

# An Examination Into the Causal Links Among Inward FDI Determinants: Empirical Evidence From Jordan

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## Abstract

This paper examined the causal links between inward foreign direct investments (FDI) and its determinants (i.e., gross domestic product, education, trade openness, infrastructure, and technological abilities) for Jordan over (the period 1980 – 2018). The paper used vector error correction model. The results of the study considered that gross domestic product, trade openness, education, infrastructure, and technological abilities are primary engine of inward FDI in (long term and short term). Thus, the results have vital role for the policy makers in Jordan to formulate domestic and foreign policies. This study relied on three essential parts. Firstly, FDI is a significant source of capital that promotes economic growth. Secondly, the question of what are the leading drivers of FDI remains inadequate in the literature. Finally, this research adds to the literature by using different econometrics techniques and long span of yearly time series data.

**Keywords:** inward FDI determinants, Jordan, time-series analysis, VECM

**JEL Classification:** F43, G11, C32

## 1. Introduction

There are many reasons behind the attraction of foreign capitals such as (1) low tax rates (2) macroeconomic stability (3) low levels of corruption and bureaucracy and (4) flexibility in the legislative system. However, there should be inward foreign direct investment (FDI) because of their benefits in increasing economic development in the host country and creating new job opportunities. In addition, it has indirect effects, such as new management, technology transfer, and new production systems.

Therefore, it is necessary to focus on the issue of inward FDI because it is considered a basic pillar for developing countries that face a great shortage of domestic resources in order to accelerate economic development. Thus, studying the determinants of inward FDI in Jordan is imperative for modeling an effective macroeconomic policy to attract FDI inflows. In addition, this paper will discuss several aspects:

Firstly, inward FDI in economies is widely reported in the literature because it is an important and stable source of capital that promotes economic development (Lien & Filatotcher, 2015; Iwasaki & Tokunaga, 2016; Beckmann & Czudaj, 2017; Kayalvizhi & Thenmozhi, 2018; Lee, Alba & Park, 2018; Li, Quan, Stonia & Azar, 2018; Cui & Xu, 2019; Dellis, Sondermann & Vansteenkiste, 2020; Hou, Li, Li & Ouyang, 2020; Sadeghi, Shahrestani, Kiani & Torabi, 2020). Secondly, the main drivers of inward FDI were investigated, because previous literature did not provide sufficient information on this topic. Finally, this research contributes to filling this gap by using different econometrics techniques and long span of yearly time - series data over (the 1980 – 2018 period). However, sections of this paper are divided as follows. In the first section, the theoretical background and review of previous literature are explained. In the second section, an overview of the Jordanian economy is summarized. In the third section, the methodology and results analysis are discussed. In the final section, summary and some policy implications are given.

## 2. Theoretical Background and Literature Review

### 2.1 Theoretical Background

The main objective of seeking FDI is the availability of native natural resources, raw materials, and well trained employees. This is what is mentioned by Dunning (1993) when he classified the determinants of FDI into four parts: (1) seeking of market (2) seeking of resources (3) seeking of efficiency and (4) seeking of motives.

The goal of attracting FDI is to obtain networks that depend mainly on building the maximum cost effective and largest universal production networks. These networks are based on reducing production costs, which are: labor costs, transportation costs and raw material costs. However, the motives seeking or ownership advantages seeking FDI is related with the companies that have significant ownership advantages (i.e., brands, technological products, and research and development expertise).

### 2.2 Literature Review

Bilgili, Tuluca and Dogan (2012) examined the determinants of inward FDI in Turkey. The outcomes showed that the factors of inward FDI (i.e., gross domestic product (GDP) growth, labor cost, and the electricity price growth) significantly influenced inward FDI. Belloumi (2014) examined the association among inward FDI, trade openness, and economic growth in Tunisia for (the 1970 – 2008 period). The study used autoregressive distributed lag (ARDL) approach and vector error correction model (VECM). The results showed the existence of a long-run relationship among variables.

As for Bekhet and Al-Smadi (2015) examined the (long-run and short-run) associations between inward FDI and its determinants (GDP, economic openness, money supply, consumer price index, and stock market index) in Jordan for (the 1978 – 2012 period). The paper employed ARDL approach and VECM. The results showed different equilibrium and causal relationships between inward FDI and its factors. Boateng, Hua, Nisar and Wu (2015) investigated the effect of macroeconomic variables on inward FDI in Norway. They used VECM and the outcomes showed that real GDP, trade openness, and exchange rate had positive effects on inward FDI. In addition, inflation rate, money supply, unemployment rate, and interest rate had negative effects. Kinuthia and Murshed (2015) examined the determinant of inward FDI in Kenya and Malaysia for (the 1960 – 2009 period) using VECM. The findings showed that Malaysia is more successful in attracting FDI compared to Kenya.

Abdoul and Hammami (2017) investigated the causal relations among FDI, environmental quality, and economic development for a group of 17 MENA countries. They used vector autoregressive (VAR) model for (the 1990 – 2012 period). The results showed a unidirectional causality running from inward FDI to economic development. Elheddad (2018) examined the determinants of inward FDI using yearly panel data of six oil dependent countries (United Arab Emirates, Saudi Arabia, Qatar, Oman, Kuwait, and Bahrain). The results revealed that inward FDI is significantly influenced by different determinants. Vo (2018) examined the determinants of inward FDI (i.e., GDP, inflation rate, trade, stock market return volatility, and exchange rate volatility) in Vietnam. The results showed that inward FDI was significantly influenced by its determinants.

Economou (2019) investigated the effect of market size, economic freedom, fixed capital formation, and unit labor cost on inward FDI. The study covered four European countries (i.e., Spain, Portugal, Italy, and Greece) over (the 1996 – 2017 period). The results indicated positive influence of fixed capital formation, market size, and economic freedom on inward FDI. In addition, a negative consequence of unit labor costs was found on inward FDI. Muhammad and Khan (2019) investigated the determinants of economic growth using generalized method of moments in 34 Asian countries. The results revealed that FDI inflows and outflows, energy consumption, fixed capital formation, and carbon dioxide emissions affected economic development. Tsitouras, Mitrakos, Tsimpida, Vlachos, and Bitzenis (2019) examined the determinants of inward FDI (i.e., trade openness, education, infrastructure, technological abilities, and real GDP) in Greece for (the 1980 – 2016 period). The study employed VECM and the results indicated long-run relationships between variables.

## 3. Jordan's Economic Overview

According to the report of the World Bank (2019a), Jordan has implemented fundamental improvements that are, announcing new guidelines to manage aspects of financial dealings, such as liquidation, public procurement, and numerical payments. In doing so, Jordan is currently one of the top 20 performers in the World Bank's 2020 doing business report (World Bank, 2019a). Figure 1 shows that FDI started at a value of 1.88% in 1975 and remained increasing till the highest point in 2006 at a value of 23.5%. After that, the FDI decreased dramatically in 2018 at a value of 2.24%. Figure 2 displays that GDP registered the highest value in 2018 amounted to JD28.96 Billion. In fact, the crises in neighboring countries (i.e., Iraq and Syria) caused arrivals of refugees, greater education and health costs,

and raise unemployment rates. The unemployment rate increased progressively from 18.7% in the second quarter of 2018 to 19.2% in the same quarter of 2019 (World Bank, 2019a).

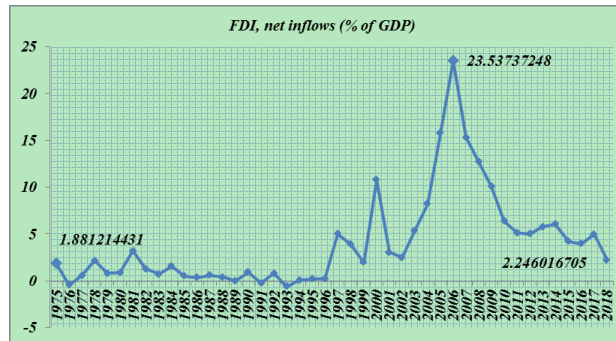


Figure 1. FDI, Net Inflows (% of GDP) for the Period, 1975-2018

Source: World Bank (2019b).

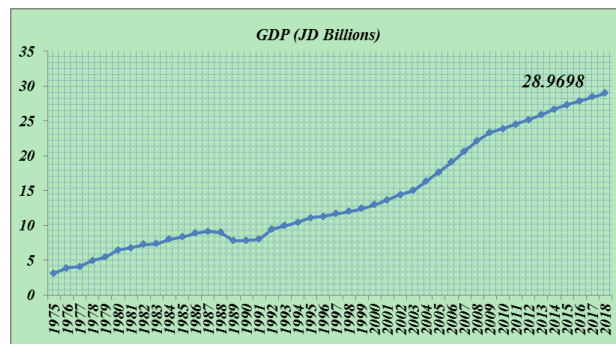


Figure 2. GDP (JD Billions) for the Period, 1975 – 2018

Source: World Bank (2019b).

#### 4. Methodology and Results Analysis

The main purpose of this study is to examine co-integration and causal relationships between inward FDI and its determinants in Jordan for (the 1980 – 2018 period). The determinants of inward FDI that have been used in this study are; gross domestic product (GDP), trade openness (TO), education (E), infrastructure (I), and technological capabilities (TC). The justification of using these determinants is based on the type of inward FDI determinants (see Table 1).

The following model explains the determinants of inward FDI in Jordan for (the 1980 – 2018 period):

$$FDI_t = f (GDP_t, TO_t, E_t, I_t, TC_t) \tag{1}$$

All the variables in the previous equation are converted into natural logarithms specification to present the following multiple regressions:

$$\text{Log}FDI_t = \alpha_0 + \alpha_1\text{Log}GDP_t + \alpha_2\text{Log}TO_t + \alpha_3\text{Log}E_t + \alpha_4\text{Log}I_t + \alpha_5\text{Log}TC_t + \varepsilon_t \tag{2}$$

Different econometrics steps are applied to investigate causal and co-integration relationships among inward FDI and its determinants. (1) The stationary properties are examined for each variable. (2) The co-integration status is analyzed to inspect long run relationship among variables. (3) The Granger causality test is used to investigate the causality relationships among variables. Table 2 shows that the null hypothesis of a unit root is overruled at the first difference. Hence, the co-integration is tested between variables using Johansen (1988), and Johansen and Juselius (1990). The outcomes in Table 3 show that the null hypotheses of no cointegration are overruled. The presence of co-integration between variables leads to examine causal relationships via the VECM. This model estimates the

causality in the short run through the Wald test, while the causality in the long run is done through the error correction term. The multivariate (p-th) order VECM formulated as follows:

$$\begin{bmatrix} \Delta \text{Log}(FDI_t) \\ \Delta \text{Log}(GDP_t) \\ \Delta \text{Log}(TO_t) \\ \Delta \text{Log}(E_t) \\ \Delta \text{Log}(I_t) \\ \Delta \text{Log}(TC_t) \end{bmatrix} = \begin{bmatrix} \alpha_{1t} \\ \alpha_{2t} \\ \alpha_{3t} \\ \alpha_{4t} \\ \alpha_{5t} \\ \alpha_{6t} \end{bmatrix} + \sum_{i=1}^{k-1} \begin{bmatrix} \beta_{11i} & \beta_{12i} & \beta_{13i} & \beta_{14i} & \beta_{15i} & \beta_{16i} \\ \beta_{21i} & \beta_{22i} & \beta_{23i} & \beta_{24i} & \beta_{25i} & \beta_{26i} \\ \beta_{31i} & \beta_{32i} & \beta_{33i} & \beta_{34i} & \beta_{35i} & \beta_{36i} \\ \beta_{41i} & \beta_{42i} & \beta_{43i} & \beta_{44i} & \beta_{45i} & \beta_{46i} \\ \beta_{51i} & \beta_{52i} & \beta_{53i} & \beta_{54i} & \beta_{55i} & \beta_{56i} \\ \beta_{61i} & \beta_{62i} & \beta_{63i} & \beta_{64i} & \beta_{65i} & \beta_{66i} \end{bmatrix} \begin{bmatrix} \Delta \text{Log}(FDI_{t-1}) \\ \Delta \text{Log}(GDP_{t-1}) \\ \Delta \text{Log}(TO_{t-1}) \\ \Delta \text{Log}(E_{t-1}) \\ \Delta \text{Log}(I_{t-1}) \\ \Delta \text{Log}(TC_{t-1}) \end{bmatrix} + \begin{bmatrix} \lambda_{1t} \\ \lambda_{2t} \\ \lambda_{3t} \\ \lambda_{4t} \\ \lambda_{5t} \\ \lambda_{6t} \end{bmatrix} [ECT_{t-1}] + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \end{bmatrix} \tag{3}$$

Table 1. Variables definitions and sources

Variable	Notation	Type of inward FDI determinant	Expected effect	Source and website
Inward FDI (millions JD).	FDI			
Gross domestic product, market size (billions JD).	GDP	Seeking of Market	Positive	
Trade openness (sum of exports and imports) (billions JD).	TO	seeking of Market & Efficiency	Positive	
Education, school enrollment - tertiary (% gross).	E	seeking of Resource & Efficiency	Positive	World Bank (2019b)
Infrastructure, Fixed telephone subscriptions (per 100 folks).	I	Seeking of Resource & Efficiency	Positive	
Technological capabilities, patent applications (residents + nonresidents).	TC	seeking of Ownership advantage	Positive	

Table 2. Results of time series unit root tests

Variables	Ng & Perron		DF & GLS	
	Constant	Constant & trend	Constant	Constant & trend
	Statistics	Statistics	Statistics	Statistics
<b>At levels</b>				
LogFDI <sub>t</sub>	-4.200	-12.32	-0.801	-2.344
LogGDP <sub>t</sub>	-3.123	-13.21	-0.823	-2.112
LogTO <sub>t</sub>	-3.543	-16.21	-1.211	-2.000
LogE <sub>t</sub>	-5.252	-16.46	-1.341	-1.544
LogI <sub>t</sub>	-6.234	-15.56	-1.101	-1.589
LogTC <sub>t</sub>	-6.341	-11.23	-1.466	-2.455
<b>At the first difference</b>				
ΔLogFDI <sub>t</sub>	-7.211*	-18.23*	-2.565*	-5.122***
ΔLogGDP <sub>t</sub>	-10.45**	-20.45**	-5.678***	-3.789**
ΔLogTO <sub>t</sub>	-8.345*	-28.12***	-3.456**	-3.344**
ΔLogE <sub>t</sub>	-15.10***	-22.50**	-4.888***	-6.123***

$\Delta\text{LogI}_t$	-10.23**	-29.10***	-2.459*	-4.156**
$\Delta\text{LogTC}_t$	-8.100*	-24.50**	-2.623*	-3.339**
	Critical values of the Ng & Perron (MZa) test		Critical values of the (DF & GLS) test	
	Constant	Constant & trend	Constant	Constant & trend
1%	-14.90	-26.90	-4.643	-4.870
5%	-9.200	-19.60	-2.954	-3.200
10%	-6.900	-17.30	-1.911	-2.991

Notes: (a) DF-GLS introduced by, Ng and Perron (2001) and Elliot et al. (1996).

(b) \*\*\*, \*\*, and \* denote the significance at: (1%, 5%, & 10%) levels, respectively.

(c) Source: author’s calculation by using the software of Eviews 12.

Table 3. Results of time series co-integration test

Null hypothesis	Trace statistics			Maximal Eigen values		
	value statistics	5% critical values	P-values	value statistics	5% critical values	P-values
$r = 0$	309.23	213.46	0.04**	210.12	190.23	0.03**
$r \leq 1$	210.45	195.45	0.03**	151.21	139.10	0.02**
$r \leq 1$	190.34	160.21	0.02**	131.10	110.23	0.04**
$r \leq 1$	100.67	92.231	0.03**	98.231	92.112	0.05**
$r \leq 1$	68.901	61.134	0.05**	71.101	66.789	0.02**
$r \leq 1$	52.345	43.101	0.05**	51.231	44.124	0.03**

Notes: (a) \*\* denotes the significance at: the (5%) level.

(b) r represents the number of cointegrating relationship among variables.

(c) The lag length, k = 3, is determined by the Akaike Information Criterion, AIC.

(d) Source: author’s calculation by using the software of Eviews 12.

Table 4. Results of time series VECM (Dependent variable is  $\Delta\text{LogFDI}_t$ )

	Short term; Wald test – F-statistics values		Diagnostic tests values	
	Coefficient	P-value	Test	Value
$\Delta\text{LogGDP}_t$	0.301	0.001***	R <sup>2</sup>	0.81
$\Delta\text{LogTO}_t$	0.213	0.043**		
$\Delta\text{LogE}_t$	0.431	0.001***	F-statistics value	619 (0.00)
$\Delta\text{LogI}_t$	0.335	0.002***		
$\Delta\text{LogTC}_t$	0.456	0.001***		
Long term; t-statistics values				
	Coefficient	P-value	Normality test (Jarque Bera)	1.342 (0.211)
$\text{ECT}_{t-1}$	-0.821	0.001***		

Notes: (a) \*\*\*, \*\* denotes the significance at: the (1% level & 5% level), respectively.

(b) The p-values were reported inside parenthesis.

(c) R<sup>2</sup> represents the determination’s coefficient.

(d) Source: author’s calculation by using the software of Eviews 12.

Table 4 reported the results regarding the VECM Granger causality test in (long term and short term), where FDI is the dependent variable. Starting with the long term results, the coefficient of the lagged error correction, -0.821, is statistically significant at the 1% level. Thus, there is a long term causality running from each of gross domestic product, education, trade openness, infrastructure, and technological abilities to inward FDI. Checking out the short term side, there is a causality direction from all variables to inward FDI.

### 5. Summary and Policy Implications

The current paper applied the VECM to examine causal links, long term and short term between inward FDI and its determinants in Jordan for (the 1980 – 2018 period). The findings indicated that gross domestic product (market size), trade openness (exports & imports), education (school enrollment), infrastructure (fixed telephone subscriptions), and technological capabilities (patent applications) stimulate inward FDI in Jordan. In other words, these variables are important drivers for inward FDI in long term and short term. Hence, it is important for legislators in Jordan to adopt national policies which advance the ability of educated local labor force, increase the economic development, and improve infrastructure abilities. In addition, legislators in Jordan should concentrate on removing trade obstacles through establishing a mutual connection between government authorities and entities of foreign private investments.

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