countries, rail density, electricity consumption in kWh, fixed and mobile telephone line density, and air transport. However, the current study seconds Singhania and Gupta's [55] logic of using power consumption in kWh as an indicator for infrastructure because it serves two purposes: (a) investment in electric power plants shows investment in infrastructure required to support the electric power supply network across different parts of a country and (b) increased electric power supply also shows plants and facilities in the host country are easy to establish. Therefore, Saudi Arabia's electric power consumption expressed in kWh has been employed as an indicator of the quality of the infrastructure in the country.

4.2.6. Inflation rate

The inflation rate indicates the overall health of an economy and the ability of the host country's government and central banks to balance their fiscal budget and restrict money supply in the economy [56]. Measured by the wholesale price index and consumer price index, lower rates of inflation have been found to have positively affected economic growth, which in turn become one of the most significant drivers for FDI inflows [57]. Recent research [58,59] has highlighted that a low inflation rate helps attract FDI inflows because it represents macroeconomic stability and translates into lower cost of operations for foreign companies, and vice versa for economies with higher rates of inflation. However, Cuyvers et al. [31] and Singhania and Gupta [55] have also proven that there exists a mixed conclusion about the impact of inflation rate on FDI inflows in the context of developing economies. In other words, developing economies, which generally have higher rates of inflation, might be able to attract FDI primarily because they exhibit higher growth market potential, which translates into a wider untapped market for foreign companies. Therefore, despite having higher rates of inflation, developing economies continue to attract FDI.

4.2.7. Natural resources

Companies whose operations rely heavily on natural resources and commodities are prone to invest in and acquire firms so as to ensure an efficient and reliable supply of minerals, metals and foodstuffs. This has been driving transnational companies from developed countries to target investment in developing countries with abundant natural resources. Oil-producing countries in sub-Saharan Africa attracted half of the entire FDI directed to poor countries [10] Developing countries are now starting to witness larger flows of cross-border investment. The present study took Ln (oil revenue to GDP) as a proxy to assess the natural resources.

4.2.8. Macro-economic stability

Jabri et al. [60] investigated the determinants of FDI inflows to the MENA region for 1970-2010 using the panel data technique. They found that macro-determinants like openness, economic growth, exchange rate and economic instability have a long-term impact on FDI inflows to the MENA region. The results suggest that economic openness and the economic growth rate increase the entry of FDI into the MENA region while economic instability

and exchange rates appear to have negative effects on the inward FDI flows and can therefore deter foreign investment. In the present study, we measured macro-economic stability by using variables like the GDP growth rate, money supply and exchange rate.

FDI flow in a country is also found to be impacted by the money supply and exchange rate. These two are primary as they help to determine the international competitiveness of a country. For example, Bekhet and Al-Smadi [23] highlighted that trade openness, money supply and GDP have a positive impact on FDI net inflows in Jordan. They revealed a positive impact of these variables on the FDI flow of the country in the long-run due to the frequent circulation of money in the market. Similarly, Danmola [61], using OLS, the Granger causality test and a correlation matrix, showed that volatility in the exchange rate drives FDI, GDP growth and trade openness, leading to the macro-economic stability of a country. They also revealed that the rate of inflation adversely affects a country's growth and that domestic production is likely to contribute to the stability of a country.

5. Results

Table 1 presents the test results of the unit root for the level and first differenced values of the variables. First, we conducted the augmented Dickey-Fuller test for the unit roots for all variables. The results indicate that all variables are non-stationery and are integrated in the order of one I (1).

Table 1. Augmented Dickey-Fuller test statistic

Exogenous: Constant			Exogenous: Constant, Linear Trend	
	t-Statistic	Prob.*	t-Statistic	Prob.*
D(NAT_RES)	-3.79333	0.0128	-3.31221	0.0113
D(EXCHANGE_RATE)	-4.04147	0.0079	-4.15401	0.0244
D(GROWTH_EXP)	-5.09495	0.0013	-5.45281	0.0031
D(INF)	-4.5978	0.0028	-5.18673	0.0041
D(INFRA)	-4.00699	0.0085	-4.42487	0.0153
D(LN_TRADE_OPN_)	-2.2869	0.1872	-2.907	0.1875
D(MKT_POTENTIAL)	0.194329	0.9603	-6.13665	0.0013
D(MKT_SIZE)	-3.46681	0.0238	-3.34267	0.095
D(MM)	-4.23356	0.0055	-4.14598	0.0247
Test critical values:	-3.92035	Test critical values:	1% level	-4.66788
	-3.06559		5% level	-3.7332
	-2.67346		10% level	-3.31035

We have checked for spurious regression, which is why we adopted White heteroscedasticity-consistent standard errors and covariance. The OLS regression results (White heteroscedasticity-consistent standard errors and covariance; see Table 2) confirms that all independent variables are significant except infrastructure and market size at the 5% level. However, we found that exchange rate and growth expectation have negative association with FDI and is significant at the 5% level. Trade openness [27,51,65-68] market potential, natural resources [44,68], money supply, and inflation have positive association with FDI and are significant at the 5% level. R-squared is 89% (adjusted R-squared is 76.9%), indicating that the model fitted well. The F-statistic is also significant at the 1% level, which implies that all the independent variables jointly influence our dependent variables.

Table 2. White heteroskedasticity-consistent standard errors & covariance

Dependent Variable: FDI_GDP				
Sample: 2000 2017				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-213.513	317.5069	-0.67247	0.5202
EXCHANGE_RATE	-0.41946	0.157171	-2.66882	0.0284
GROWTH_EXP	-0.50349	0.213643	-2.3567	0.0462
INF	0.816918	0.315404	2.590072	0.0321
INFRA	-0.18092	0.554515	-0.32627	0.7526
LN_TRADE_OPN_	7.9942	4.082515	1.958156	0.0459
MKT_POTENTIAL	2.562086	1.450789	1.765995	0.0571
MKT_SIZE	6.259244	13.1681	0.475334	0.6473
MM	-0.77631	0.284514	-2.72854	0.0471
NAT_RES	0.41781	0.155029	2.695042	0.0067
R-squared	0.89135	Mean dependent var		2.403889
Adjusted R-squared	0.769118	S.D. dependent var		2.902137
S.E. of regression	1.394483	Akaike info criterion		3.803105
F-statistic	7.292291	Schwarz criterion		4.297756
Prob(F-statistic)	0.005105	Hannan-Quinn criter		3.871311
		Durbin-Watson stat		2.473289

Further, to check the long-run association of these independent variables, we employ Johansen's co-integration test. Since the all the variables are integrated of order one, it implies that the linear summation of these variables will be co-integrated, and there could be as many co-integrating relations as the number of variables in the model. Co-integration means each variable integrated of order one will co-move in constant distances from one another. This co-movement within constant distances from one another aligns with the notion of equilibrium in economics [69]. The results indicate that all the variables have a long-run association with FDI (see Table 3).

Table 3. Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.987937	151.5605	69.81889	0.0915
At most 1 *	0.919963	80.87869	47.85613	0.0000
At most 2 *	0.669457	40.47445	29.79707	0.0021
At most 3 *	0.552567	22.76216	15.49471	0.0034
At most 4 *	0.461198	9.894504	3.841466	0.0017
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.987937	70.68177	33.87687	0.7222
At most 1 *	0.919963	40.40424	27.58434	0.0007
At most 2	0.669457	17.71229	21.13162	0.0141
At most 3	0.552567	12.86766	14.2646	0.0082
At most 4 *	0.461198	9.894504	3.841466	0.0017

6. Conclusion

Natural resources (i.e., oil) are still a strong dominant factor in attracting FDI in the Saudi Arabian region. The results specify that all the assigned variables significantly affect foreign direct investment except infrastructure and market size and all the independent variables have a long-run association with foreign direct investment in Saudi Arabia. Further, it is necessary to frame stronger and more supportive FDI policies to attract investment into the Saudi Arabian economy, which is still in the transition phase of development. More efforts should be made to encourage and stimulate more capital influx into the country.

7. Limitations

We had to drop some of the variables (e.g., taxes and tariffs, research and development, corruption, and political stability) due to insufficient and non-available data. We will try to incorporate these variables into further research. Another limitation of the study is that it covers only one country. Further, more countries should be considered to have generalized results.

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